FINANCIAL AND MANAGERIAL ACCOUNTING

Information for Decisions

9e

JOHN J. WILD | KEN W. SHAW

Mc Graw Hill

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Financial and Managerial Accounting

9th edition

INFORMATION FOR DECISIONS

John J. Wild

University of Wisconsin—Madison

Ken W. Shaw

University of Missouri—Columbia

Mc Graw Hill

To my students and family, especially Kimberly, Jonathan, Stephanie, and Trevor.

To my wife Linda and children Erin, Emily, and Jacob.

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About the Authors

Courtesy of John J. Wild

JOHN J. WILD is a distinguished professor of accounting at the University of Wisconsin at Madison. He previously held appointments at Michigan State University and the University of Manchester in England. He received his BBA, MS, and PhD from the University of Wisconsin.

John teaches accounting courses at both the undergraduate and graduate levels. He has received numerous teaching honors, including the Mabel W. Chipman Excellence-in-Teaching Award and the departmental Excellence-in-Teaching Award, and he is a two-time recipient of the Teaching Excellence Award from business graduates at the University of Wisconsin. He also received the Beta Alpha Psi and Roland F. Salmonson Excellence-in-Teaching Award from Michigan State University. John has received several research honors, is a past KPMG Peat Marwick National Fellow, and is a recipient of fellowships from the American Accounting Association and the Ernst and Young Foundation.

John is an active member of the American Accounting Association and its sections. He has served on several committees of these organizations, including the Outstanding Accounting-Educator Award, Wildman Award, National Program Advisory, Publications, and Research Committees. John is author of *Financial Accounting Fundamentals,* Managerial Accounting, *Fundamental Accounting Principles,* and *Financial and Managerial Accounting,* all published by McGraw Hill.

John's research articles on accounting and analysis appear in *The Accounting Review; Journal of Accounting Research; Journal of Accounting and Economics; Contemporary Accounting Research; Journal of Accounting, Auditing and Finance; Journal of Accounting and Public Policy; Accounting Horizons;* and other journals. He is past associate editor of *Contemporary Accounting Research* and has served on several editorial boards including *The Accounting Review* and the *Journal of Accounting and Public Policy.*

In his leisure time, John enjoys hiking, sports, boating, travel, and spending time with family and friends.

Courtesy of Ken W. Shaw

KEN W. SHAW is the KPMG/Joseph A. Silvoso Distinguished Professor of Accounting at the University of Missouri at Columbia. He previously was on the faculty at the University of Maryland at College Park. He has also taught in international programs at the University of Bergamo (Italy) and the University of Alicante (Spain). He received a B.S. in accounting from Bradley University and an MBA and PhD from the University of Wisconsin. He is a Certified Public Accountant with audit experience at KPMG.

Ken teaches managerial and financial accounting. He teaches in online, flipped classroom, and face-to-face modes. He has received numerous School of Accountancy, College of Business, and university-level awards for teaching excellence and for teaching with technology. He is the past advisor to his school's Beta Alpha Psi and Association of Certified Fraud Examiners chapters.

Ken is an active member of the American Accounting Association and its sections. He has served on many committees of these organizations. Ken has presented his research papers at

international and national conferences and workshops. Ken's research appears in the *Journal of Accounting Research; The Accounting Review; Contemporary Accounting Research; Journal of Financial and Quantitative Analysis; Journal of the American Taxation Association; Strategic Management Journal; Journal of Accounting, Auditing, & Finance;* and other journals. He has served on the editorial boards of *Issues in Accounting Education; Journal of Business Research;* and *Research in Accounting Regulation.* Ken is co-author of *Fundamental Accounting Principles, and Managerial Accounting,* all published by McGraw Hill.

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Author note

Applying Learning Science and Data Analytics

Learning science reveals that students better learn and retain information when text is presented in a direct, concise, and systematic manner within a blocked format. Our new edition delivers the content in that format and in fewer pages. Visual aids and numerous demonstrations and videos offer additional learning support. Summary *Cheat Sheets* conclude each chapter to visually reinforce key concepts and procedures, and provide a mapping for students as they search and learn.

Our new edition has over 1,500 videos aimed to captivate students and improve outcomes.

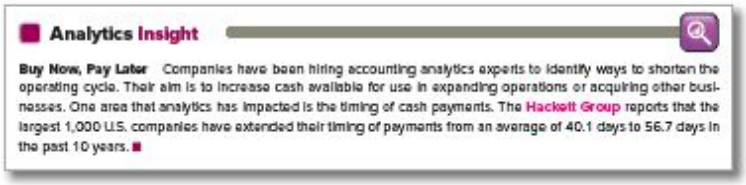
- **Concept Overview Videos**—cover each chapter's learning objectives with multimedia presentations that include interactive Knowledge Checks to engage students and assess comprehension.
- **Need-to-Know Demos**—walk-through demonstrations of key procedures and analysis for each text block to ensure success with assignments and tests.
- **Hint (Guided Example) Videos**—step-by-step walk-through of assignments that mimic Quick Studies, Exercises, and General Ledger assignments. Instructors can turn the Hint on or off for each assignment.

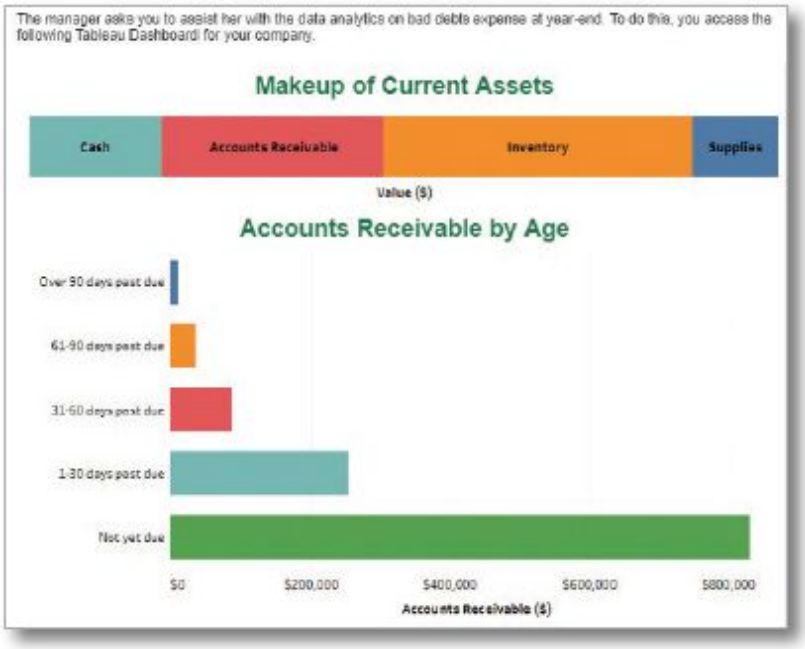
Data analytics and visualizations skills are increasingly in demand. Our new edition has 3 Tableau Dashboard Activities per chapter to develop those skills. They are in Connect and are auto-graded. No knowledge of Tableau or analytics is required. Introductory students can begin immediately.

Tableau Dashboard Activities

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments (1) do not require instructors to know Tableau, (2) are accessible to introductory students, (3) do not require Tableau software, and (4) run in **Connect.** All analytics and visualization activities are familiar to instructors as they consist of introductory accounting concepts and-procedures applied in our current assignments.

A quick study, exercise, and mini-case are available for each chapter. All are auto-gradable. Tableau is a great tool to excite students and show the relevance of accounting.





NEW! Analytics Insight

In an NVP survey of executives, 97% report they are investing in data analytics, big data, and AI. In a Robert Half survey of CFOs, 61% felt that knowledge of data analytics and visualization is mandatory for some or all of their accounting employees. Accounting students with analytics skills are highly sought after and are commanding higher salaries.

Analytics Insight boxes show students the importance of accounting analytics and visualization in business. These boxes educate students on how businesses are utilizing these competencies to improve business decisions.

Accounting Analysis

Accounting Analysis assignments have students evaluate the most current financial statements from Apple, Google, and Samsung. Students compute key metrics and compare performance across companies and the industry.

These three types of assignments—Company Analysis, Comparative Analysis, Extended Analysis—are auto-gradable in **Connect** and are included after Problem Set B in each chapter.

AA 6-2 Key comparative figures for Apple and Google follow.

COMPARATIVE ANALYSIS
A1

	Apple		Google	
$ millions	Current Year	Prior Year	Current Year	Prior Year
Accounts receivable	$ 22,926	$ 23,186	$ 25,326	$ 20,838
Net sales	260,174	265,595	161,857	136,819

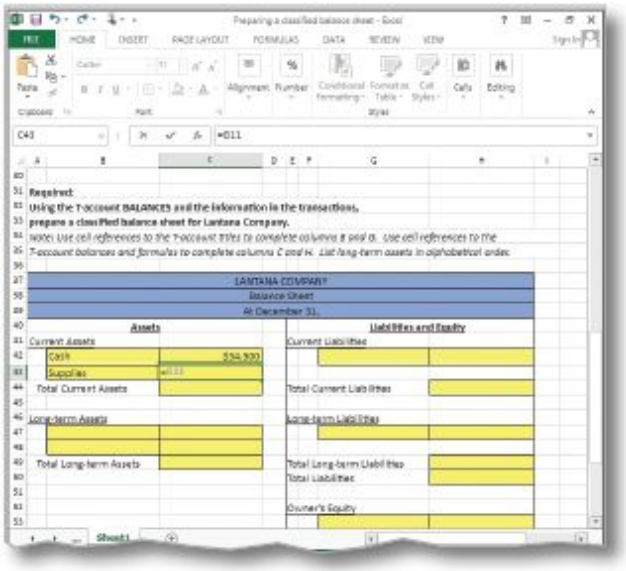
Required

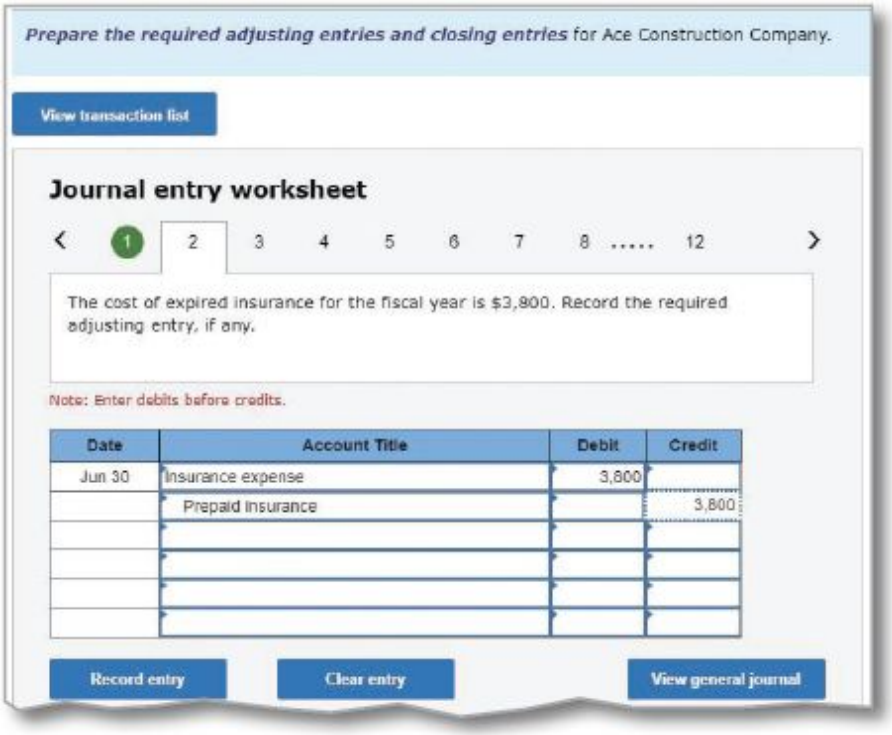
1. Compute days' sales uncollected (rounded to one decimal) for the current year and the prior year for (*a*) Apple and (*b*) Google.
2. Which company had more success collecting receivables?

General Ledger Problems

page v

General Ledger Problems expose students to general ledger software similar to that in practice, without the expense and hassle of downloading additional software. They offer students the ability to record financial transactions and see how these transactions flow into financial statements. Easy minimal-scroll navigation, instant "Check My Work" feedback, and fully integrated hyperlinking across tabs show how inputted data affect each stage of the accounting process. Algorithmic versions are available. **All are auto-gradable.**





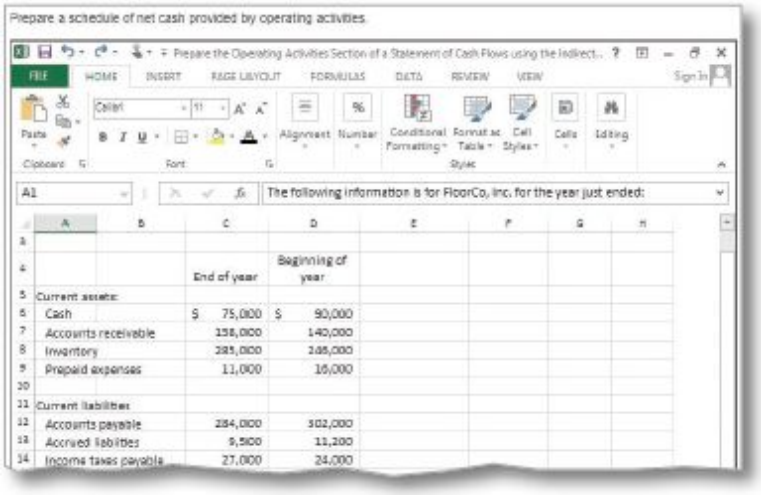
Applying Excel

Applying Excel enables students to work select chapter problems or examples in Excel. These problems are assignable in **Connect** and give students instant feedback as they work through assignments in Excel.

Accompanying Excel videos teach students how to use Excel and the primary functions needed to complete each assignment. Short assessments can be assigned to test student comprehension of key Excel skills.

Excel Simulations

Excel Simulations, assignable in **Connect,** allow students to practice their Excel skills—such as basic formulas and formatting—within the context of accounting. These questions feature animated, narrated Help and Show Me tutorials (when enabled), as well as automatic feedback and grading for both students and professors. These questions differ from **Applying Excel** in that students work in a simulated version of Excel. *Downloading the Excel application is* ***not*** *required to complete Excel Simulations.*



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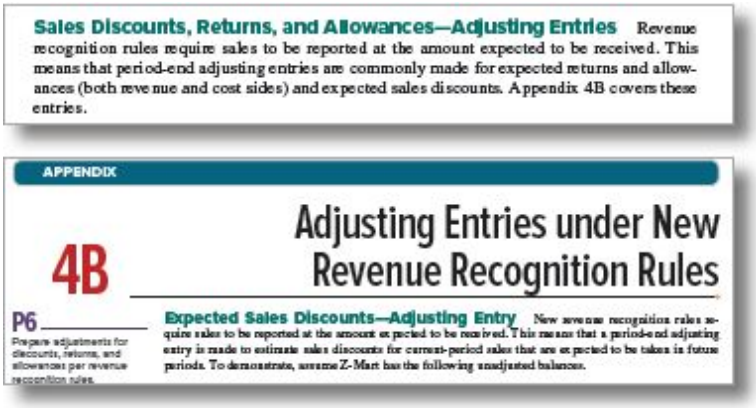


Sales Discounts, Returns, and Allowances—Adjusting Entries Revenue recognition rules require sales to be reported at the amount expected to be received. This means that period-end adjusting entries are commonly made for expected returns and allowances (both revenue and cost sides) and expected sales discounts. Appendix 4B covers these entries.

APPENDIX

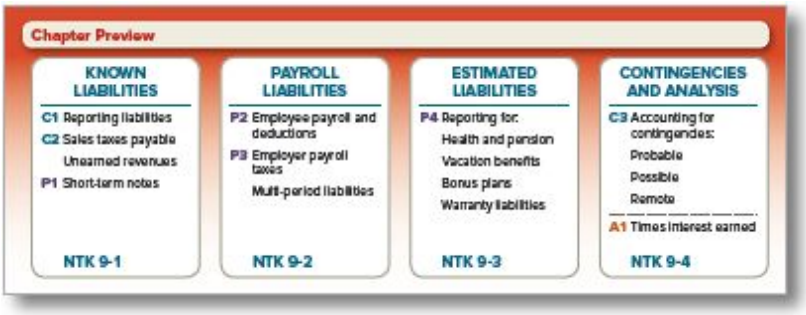
4B

Adjusting Entries under New Revenue Recognition Rules

P6

Prepare adjustments for discounts, returns, and allowances per revenue recognition rules.

Expected Sales Discounts—Adjusting Entry New revenue recognition rules require sales to be reported at the amount expected to be received. This means that a period-end adjusting entry is made to estimate sales discounts for current-period sales that are expected to be taken in future periods. To demonstrate, assume Z-Mart has the following unadjusted balances.



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- 100% of Wild's Accounting Analysis assignments are in **Connect**.

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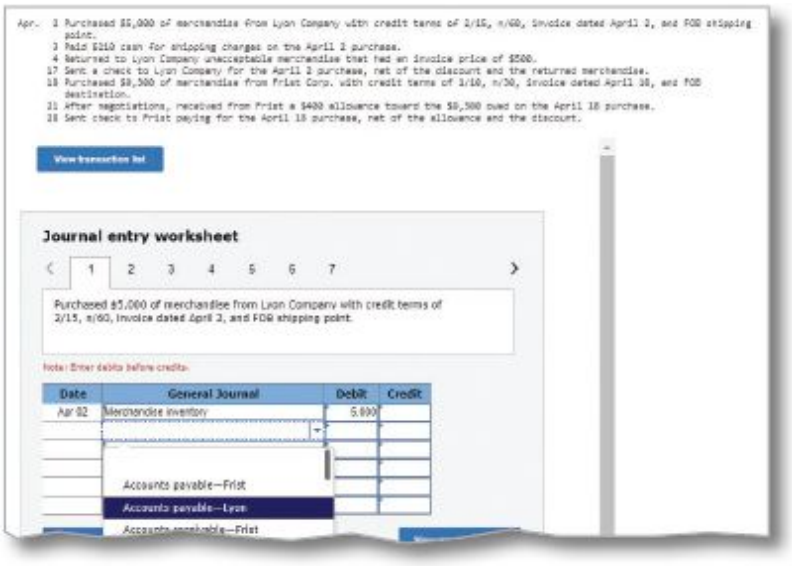

Updated Learning Videos

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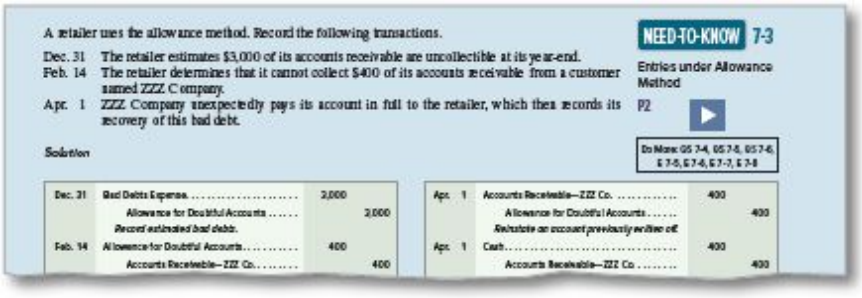
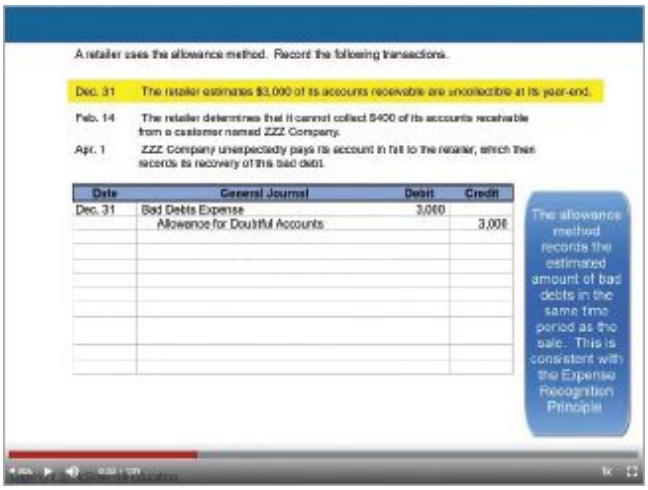
- **Wild offers over 1,500** videos that increase student engagement and improve outcomes.
- Hundreds of **Hint videos** or **Guided Examples** provide a narrated, animated, step-by-step walk-through of most Quick Studies and Exercises similar to those assigned. These short presentations, which can be turned on or off by instructors, provide reinforcement when students need it most. (Exercise PowerPoints are available for instructors.)
- Concept Overview Videos cover each chapter's learning objectives with narrated, animated presentations that frequently assess comprehension using interactive Knowledge Checks. Grading of Knowledge Checks can be turned on or off by instructors.

Need-to-Know Demos

Need-to-Know demonstrations are located at the end of each learning block. There are multiple learning blocks within each chapter. These demonstrations pose questions about the material just presented—content that students "need to know" to learn accounting. Accompanying solutions walk students through key procedures and analyses necessary to be successful with homework and test materials.

Need-to-Know demonstrations are supplemented with narrated, animated, step-by-step walk-through videos led by an instructor, which are available via **Connect**.





Remote Proctoring & Browser-Locking

connect + proctorio

New remote proctoring and browser-locking capabilities, hosted by Proctorio within Connect, provide control of the assessment environment by enabling security options and verifying the identity of the student.

Seamlessly integrated within Connect, these services allow instructors to control students' assessment experience by restricting browser activity, recording activity during assessment, and verifying students are doing their own work.

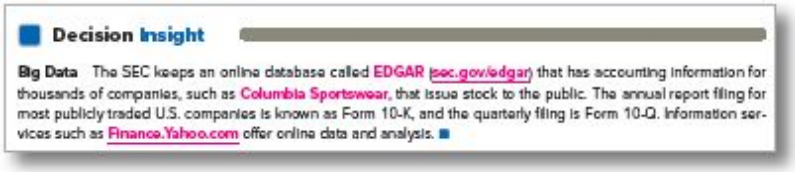
Instant and detailed reporting gives instructors an at-a-glance view of potential academic integrity concerns, thereby avoiding personal bias and supporting evidence-based claims.

Engaging Content . . .

Business Decisions

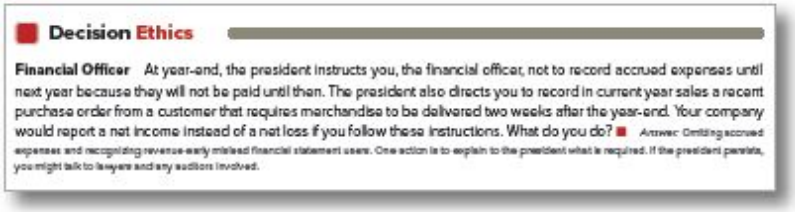
Whether we prepare, analyze, or apply accounting information, one skill remains essential: decision making. To help develop good decision-making habits and to show the relevance of accounting, we use a decision-learning framework.

- **Decision Insight** offers context for business decisions.
- **Decision Ethics** and **Decision Maker** are role-playing scenarios that show the relevance of accounting.
- **Decision Analysis** provides key tools and ratios to assess company performance.



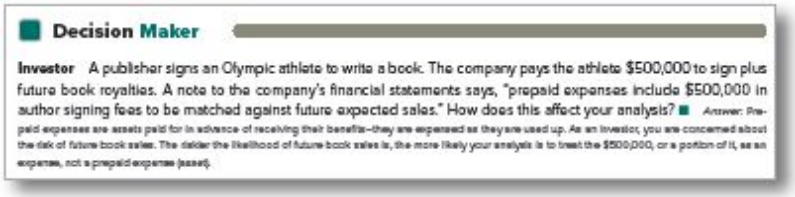
Decision Insight

Big Data The SEC keeps an online database called EDGAR (sec.gov/edgar) that has accounting information for thousands of companies, such as Columbia Sportswear, that issue stock to the public. The annual report filing for most publicly traded U.S. companies is known as Form 10-K, and the quarterly filing is Form 10-Q. Information services such as Finance.Yahoo.com offer online data and analysis. ■



Decision Ethics

Financial Officer At year-end, the president instructs you, the financial officer, not to record accrued expenses until next year because they will not be paid until then. The president also directs you to record in current year sales a recent purchase order from a customer that requires merchandise to be delivered two weeks after the year-end. Your company would report a net income instead of a net loss if you follow these instructions. What do you do? ■ *Answer:* Omitting accrued expenses and recognizing revenue early misled financial statement users. One action is to explain to the president what is required. If the president persists, you might talk to lawyers and any auditors involved.



Decision Maker

Investor A publisher signs an Olympic athlete to write a book. The company pays the athlete $500,000 to sign plus future book royalties. A note to the company's financial statements says, "prepaid expenses include $500,000 in author signing fees to be matched against future expected sales." How does this affect your analysis? ■ *Answer:* Prepaid expenses are assets paid for in advance of receiving their benefits—they are expensed as they are used up. As an investor, you are concerned about the risk of future book sales. The riskier the likelihood of future book sales is, the more likely your analysis is to treat the $500,000, or a portion of it, as an expense, not a prepaid expense (asset).

Inventory Turnover and Days' Sales in Inventory — Decision Analysis

Inventory Turnover

Inventory turnover, also called *merchandise inventory turnover*, is defined in Exhibit 5.13. Inventory turnover tells how many *times* a company turns over (sells) its inventory in a period. It is used to assess whether management is doing a good job controlling the amount of inventory. A low ratio means the company may have more inventory than it needs or is struggling to sell inventory. A very high ratio means inventory might be too low. This can cause lost sales if customers must back-order merchandise. Inventory turnover has no simple rule except to say *a high ratio is preferable if inventory is adequate to meet demand.*

A3

Assess inventory management using both inventory turnover and days' sales in inventory

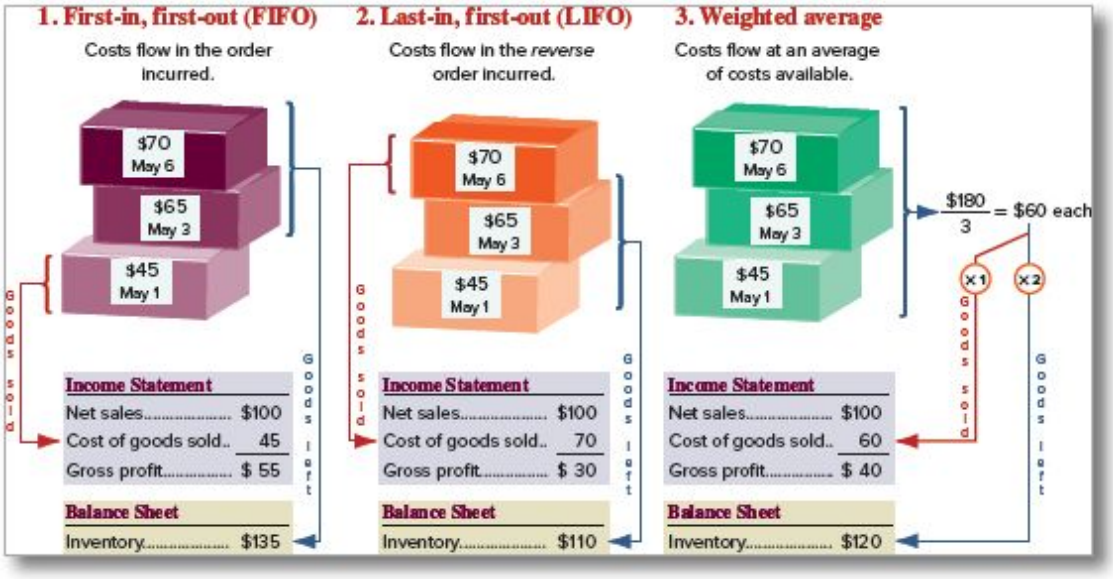
$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

EXHIBIT 5.13

Inventory Turnover

Visual Learning

Learning science tells us today's students learn better with visual aids supporting blocks of text. Wild has adapted to student needs by having informative visual aids throughout. Many visuals and exhibits are new to this edition.



Exercise Presentations

Animated PowerPoints, created from text assignments, enable instructors to be fully prepared for in-class demonstrations. Instructors can use these animated PowerPoints along with their own audio to record personalized online lectures.

Less Is More

Wild is more direct, concise, and systematic than competing books covering the same content.

- The text is to the point and uses visuals to aid student learning.
- Bullet-point discussions and active writing aid learning.

Cheat Sheets

page ix

Cheat Sheets are provided at the end of each chapter to reinforce student learning. Cheat Sheets are roughly one page in length and include key procedures, concepts, journal entries, and formulas.

Summary: Cheat Sheet

MERCHANDISING ACTIVITIES

Merchandise: Goods a company buys to resell.
Cost of goods sold: Costs of merchandise sold.
Gross profit (gross margin): Net sales minus cost of goods sold.
Computing net income (service company vs. merchandiser):

Service Company

Revenues — Minus → Expenses — Equals → Net income

Merchandiser

Net sales — Minus → Cost of goods sold — Equals → Gross profit — Minus → Expenses — Equals → Net income

Inventory: Costs of merchandise owned but not yet sold. It is a current asset on the balance sheet.

Merchandise Cost Flows:

Perpetual inventory system: Updates accounting records for each purchase and each sale of inventory.
Periodic inventory system: Updates accounting records for purchases and sales of inventory only at the end of a period.

MERCHANDISING PURCHASES

Cash discount: A purchases discount on the price paid by the buyer, or a sales discount on the amount received for the seller.
Credit terms example: "2/10, n/60" means full payment is due within 60 days, but the buyer can deduct 2% of the invoice amount if payment is made within 10 days.
Gross method: Initially record purchases at gross (full) invoice amounts.

Purchasing Merchandise for Resale Entries:

Purchasing merchandise on credit	Merchandise Inventory	500	
	Accounts Payable		500
Paying within discount period (Inventory reduced by discount taken)	Accounts Payable	500	
	Merchandise Inventory		10
	Cash		490
Paying outside discount period	Accounts Payable	500	
	Cash		500
Recording purchases returns or allowances	Cash or Accounts Payable	30	
	Merchandise Inventory		30

Transportation Costs and Ownership Transfer Rules:

Shipping Terms	Ownership Transfers at	Goods in Transit Owned by	Transportation Costs Paid by
FOB shipping point	Shipping point	Buyer	Buyer Merchandise Inventory ... # Cash ... #
FOB destination	Destination	Seller	Seller Delivery Expense ... # Cash ... #

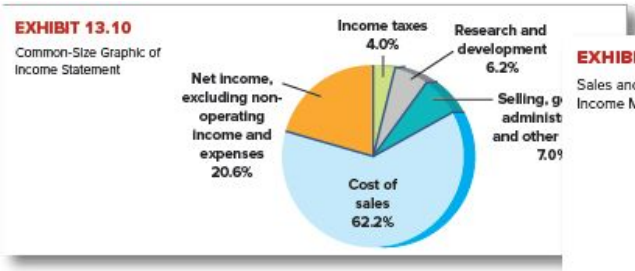
Keep It Real

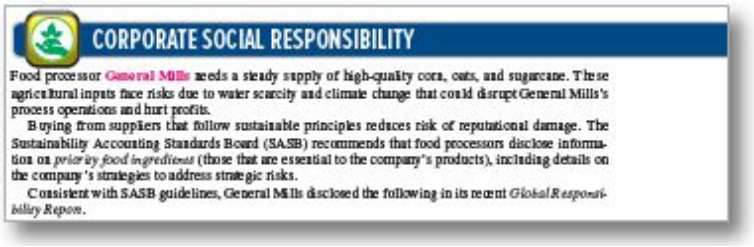
Research shows that students learn best when using current data from real companies. Wild uses the most current data from real companies for assignments, examples, and analysis in the text. See Chapter 13 for samples on the use of real data.

APPLE

GOOGLE

SAMSUNG





CORPORATE SOCIAL RESPONSIBILITY

Food processor General Mills needs a steady supply of high-quality corn, oats, and sugarcane. These agricultural inputs face risks due to water scarcity and climate change that could disrupt General Mills's process operations and hurt profits.

Buying from suppliers that follow sustainable principles reduces risk of reputational damage. The Sustainability Accounting Standards Board (SASB) recommends that food processors disclose information on *priority food ingredients* (those that are essential to the company's products), including details on the company's strategies to address strategic risks.

Consistent with SASB guidelines, General Mills disclosed the following in its recent *Global Responsibility Report*.

Doing What's Right

Companies increasingly issue corporate social responsibility reports, and accountants are being asked to prepare, analyze, and audit them. Wild includes brief Corporate Social Responsibility sections in the managerial chapters that show the importance of corporate social responsibility.

Enhancing Learning . . .

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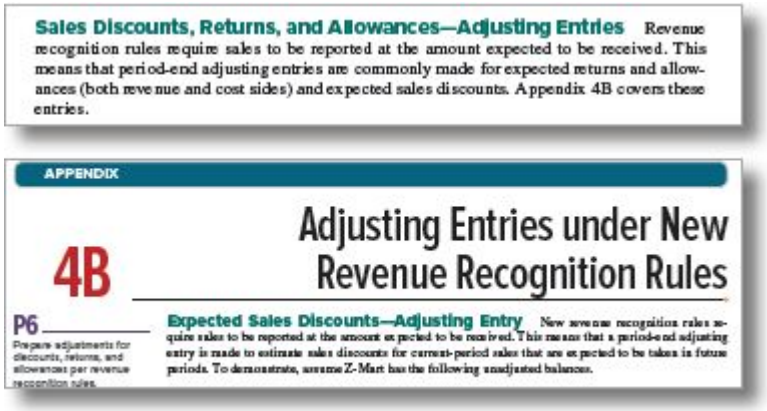

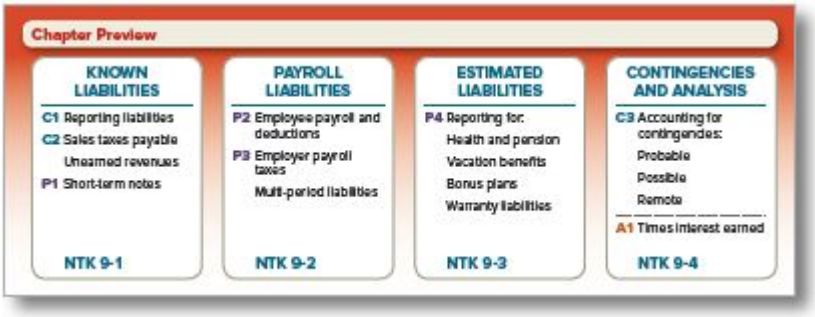

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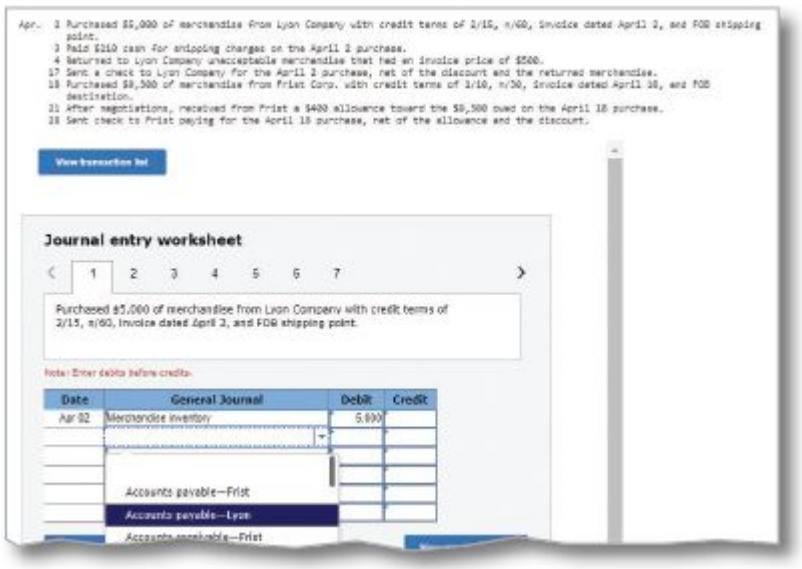

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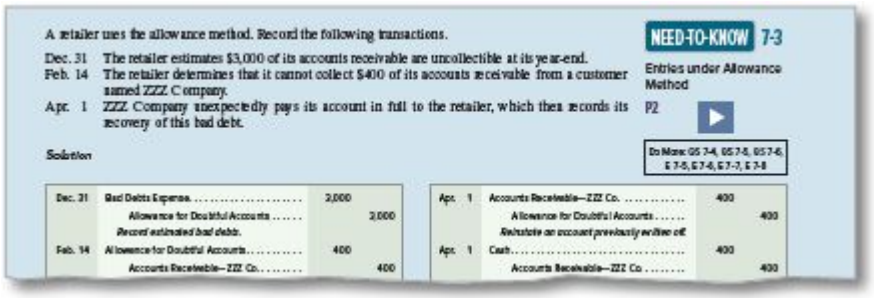
page vii

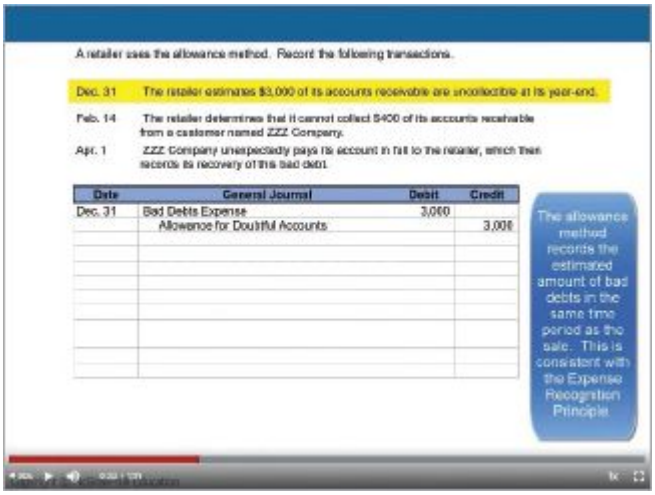
- **Wild offers over 1,500** videos that increase student engagement and improve outcomes.
- Hundreds of **Hint videos** or **Guided Examples** provide a narrated, animated, step-by-step walk-through of most Quick Studies and Exercises similar to those assigned. These short presentations, which can be turned on or off by instructors, provide reinforcement when students need it most. (Exercise PowerPoints are available for instructors.)
- Concept Overview Videos cover each chapter's learning objectives with narrated, animated presentations that frequently assess comprehension using interactive Knowledge Checks. Grading of Knowledge Checks can be turned on or off by instructors.

Need-to-Know Demos

Need-to-Know demonstrations are located at the end of each learning block. There are multiple learning blocks within each chapter. These demonstrations pose questions about the material just presented—content that students "need to know" to learn accounting. Accompanying solutions walk students through key procedures and analyses necessary to be successful with homework and test materials.

Need-to-Know demonstrations are supplemented with narrated, animated, step-by-step walk-through videos led by an instructor, which are available via **Connect**.





Remote Proctoring & Browser-Locking

connect + proctorio

New remote proctoring and browser-locking capabilities, hosted by Proctorio within Connect, provide control of the assessment environment by enabling security options and verifying the identity of the student.

Seamlessly integrated within Connect, these services allow instructors to control students' assessment experience by restricting browser activity, recording activity during assessment, and verifying students are doing their own work.

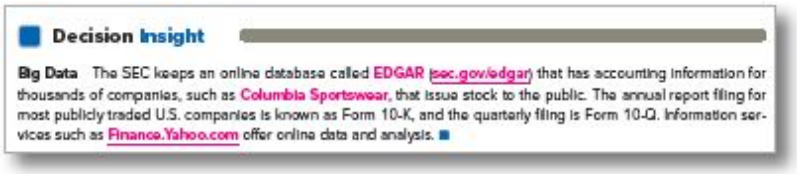
Instant and detailed reporting gives instructors an at-a-glance view of potential academic integrity concerns, thereby avoiding personal bias and supporting evidence-based claims.

Engaging Content . . .

Business Decisions

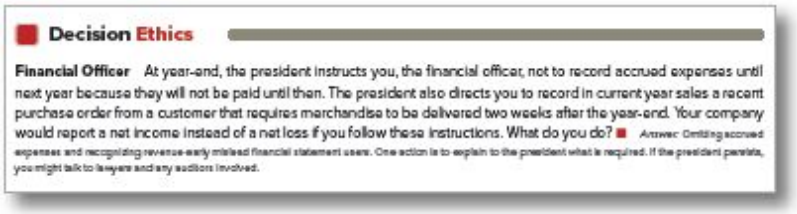
Whether we prepare, analyze, or apply accounting information, one skill remains essential: decision making. To help develop good decision-making habits and to show the relevance of accounting, we use a decision-learning framework.

- **Decision Insight** offers context for business decisions.
- **Decision Ethics** and **Decision Maker** are role-playing scenarios that show the relevance of accounting.
- **Decision Analysis** provides key tools and ratios to assess company performance.



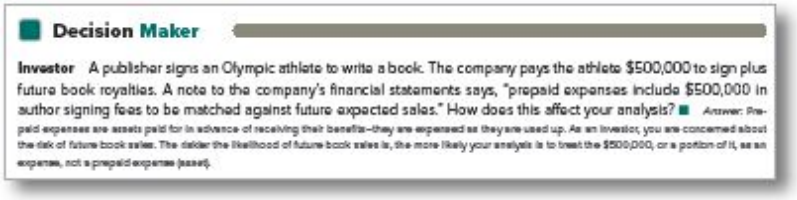
Decision Insight

Big Data The SEC keeps an online database called EDGAR (sec.gov/edgar) that has accounting information for thousands of companies, such as Columbia Sportswear, that issue stock to the public. The annual report filing for most publicly traded U.S. companies is known as Form 10-K, and the quarterly filing is Form 10-Q. Information services such as Finance.Yahoo.com offer online data and analysis. ■



Decision Ethics

Financial Officer At year-end, the president instructs you, the financial officer, not to record accrued expenses until next year because they will not be paid until then. The president also directs you to record in current year sales a recent purchase order from a customer that requires merchandise to be delivered two weeks after the year-end. Your company would report a net income instead of a net loss if you follow these instructions. What do you do? ■ *Answer:* Omitting accrued expenses and recognizing revenue early misled financial statement users. One action is to explain to the president what is required. If the president persists, you might talk to lawyers and any auditors involved.

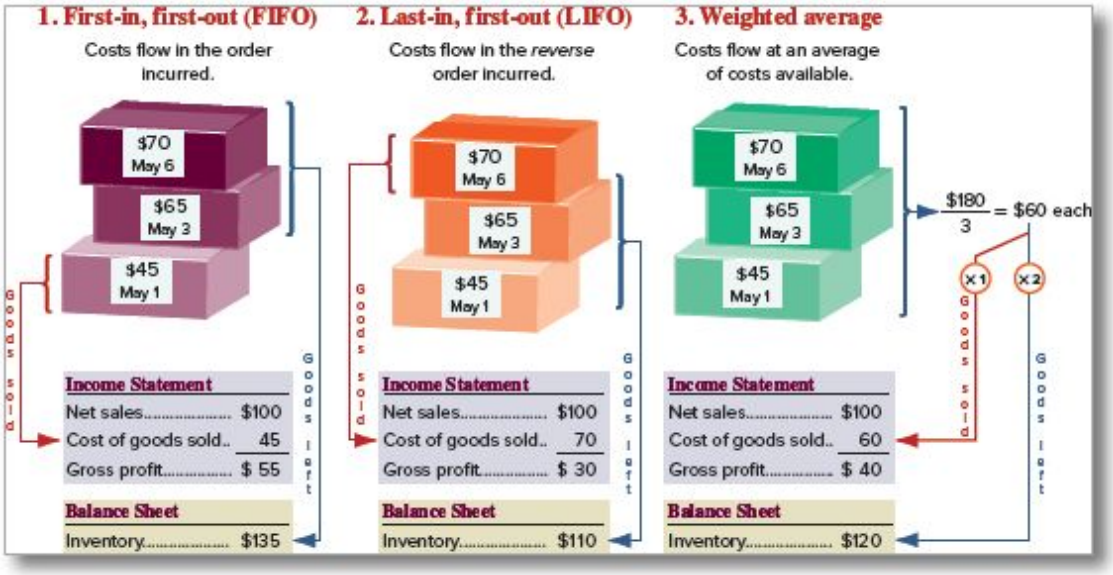


Decision Maker

Investor A publisher signs an Olympic athlete to write a book. The company pays the athlete $500,000 to sign plus future book royalties. A note to the company's financial statements says, "prepaid expenses include $500,000 in author signing fees to be matched against future expected sales." How does this affect your analysis? ■ *Answer:* Prepaid expenses are assets paid for in advance of receiving their benefits—they are expensed as they are used up. As an investor, you are concerned about the risk of future book sales. The dimmer the likelihood of future book sales is, the more likely your analysis is to treat the $500,000, or a portion of it, as an expense, not a prepaid expense (asset).

Visual Learning

Learning science tells us today's students learn better with visual aids supporting blocks of text. Wild has adapted to student needs by having informative visual aids throughout. Many visuals and exhibits are new to this edition.



Exercise Presentations

Animated PowerPoints, created from text assignments, enable instructors to be fully prepared for in-class demonstrations. Instructors can use these animated PowerPoints along with their own audio to record personalized online lectures.

Less Is More

Wild is more direct, concise, and systematic than competing books covering the same content.

- The text is to the point and uses visuals to aid student learning.
- Bullet-point discussions and active writing aid learning.

Cheat Sheets

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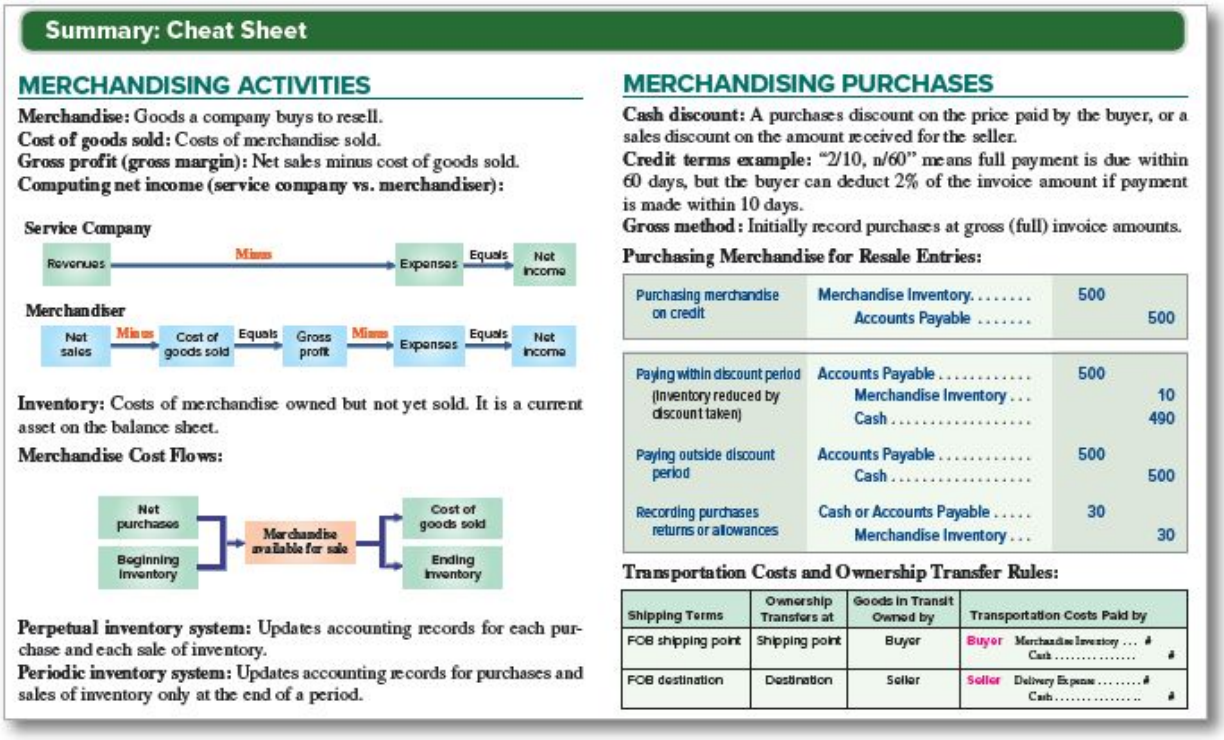
Cheat Sheets are provided at the end of each chapter to reinforce student learning. Cheat Sheets are roughly one page in length and include key procedures, concepts, journal entries, and formulas.



Summary: Cheat Sheet

MERCHANDISING ACTIVITIES

Merchandise: Goods a company buys to resell.
Cost of goods sold: Costs of merchandise sold.
Gross profit (gross margin): Net sales minus cost of goods sold.
Computing net income (service company vs. merchandiser):

Service Company

Revenues — Minus → Expenses — Equals → Net income

Merchandiser

Net sales — Minus → Cost of goods sold — Equals → Gross profit — Minus → Expenses — Equals → Net income

Inventory: Costs of merchandise owned but not yet sold. It is a current asset on the balance sheet.

Merchandise Cost Flows:

Net purchases + Beginning inventory → Merchandise available for sale → Cost of goods sold + Ending inventory

Perpetual inventory system: Updates accounting records for each purchase and each sale of inventory.
Periodic inventory system: Updates accounting records for purchases and sales of inventory only at the end of a period.

MERCHANDISING PURCHASES

Cash discount: A purchases discount on the price paid by the buyer, or a sales discount on the amount received for the seller.
Credit terms example: "2/10, n/60" means full payment is due within 60 days, but the buyer can deduct 2% of the invoice amount if payment is made within 10 days.
Gross method: Initially record purchases at gross (full) invoice amounts.

Purchasing Merchandise for Resale Entries:

Purchasing merchandise on credit	Merchandise Inventory	500	
	Accounts Payable		500
Paying within discount period (Inventory reduced by discount taken)	Accounts Payable	500	
	Merchandise Inventory		10
	Cash		490
Paying outside discount period	Accounts Payable	500	
	Cash		500
Recording purchases returns or allowances	Cash or Accounts Payable	30	
	Merchandise Inventory		30

Transportation Costs and Ownership Transfer Rules:

Shipping Terms	Ownership Transfers at	Goods in Transit Owned by	Transportation Costs Paid by
FOB shipping point	Shipping point	Buyer	Buyer Merchandise Inventory ... # Cash ... #
FOB destination	Destination	Seller	Seller Delivery Expense ... # Cash ... #

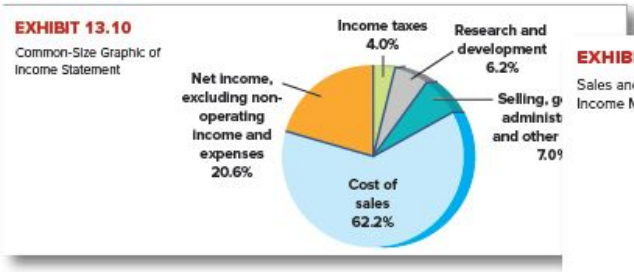
Keep It Real

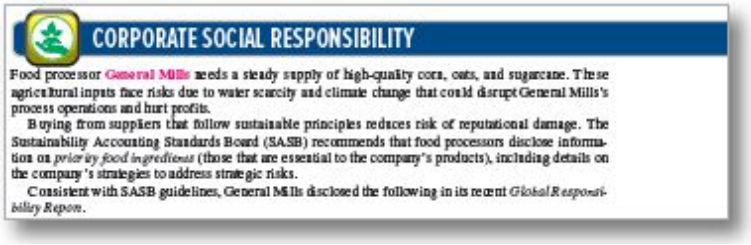
Research shows that students learn best when using current data from real companies. Wild uses the most current data from real companies for assignments, examples, and analysis in the text. See Chapter 13 for samples on the use of real data.

APPLE

GOOGLE

SAMSUNG





CORPORATE SOCIAL RESPONSIBILITY

Food processor General Mills needs a steady supply of high-quality corn, oats, and sugarcane. These agricultural inputs face risks due to water scarcity and climate change that could disrupt General Mills's process operations and hurt profits.

Buying from suppliers that follow sustainable principles reduces risk of reputational damage. The Sustainability Accounting Standards Board (SASB) recommends that food processors disclose information on *priority food ingredients* (those that are essential to the company's products), including details on the company's strategies to address strategic risks.

Consistent with SASB guidelines, General Mills disclosed the following in its recent *Global Responsibility Report*.

Doing What's Right

Companies increasingly issue corporate social responsibility reports, and accountants are being asked to prepare, analyze, and audit them. Wild includes brief Corporate Social Responsibility sections in the managerial chapters that show the importance of corporate social responsibility.

Leading Edge Content . . .

Instructors and students guided this edition's revisions. Those revisions include the following.

- New **Tableau Dashboard Activities** expose students to accounting analytics and visualizations with 3 assignments per chapter.
- New **Analytics Insight** boxes highlight accounting analytics in business.
- New coverage of artificial intelligence, Bitcoin, data analytics, blockchain, and other emerging topics.
- New **Applying Excel** and **Excel Simulations** enhance skills for career readiness.
- Expanded **General Ledger** assignments let students engage with general ledger software tools similar to those in practice.
- Content is up-to-date for GAAP, including revenue recognition, investments, and leases.
- Content is concise and succinct; new edition has fewer pages with no loss of content and text organized into learning blocks.
- More than 211 new assignments—all in Connect with static and algorithmic options.
- Gross method used for merchandising transactions, reflecting practice; adjusting entries for full revenue recognition in appendix.
- **Cheat Sheets** at each chapter-end visually reinforce key chapter content and provide a search map for students.
- Updated Accounting Analysis assignments—all in Connect and auto-gradable—use data from **Apple**, **Google, and Samsung.**
- Auto-gradable Concept Overview Videos for each learning objective.

Chapter 1

NEW opener—**Netflix** and entrepreneurial assignment.
Streamlined conceptual learning objectives.
New sections on AI and analytics in accounting.
Coverage of SOX Act moved to Chapter 6.
New and improved NTK 1-2.
New and simplified NTK 1-5.
Appendices 1A and 1B are now by request only.
Updated return on assets analysis using **Nike** and **Under Armour**.
Added five new Quick Studies.
Added six new Exercises.
Updated analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 2

NEW opener—**Stitch Fix** and entrepreneurial assignment.
Streamlined learning objectives.
New and enhanced Exhibit 2.1 shows the relation between balance sheet accounts.
New Analytics Insight on blockchain ledger.
New and improved NTK 2-4.
Updated debt ratio analysis using **Costco** and **Walmart**.
Added four new Quick Studies.

Added six new Exercises.
Updated analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 3

NEW opener—**Sword & Plough** and entrepreneurial assignment.
Combined learning objectives on adjusted trial balance and financial statements.
New Analytics Insight on accounting for Bitcoin.
Revised and improved NTK 3-6.
Enhanced Exhibit 3.21 simplifies a classified balance sheet.
Revised NTK 3-7 for clarity.
Added twelve new Quick Studies.
Added twenty new Exercises.
Added four new Problems.

Updated profit margin analysis using Visa and Mastercard.
Updated current ratio analysis using Costco and Walmart.
Updated analysis assignments.

Chapter 4

Content complies with revenue recognition rules according to GAAP.
NEW opener—**Kendra Scott** and entrepreneurial assignment.
Streamlined learning objectives.
New Analytics Insight box on extending timing of payments.
Coverage of defective returned goods left to advanced courses.
Updated acid-test ratio and gross margin analysis using **Nike** and **Under Armour**.
Entries for net method of periodic inventory left to advanced courses.
Added four new Quick Studies.
Added one new Exercise.
Updated analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 5

NEW opener—**Amazon** and entrepreneurial assignment.
Streamlined conceptual learning objectives.
New Exhibit 5.1 on shipping terms.
Revised Exhibit 5.4 so that format is consistent for all inventory calculations (which matches Connect).
Revised NTK 5-2 and NTK 5-6 solutions on specific identification for consistency with text and Connect.
Removed income taxes from Exhibits 5.8 and 5A.6 to focus on cost of goods sold impact.
Revised Exhibits 5A.2, 5A.3, 5A.4, and 5A.5 for consistency with Connect and accounting software.
Revised NTK 5-5 and NTK 5-7 solutions for consistency with text.
Updated inventory turnover and the days' sales in inventory analysis using **Costco** and **Walmart**.
Added three new Quick Studies.
Added two new Exercises.

Updated analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 6

NEW opener—**Didi** and entrepreneurial assignment.
New section on blockchain and its implications for accounting.
Revised and improved NTK 6-1.
Enhanced and modernized Exhibit 6.5.
Enhanced and modernized Exhibit 6.6 to be consistent with online banking.
Removed collection expenses and NSF fees—most are immaterial and covered in advanced courses.
Updated days' sales uncollected analysis using **Starbucks** and **Jack in the Box**.
Added five new Quick Studies.
Added one new Exercise.
New Tableau Dashboard Activities: Quick Study, Exercise, and Mini-Case.
Updated analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 7

NEW opener—**Credit Karma** and entrepreneurial assignment.
Removed coverage of store credit cards as nearly all are now managed by banks and accounted for as bank credit cards.
New Analytics Insight on predicting bad debts.
Excel demos to compute maturity dates.
Updated accounts receivable analysis using **Visa** and **Mastercard**.
Added four new Quick Studies.
Added six new Exercises.
Updated analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 8

NEW opener—**SpaceX** and entrepreneurial assignment.
Plant asset impairments left to advanced courses.
Added simple exhibit on reporting natural resources.

Updated asset turnover analysis using **Starbucks** and **Jack in the Box**.
Simplified NTK 8-6 by removing part 6.
Added seven new Quick Studies.
Added two new Exercises.
Updated analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 9

NEW opener—**Zumba** and entrepreneurial assignment.
Updated payroll tax rates and explanations.
New employee and employer payroll taxes summary table.
Revised and simplified NTK 9-3.
Simplified NTK 9-5 by removing part g.
Updated Forms 941, W-2, and W-4 in Appendix 9A.
Added five new Quick Studies.
Added three new Exercises.
Updated analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 10

NEW opener—**Airbnb** and entrepreneurial assignment.
Streamlined learning objectives.
Enhanced explanation of relation between bond issue price, contract rate, and market rate.
Simplified numbers in Exhibit 10.7.
Simplified Exhibit 10.10 on premium bonds.
Simplified numbers in Exhibit 10.11.
Coverage of convertible bonds left to advanced courses.
New section on Installment Notes with Monthly Payments.
Updated debt-to-equity analysis using **Nike** and **Under Armour**.
Bond pricing demos are consistent with text and covered in Appendix 10A.
Simplified numbers in Exhibits 10B.1 and 10B.2.
Added four new Quick Studies.
Added one new Exercise.
Added two new Problems.

Updated analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 11

NEW opener—**Eventbrite** and entrepreneurial assignment.
Streamlined analytical learning objectives.
New Analytics Insight on bots investing in stocks based on erroneous news.
Coverage of retained earnings deficit and liquidating cash dividends left to advanced courses.
Coverage of participating or nonparticipating left to advanced courses.
Revised and simplified statement of equity in Exhibit 11.10.
Updated PE ratio and dividend yield using **Amazon**, **Altria**, **Visa**, and **Mastercard**.
Book value per share computation left to advanced courses.
Revised NTK 11-5 by removing part 2.
Added two new Quick Studies.
Added four new Exercises.
Updated analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 12

Slightly revised infographics on cash flows from operating, investing, and financing.
Updated cash flow on total assets analysis using **Nike** and **Under Armour**.
Added one new Quick Study.
Added two new Exercises.
Updated analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 13

Streamlined conceptual learning objectives.
Updated data for all analyses of **Apple** using horizontal, vertical, and ratio analysis.
Updated comparative analysis using **Google** and **Samsung**.

Updated data visualizations with current data.
Added gross margin ratio to profitability analysis.
Revised and simplified return on equity calculation.
Added seven new Quick Studies.
Added one new Exercise.
Updated analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 14

NEW Opener—**Sweet Tea Cosmetics** and entrepreneurial assignment.
Streamlined learning objectives.
NEW Analytics Insight on **Kickstarter** crowdfunding.
Postponed fixed vs variable cost classifications to later chapters.
NEW Exhibit 14.6 on prime and conversion costs.
Improved Exhibits 14.7 and 14.8 on product versus period costs.
NEW Exhibit 14.9 on cost classifications for service company.
Simplified Exhibit 14.12 on reporting Cost of Goods Sold.
NEW NTK 14-3 on reporting for manufacturers.
Simplified Exhibits 14.13 and 14.15 on cost flows.
Simplified Schedule of Cost of Goods Manufactured in Exhibit 14.14 and 14.15.
New Part B to NTK 14-4 on preparing schedule of cost of goods manufactured.
NEW coverage of digital manufacturing, data analytics, and data visualization.
Revised NTK 14-5.
Added four new Quick Studies, one new Exercise, and one new Problem.
Revised analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 15

NEW Opener—**Wallace Detroit Guitars** and entrepreneurial assignment.
Combined C1 and C2 LOs.
Simplified job order costing example from five jobs to three jobs.

Revised Exhibits 15.2, 15.3, 15.5, 15.6, 15.7, 15.9, 15.10, 15.13, 15.14, 15.16, and 15.17.
Revised NTK 15-1, 15-2 and 15-3.
NEW systematic way to apply estimated overhead costs.
Enhanced Exhibit 15.15 on cost flows.
NEW coverage of financial statements.
Revised Adjusting Overhead section for consistency with Road Warriors example.
NEW Analytics Insight on risk scores for health-care providers.
Revised Decision Analysis section and added *gross profit ratio*.
Enhanced and clarified NTK 15-7.
Added five new Quick Studies, seven new Exercises, one new Problem.
Revised analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 16

UPDATED Opener—**Azucar Ice Cream Company**.
Streamlined learning objectives.
Modernized Exhibit 16.1.
NEW Exhibit 16.2 is simple overview of GenX operations.
Moved coverage of EUP to step 2 of process costing demo.
Simplified process costing demo into 4-steps.
Revised Exhibits 16.7, 16.10 and 16.11 to match Connect assignments.
Simplified Exhibit 16.8 on cost data.
Improved NTKs 16-2, 16-3, 16-5, 16-6 to match Connect assignments.
Renamed Process Cost Summary to Production Cost Report for consistency with practice.
Simplified Production Cost Report in Exhibit 16.11.
NEW coverage of reporting on financial statements.
NEW discussion of computing cost per completed unit.
NEW Analytics Insight on machine learning at **Hershey**.
Revised hybrid costing systems and added manufacturing *yield* to Decision Analysis.
Simplified FIFO process costing demo into 4-steps in Appendix 16A.

NEW section on determining units started and completed for FIFO.
Revised Exhibits 16A.3, 16A.6, and 16A.9 to match Connect assignments.
Simplified Exhibit 16A.7 on cost data.
Improved NTKs 16-8 and 16-9 to match Connect assignments.
Renamed (FIFO) Process Cost Summary to Production Cost Report.
Simplified Production Cost Report in Exhibit 16A.10.
Added three new Quick Studies and five new Exercises.
Revised analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 17

NEW Opener—**Grimm Artisanal Ales** and entrepreneurial assignment.
Streamlined learning objectives.
Revised Exhibit 17.4 (previously 17.5).
Enhanced NTK 17-1 for consistency with assignment materials.
Simplified and improved ABC section.
NEW Exhibit 17.10 gives a step-by-step allocation table for ABC.
Revised NTK 17-2 using new step-by-step allocation approach for ABC.
Postponed Cost of Quality and Lean Manufacturing coverage to later chapters.
Supported ABC for Service Providers with step-by-step allocation example.
NEW NTK 17-3 on ABC for Service Providers.
NEW Analytics Insight on cost allocation at DHL Express.
Improved NTK 17-4 using step-by-step ABC allocation approach.
Enhanced and revised multiple choice quiz.
Three new Quick Studies and eight new Exercises.
Revised analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 18

NEW opener—**SmartSweets** and entrepreneurial assignment.
Streamlined procedural learning objectives.

Removed income taxes and pretax income for clarity.
Postponed coverage of curvilinear costs to advanced courses.
Simplified Exhibit 18.2 on step-wise costs.
Added examples of step-wise costs to Exhibit 18.3.
Revised formula for variable cost per unit using high-low method.
Enhanced NTK 18-2 to show solution in steps.
Added NEW alternative to compute contribution margin ratio.
Simplified Exhibit 18.13 on contribution margin in reporting.
Streamlined CVP changes in estimates for Exhibits 18.15, 18.16 and 18.17.
NEW coverage of sales mix and break-even using *Weighted-Average Contribution Margin per Unit*.
Revised Exhibits 18.27, 18.28, 18.29 for weighted-average contribution margin per unit and contribution margin in dollars.
Revised NTK 18-5 for weighted-average contribution margin per unit.
NEW Analytics Insight on big data at **Amazon**.
Simplified degree of operating leverage formulas in Exhibits 18.31 and 18.32.
Simplified NTK 18-6.
Added six new Quick Studies and four new Exercises.
Revised analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 19

NEW Opener—**Da Bomb** and Entrepreneurial assignment.
Streamlined learning objectives.
Revised account titles in Exhibit 19.4, 19.5, and 19.6 for consistency and simplicity.
Removed *previous edition* Exhibits 19.5, 19.7, and 19.9 based on student and instructor feedback.
Improved NTK 19-2 with more consistent terminology.
Moved 'Converting Income from Variable Costing to Absorption Costing' to Appendix 19A.
Simplified Exhibit 19.9 by shortening the selling and administrative expenses section.

Moved Analyzing Special Orders into text following Setting Target Price section.
Postponed CVP analysis coverage to later chapters.
NEW Decision Analysis section on using Contribution Margin Ratio to make decisions.
Simplified computations in NTK 19-4 to focus on the accounting.
Six new Quick Studies and six new Exercises.

Revised analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 20

NEW opener—**Ellis Island Tropical Tea** and entrepreneurial assignment.
NEW LO on direct labor budget for a service firm and revenue per employee.
Simplified Production Budget in Exhibit 20.6.
Slightly revised direct materials budget in Exhibit 20.7.
Slightly revised direct labor budget in Exhibit 20.8.
Revised NTK 20-3 solution formatting.
Simplified factory overhead budget in Exhibit 20.9.
NEW cost of goods sold budget.
Revised NTK 20-4 solution for consistency with Connect assignments.
Improved schedule of cash receipts from sales in Exhibit 20.14.
NEW table for capital expenditures budget.
NEW tables to budget cash receipts of credit sales and with uncollectibles.
Enhanced schedule of cash payments for direct materials in Exhibit 20.15.
Revised NTK 20-5 solution for consistency with Connect assignments.
NEW Decision Analysis on direct labor budget for service firms and revenue per employee.
Revised NTK 20-6 and 20-7.
Improved merchandise purchases budget in Exhibit 20A.3.
NEW schedule of cash payments for merchandise purchases in Exhibit 20A.4.

Added one new Exercise.
Revised analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 21

NEW opener—**True Fit** and entrepreneurial assignment.
Revised Exhibit 21.1 to better show fixed vs flexible budgets.
Simplified Exhibit 21.2 for a fixed budget performance report.
Simplified Exhibits 21.3 and 21.4.
Added Part B to Need-to-Know 21-1.
Modernized Exhibit 21.5.
Revised cost variance example and tables.
Revised NTK 21-2.
Modified direct labor variances example from 1 direct labor hour per unit to ½ direct labor hour per unit to clarify steps.
NEW Analytics Insight on predictive analysis.
Enhanced and revised NTK 21-4.
Revised Exhibit 21.12 on Flexible Overhead Budget, so that variable overhead rate per unit differs from $1.
NEW section on overhead controllable and volume variances.
NEW formulas for Variable overhead rate and Fixed overhead rate.
Revised Exhibit 21.15 to show volume and controllable variances for overhead.
Revised Exhibit 21.16 to better explain the overhead variance report.
Simplified NTK 21-6.
NEW numbers and exhibits in Appendix 21A.
Expanded and improved NTK 21-7.
Added five new Exercises.
Revised analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 22

NEW opener—**Teysha** and entrepreneurial assignment.
Streamlined conceptual learning objectives.
Removed Appendix A; cost allocations simplified and moved into chapter.

Removed Appendix B; transfer pricing streamlined and moved into chapter.
NEW demo company, Outdoor Gal, with new department examples beginning with Exhibit 22.8.
Reduced five departments to three departments in Departmental Income Statement to simplify demonstration.
Revised Exhibits 22.9, 22.10, 22.11 and 22.12.
Simplified return on investment example and formula in Exhibit 22.13.
Simplified residual income example and formula in Exhibit 22.14.
Combined and updated NTKs 22-3 and 22-4.
Postponed Measurement Issues to advanced courses.
Simplified profit margin and investment turnover examples and formulas in Exhibits 22.15 and 22.16.
Refined balance scorecard in Exhibit 22.18.
Changed joint cost demonstration in Appendix 22A to milk types.
Postponed physical basis allocation to advanced courses.
Added three new Quick Studies and one new Exercise.
Revised analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 23

NEW opener—**Eye Symmetry** and entrepreneurial assignment.
Added *avoidable cost* in distinguishing between relevant and irrelevant costs.
Improved NTK 23-1.
Enhanced Make or Buy analysis with a decision row in Exhibit 23.2.
Revised NTK 23-2.
Enhanced Sell or Process Further demo to focus on one product and to include a decision row in Exhibit 23.3.
Improved Scrap or Rework analysis with a decision row in Exhibit 23.4.
Revised NTK 23-3.
Revised Sales Mix section with electric scooters example.
Updated Exhibit 23.5 to apply new scooters example.
NEW Exhibits 23.6 and 23.7 for sales mix decisions with unlimited and limited demand.

Revised NTK 23-4.
NEW and improved Segment Elimination with Exhibits 23.8, 23.9 and 23.10.
NEW and improved Keep or Replace with Exhibit 23.11.
Revised NTK 23-5.
New visual aid for price takers versus price setters.
New formula for selling price per unit.
New illustration of three-step total cost method to determine price.
Simplified Special Offer analysis and Exhibits 23.12 and 23.13.
Revised NTK 23-6.
Revised and improved Decision Analysis section on Time and Materials Pricing.
Improved NTK 23-7 to include all decision scenarios.
Added two new Quick Studies and three new Problems.
Revised analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Chapter 24

NEW opener—**Gecko Robotics** and entrepreneurial assignment.
Removed income taxes and pretax income for clarity.
Simplified Payback Period with numbers not requiring rounding.
Simplified Payback Period with unequal cash flows from 8 to 5 years.
Revised accounting rate of return formula in Exhibit 24.6.
Simplified calculations for accounting rate of return in Exhibit 24.7.
Revised NTK 24-2 to not require rounding.
Simplified NPV demo from 8 to 3 years in Exhibit 24.8.
Simplified numbers in NPV of annuity in Exhibit 24.9.
Streamlined NPV with unequal cash flows in Exhibit 24.10 by removing Project C.
NEW table on NPV for investments with salvage value.
Postponed accelerated depreciation, inflation, and capital rationing in NPV to advanced courses.
Revised IRR to simplify calculations, limit rounding, and work with App B present value tables.
Postponed Postaudit coverage to advanced courses.
Simplified Break-even time demo from 8 to 5 years in Exhibit 24.14.

Added one new Quick Study, one new Exercise, two new Problems.
Revised analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Appendix A

New financial statements for Apple, Google, and Samsung.

Appendix C

All content updated for new investment rules per GAAP.
Revised and simplified Exhibit C.2 for new standard on investments.
Updated component-returns analysis using **Costco** and **Walmart**.
New Cheat Sheet reinforces chapter content.
Added two new Quick Studies.
Added two new Exercises.
Updated analysis assignments: Company Analysis, Comparative Analysis, and Extended Analysis.

Appendix D

Revised Exhibit D.1 on lean business model.
Updated coverage of lean principles.
Added P2 learning objective on costs of quality and cost of quality report.
Revised Exhibit D.3 on push versus pull production.
NEW section on Lean Overhead Costs and the 80-20 rule.
NEW exhibit with real-world example of using lean techniques to reduce overhead costs.
Revised exhibit on components of cycle efficiency.
NEW example of computing revised days' sales in WIP from lean techniques.
NEW section on costs of quality and cost of quality report.
New Exhibit D.8 on quality costs.
New Exhibit D.9 on a Cost of Quality Report.
Added two new Quick Studies and two new Exercises.

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Chapter Preview is organized by "blocks" of key content and learning objectives followed by Need-to-Know (NTK) guided examples (with video)

Learning Objectives are classified as conceptual, analytical, or procedural

Learning Objectives

CONCEPTUAL

C1 Explain the importance of accounting and identify its users.

C2 Describe the importance of ethics and GAAP.

ANALYTICAL

A1 Define and interpret the accounting equation and each of its components.

A2 Compute and interpret return on assets.

PROCEDURAL

P1 Analyze business transactions using the accounting equation.

P2 Identify and prepare basic financial statements and explain how they interrelate.

Decision Feature launches each chapter showing the relevance of accounting for a real entrepreneur; Entrepreneurial Decision assignment returns to this feature with a mini-case

By the Numbers

"Learn from others' failures"—**REED HASTINGS**

SAN JOSE, CA—Reed Hastings recalls he got the idea for **Netflix (Netflix.com)** after paying a $40 late fee on the movie *Apollo 13.* "I was embarrassed . . . and it got me thinking that there's a big market out there," says Reed. While Netflix started out delivering movies and shows by mail, Reed's college coursework convinced him that Internet streaming was the future. Today, Netflix's video-streaming service accounts for 40% of Internet traffic in the evening hours.

While some of Netflix's success is attributed to a good business idea, much of it is a result of execution. In the early stages, Netflix invested heavily in accounting and data analytics systems. These systems track everything from detailed sales information to how long a customer watches a show. "Being an entrepreneur is about patience and persistence, not the quick buck," claims Reed.

Accounting and data analytics help Netflix make key decisions. For example, Netflix spent $140 million for one season of *The Crown,* which was the most expensive show ever produced. Using sales data and analytics on viewing habits, Netflix predicted the show would be a hit and generate additional sales.

Netflix's accounting analytics also enable it to target customers with personalized content suggestions. Some estimate that this accounting-driven strategy to customer retention adds an additional $1 billion in revenue each year.

While accounting analytics have contributed to success for Netflix, Reed insists business is fun: "For some people, high school graduation is the peak . . . but I find running a company to be a lot more fun and exciting."

Gabriel Aponte/Stringer/Getty Images

Sources: *Netflix website*, January 2021; *Quartz*, August 2017 and February 2017; *Inc.com*, December 2005

IMPORTANCE OF ACCOUNTING

C1

Explain the importance of accounting and identify its users.

Why is accounting so popular on campus? Why are there so many openings for accounting jobs? Why is accounting so important to companies? The answer is that we live in an information age in which accounting information impacts us all.

Accounting is an information and measurement system that identifies, records, and communicates an organization's business activities. Exhibit 1.1 shows these accounting functions.

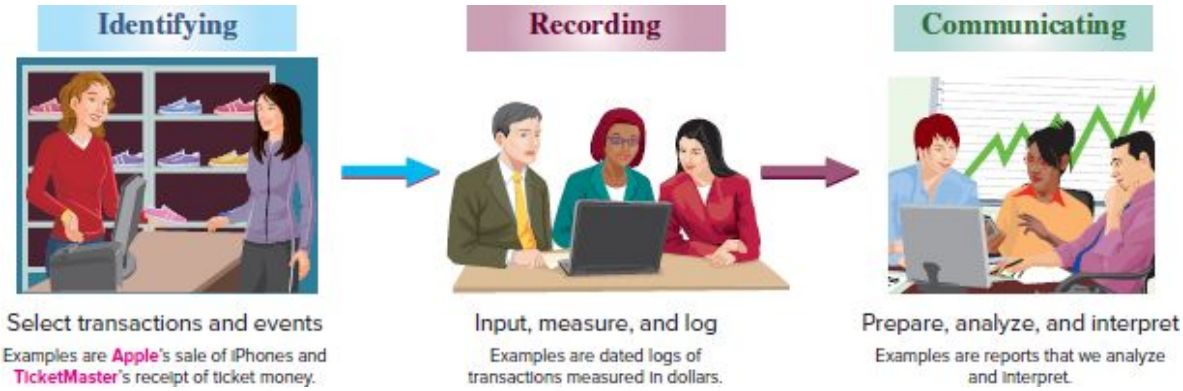


EXHIBIT 1.1

Accounting Functions

Our most common contact with accounting is through credit checks, checking accounts, tax forms, and payroll. These experiences focus on **recordkeeping**, or **bookkeeping**, which is the recording of transactions and events. This is just one part of accounting. Accounting also includes analysis and interpretation of information.

Users of Accounting Information

Accounting is called the *language of business* because it communicates data that help people make better decisions. People using accounting information are divided into two groups: *external users* and *internal users*. **Financial accounting** focuses on the needs of external users, and **managerial accounting** focuses on the needs of internal users.

External Users **External users** of accounting information do *not* directly run the organization and have limited access to its accounting

information. These users get accounting information from general-purpose financial statements. Following is a partial list of external users and decisions they make with accounting information.

Point: The largest accounting firms are EY, KPMG, PwC, and Deloitte.

- *Lenders* (creditors) loan money or other resources to an organization. Banks, savings and loans, and mortgage companies are lenders. Lenders use information to assess if an organization will repay its loans.
- *Shareholders* (*investors*) are the owners of a corporation. They use accounting reports to decide whether to buy, hold, or sell stock.
- *External* (independent) *auditors* examine financial statements to verify that they are prepared according to generally accepted accounting principles.
- *Nonmanagerial* and *nonexecutive employees* and *labor unions* use external information to bargain for better wages.
- *Regulators* have legal authority over certain activities of organizations. For example, the Internal Revenue Service (IRS) requires accounting reports for computing taxes.
- *Voters* and *government officials* use information to evaluate government performance.
- *Contributors* to nonprofits use information to evaluate the use and impact of donations.
- *Suppliers* use information to analyze a customer before extending credit.
- *Customers* use financial reports to assess the stability of potential suppliers.

Internal Users **Internal users** of accounting information directly manage the organization. Internal reports are designed for the unique needs of managerial or executive employees, such as the chief executive officer (CEO). Following is a partial list of internal users and decisions they make with accounting information.

- *Purchasing managers* need to know what, when, and how much to purchase.
- *Human resource managers* need information about employees' payroll, benefits, and performance.
- *Production managers* use information to monitor costs and ensure quality.
- *Distribution managers* need reports for timely and accurate delivery of products and services.
- *Marketing managers* use reports to target consumers, set prices, and monitor consumer needs.
- *Service managers* use reports to provide better service to customers.
- *Research and development managers* use information on projected costs and revenues of innovations.

Opportunities in Accounting

Accounting has four areas of opportunities: financial, managerial, taxation, and accounting-related. Exhibit 1.2 lists selected opportunities in each area.

EXHIBIT 1.2

Accounting Opportunities

Exhibit 1.3 shows that the majority of opportunities are in *private accounting,* which are employees working for businesses. *Public accounting* involves accounting services such as auditing, taxation, and advisory services. Opportunities also exist in government and not-for-profit agencies, including business regulation and law enforcement.

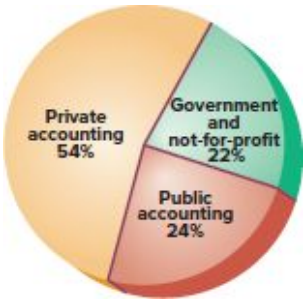


EXHIBIT 1.3

Accounting Jobs by Area

Accounting specialists are highly regarded, and their page 5 professional standing is often denoted by a certificate. Certified public accountants (CPAs) must meet education and experience requirements, pass an exam, and be ethical. Many accounting specialists hold certificates in addition to or instead of the CPA. Two of the most common are the certificate in management accounting (CMA) and the certified internal auditor (CIA). Employers want specialists with designations such as certified bookkeeper (CB), certified payroll

professional (CPP), certified fraud examiner (CFE), and certified forensic accountant (CrFA).

Accounting specialists are in demand. Exhibit 1.4 reports average annual salaries for several accounting positions. Salaries vary based on location, company size, and other factors.

Public Accounting	Salary
Partner	$245,000
Manager (6–8 years)	112,000
Senior (3–5 years)	90,000
Junior (0–2 years)	62,500

Private Accounting	Salary
CFO	$290,000
Controller/Treasurer	180,000
Manager (6–8 years)	98,500
Senior (3–5 years)	81,500
Junior (0–2 years)	60,000

Recordkeeping	Salary
Full-charge bookkeeper	$60,500
Accounts manager	58,000
Payroll manager	59,500
Accounting clerk (0–2 years)	39,500

EXHIBIT 1.4

Accounting Salaries

Artificial Intelligence in Accounting Some estimate that artificial intelligence (AI) could replace 40% of today's workforce in the next decade. Repetitive tasks such as *entering invoice and transaction data* will be done by AI and software. This trend toward more AI integration bodes well for those with accounting knowledge. Accountants will be needed to help develop advanced AI systems and to analyze reports *and graphics* created by AI systems. Because employers recognize these valuable skills, accounting is consistently ranked among the top professions in terms of both future demand and *future earnings.*

Data Analytics and Visualization in Accounting Data analytics and data visualization are among the top skills sought by employers. **Data analytics** is a process of analyzing data to identify meaningful relations and trends. **Data visualization** is a graphical presentation of data to help people understand their significance. In accounting, data analytics and visualization help individuals make informed business decisions. **Dr Pepper Snapple Group** uses data analytics and visualization to send accounting information to its sales route staff via an app in real time. Staff then make data-driven decisions on what sales and promotions to offer retailers. **Tableau Dashboard Activities** *in Connect* offer the opportunity to begin developing such skills.

***NEED-TO-KNOW** have students apply key procedures and concepts; each NTK has a video walkthrough*

NEED-TO-KNOW 1-1

Accounting Users

C1

Identify the following users of accounting information as either an (a) external or (b) internal user.

1. Regulator
2. CEO
3. Shareholder
4. Marketing manager
5. Executive employee
6. External auditor
7. Production manager
8. Nonexecutive employee
9. Bank lender

Solution

1. a **2.** b **3.** a **4.** b **5.** b **6.** a **7.** b **8.** a **9.** a

Do More: QS 1-1, QS 1-2, E 1-1,E 1-2, E 1-3

FUNDAMENTALS OF ACCOUNTING

C2

Describe the importance of ethics and GAAP.

Ethics—A Key Concept

For information to be useful, it must be trusted. This demands ethics in accounting. **Ethics** are beliefs that separate right from wrong. They are accepted standards of good and bad behavior.

Accountants face ethical choices as they prepare financial reports. These choices can affect the salaries and bonuses paid to workers. They even can affect the success of products and services. Misleading information can lead to a bad decision that harms workers and the business. There is an old saying: *Good ethics are good business.* Exhibit 1.5 gives a three-step process for making ethical decisions.

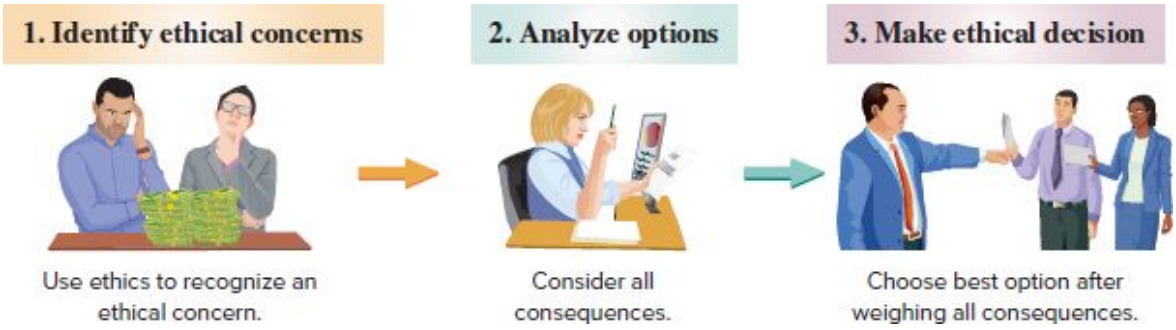


EXHIBIT 1.5

Ethical Decision Making

Fraud Triangle: Ethics under Attack The fraud triangle shows *three* factors that push a person to commit fraud.

- **Opportunity**. A person must be able to commit fraud with a low risk of getting caught.
- **Pressure**, or incentive. A person must feel pressure or have incentive to commit fraud.

- **Rationalization**, or attitude. A person justifies fraud or does not see its criminal nature.

The key to stopping fraud is to focus on prevention. It is less expensive and more effective to prevent fraud from happening than it is to detect it.

To help prevent fraud, companies set up internal controls. **Internal controls** are procedures to protect assets, ensure reliable accounting, promote efficiency, and uphold company policies. Examples are good records, physical controls (locks), and independent reviews. **Auditors** verify the effectiveness of internal controls.

Generally Accepted Accounting Principles

Financial accounting is governed by concepts and rules known as **generally accepted accounting principles (GAAP).** GAAP wants information to have *relevance* and *faithful representation*. Relevant information affects decisions of users. Faithful representation means information accurately reflects the business results.

The **Financial Accounting Standards Board (FASB)** is given the task of setting GAAP from the **Securities and Exchange Commission (SEC).** The SEC is a U.S. government agency that oversees proper use of GAAP by companies that sell stock and debt to the public. An **audit** examines whether financial statements are prepared using GAAP.

International Standards Our global economy demands comparability in accounting reports. The **International Accounting Standards Board (IASB)** issues **International Financial Reporting Standards (IFRS)** that identify preferred accounting practices. These standards are similar to, but sometimes different from, U.S. GAAP. The FASB and IASB are working to reduce differences between U.S. GAAP and IFRS.

Conceptual Framework

The FASB **conceptual framework** in Exhibit 1.6 consists of the-following.

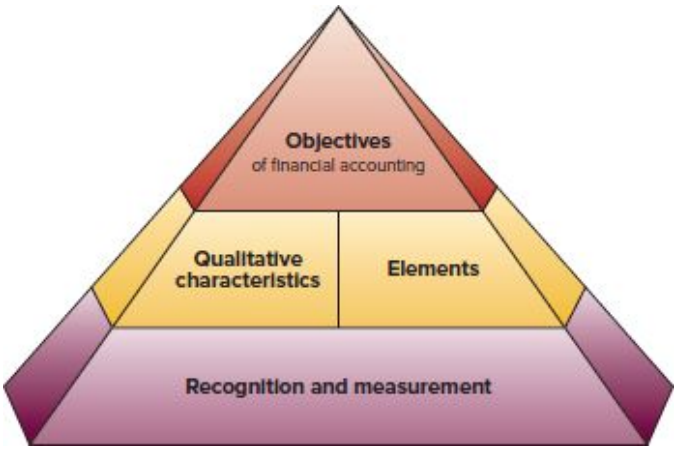


EXHIBIT 1.6

Conceptual Framework

- **Objectives**—to provide information useful to investors, creditors, and others.
- **Qualitative characteristics**—to require information that has *relevance* and *faithful representation.*
- **Elements**—to define items in financial statements.
- **Recognition and measurement**—to set criteria for an item to be recognized as an element; and how to measure it.

Principles, Assumptions, and Constraint There are two types of accounting principles (and assumptions). *General principles* are the assumptions, concepts, and guidelines for preparing financial statements; these are shown in purple font in Exhibit 1.7, along with key assumptions in red font. *Specific principles* are detailed rules used in reporting business transactions and events; they are described as we encounter them.

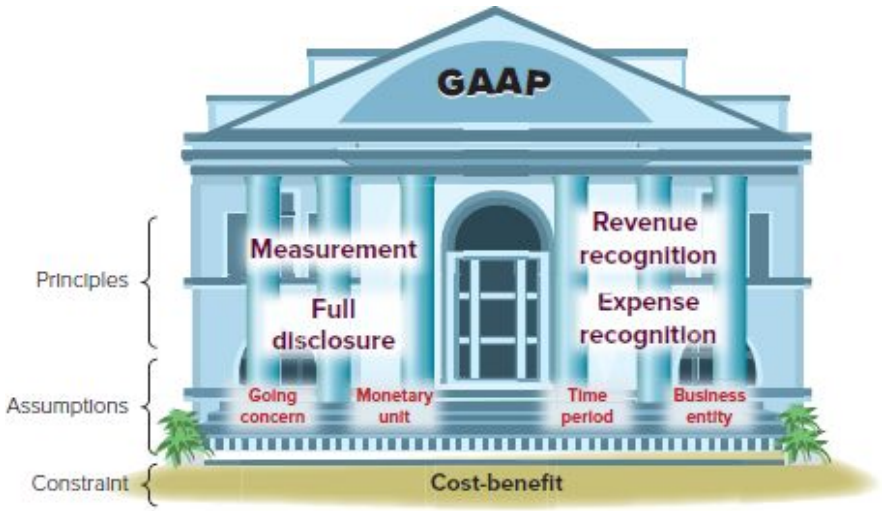


EXHIBIT 1.7

Building Blocks for GAAP

Accounting Principles There are four general principles.

Point: A company pays $500 for equipment. The cost principle requires it be recorded at $500. It makes no difference if the owner thinks this equipment is worth $700.

Example: A lawn service bills a customer $800 on June 1 for two months of mowing (June and July). The customer pays the bill on July 1. When is revenue recorded? Answer: It is recorded over time as it is earned; record $400 revenue for June and $400 for July.

- **Measurement principle (cost principle)** Accounting information is based on actual cost. Cost is measured on a cash or equal-to-cash basis. This means if cash is given for a service, its cost is measured by the cash paid. If something besides cash is exchanged (such as a car traded for a truck), cost is measured as the cash value of what is given up or received. Information based on cost is considered objective. *Objectivity* means that information is supported by independent, unbiased evidence. Later chapters cover adjustments to market and introduce *fair value*.
- **Revenue recognition principle** Revenue is recognized (1) when goods or services are provided to customers and (2) at the amount expected to be received from the customer. Revenue (sales) is the amount received from selling products and services. The amount

received is usually in cash, but it can also be a customer's promise to pay at a future date, called credit sales. (To *recognize* means to record it.)

- **Expense recognition principle (matching principle)** A company records the expenses it incurred to generate the revenue reported. An example is rent costs of office space.
- **Full disclosure principle** A company reports the details page 8 behind financial statements that would impact users' decisions. Those disclosures are often in footnotes to the statements.

Example: Credit cards are used to pay $200 in gas for a lawn service during June and July. The cards are paid in August. When is expense recorded? Answer: If revenue is earned over time, record $100 expense in June and $100 in July.

Accounting Assumptions There are four accounting assumptions.

- **Going-concern assumption** Accounting information presumes that the business will continue operating instead of being closed or sold. This means, for example, that property is reported at cost instead of liquidation value.
- **Monetary unit assumption** Transactions and events are expressed in monetary, or money, units. Examples of monetary units are the U.S. dollar and the Mexican peso.
- **Time period assumption** The life of a company can be divided into time periods, such as months and years, and useful reports can be prepared for those periods.
- **Business entity assumption** A business is accounted for separately from other business entities and its owner. Exhibit 1.8 describes four common business entities.

	Sole Proprietorship	Partnership	Corporation	Limited Liability Company (LLC)
				
Number of owners	1 owner; easy to set up.	2 or more, called *partners;* easy to set up.	1 or more, called *shareholders;* can get many investors by selling **stock** or **shares** of corporate ownership.*	1 or more, called *members.*
Business taxation	No additional business income tax.	No additional business income tax.	Additional corporate income tax.	No additional business income tax.
Owner liability	Unlimited liability. Owner is personally liable for **proprietorship** debts.	Unlimited liability. Partners are jointly liable for partnership debts.	Limited liability. Owners, called **shareholders** (or **stockholders**), are not liable for corporate acts and debts.	Limited liability. Owners, called **members,** are not personally liable for LLC debts.
Legal entity	*Not* a separate legal entity.	*Not* a separate legal entity.	A separate entity with the same rights and responsibilities as a person.	A separate entity with the same rights and responsibilities as a person.
Business life	Business ends with owner death or choice.	Business ends with a partner death or choice.	Indefinite.	Indefinite.

EXHIBIT 1.8

Attributes of Businesses

*When a corporation issues only one class of stock, it is called **common stock** (or *capital stock*).

Accounting Constraint The **cost-benefit constraint,** or **cost constraint,** says that information disclosed by an entity must have benefits to the user that are greater than the costs of providing it. *Materiality,* or the ability of information to influence decisions, is also sometimes mentioned as a constraint. *Conservatism* and *industry practices* are sometimes listed as well.

***Decision Ethics** boxes are role-playing exercises that stress ethics in accounting*

Decision Ethics

Entrepreneur You and a friend develop a new design for ice skates that improves speed but increases risk of injury. You plan to form a business to manufacture and sell the skates. You and your friend want to minimize taxes, but your big concern is potential lawsuits from customers who might be injured on these skates. What form of organization do you set up? ■ *Answer:* You should probably form an LLC. An LLC helps protect personal property from lawsuits directed at the business. Also, an LLC is not subject to an additional business income tax. You must also examine the ethics of starting a business where injuries are expected.

NEED-TO-KNOW 1-2

Accounting Guidance

C2 

Part 1: Identify the accounting principle or assumption that best reflects each situation.

1. AAA Painting performs services for a customer this period. AAA records revenue for this period even though the customer is not billed until next period.
2. Ming Studios purchases camera equipment for $12,000 cash. The owner thinks the equipment is worth $18,000. The equipment is recorded at $12,000.
3. Alfonso owns Consulting LLC. Alfonso keeps personal expenses separate from LLC expenses.

Solution

1. Revenue recognition principle **2.** Measurement principle **3.** Business entity assumption

Part 2: Recommend a business entity type in each situation.

a. An entrepreneur is deciding between a sole proprietorship and an LLC. Two goals are to pay no additional business income tax and to have limited liability.

b. An entrepreneur is deciding between a partnership and a corporation. Two goals are the ability to add many investors by selling shares of ownership and a business with an indefinite life.

Solution

a. LLC **b.**Corporation

Do More: QS 1-3, QS 1-4, QS 1-5, QS 1-6, E 1-4, E 1-5, E 1-6, E 1-7, E 1-8

BUSINESS TRANSACTIONS AND ACCOUNTING

A1

Define and interpret the accounting equation and each of its components.

Accounting shows two basic aspects of a company: what it page 9 owns and what it owes. *Assets* are resources a company owns or controls. The claims on a company's assets—what it owes—are separated into owner (equity) and nonowner (liability) claims. Together, liabilities and equity are the source of funds to acquire assets.

Assets **Assets** are resources a company owns or controls. These resources are expected to yield future benefits. Examples are web servers for an online services company, musical instruments for a rock band, and land for a vegetable grower. Assets include cash, supplies, equipment, land, and accounts receivable. A *receivable* is an asset that promises a future inflow of resources. A company that provides a service or product on credit has an account receivable from that customer.

Point: "On credit" and "on account" mean cash is received or paid at a future date.

Liabilities **Liabilities** are creditors' claims on assets. These claims are obligations to provide assets, products, or services to others. A *payable* is a liability that promises a future outflow of resources. Examples are wages payable to workers, accounts payable to suppliers, notes (loans) payable to banks, and taxes payable.

Equity **Equity** is the owner's claim on assets and is equal to assets minus liabilities. Equity is also called *net assets* or *residual equity*.

Accounting Equation

The relation of assets, liabilities, and equity is shown in the following **accounting equation. The accounting equation applies to all transactions and events, to all companies and organizations, and to all points in time.**

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$

Point: This equation can be rearranged. Example: Assets − Liabilities = Equity

We can separate equity into four parts to get the **expanded accounting equation.**

$$\text{Assets} = \text{Liabilities} + \underbrace{\text{Owner, Capital} - \text{Owner, Withdrawals} + \text{Revenues} - \text{Expenses}}_{\text{Equity}}$$

We see that equity increases from **owner investments**, called *stock issuances*, and from revenues. It decreases from dividends and from expenses. These four parts of equity follow. page 10

+ Owner, Capital	**Owner investments** are inflows of cash and other net assets from owner contributions, which increase equity.
− Owner, Withdrawals	**Owner withdrawals** are outflows of cash and other assets to owners for personal use, which reduce equity.
+ Revenues	**Revenues** increase equity (via net income) from sales of products and services to customers; examples are sales of products, consulting services provided, facilities rented to others, and commissions from services.
− Expenses	**Expenses** decrease equity (via net income) from costs of providing products and services to customers; examples are costs of employee time, use of supplies, advertising, utilities, and insurance fees.

NEED-TO-KNOW 1-3

Accounting Equation

A1

Part 1: Use the *accounting equation* to compute the missing financial statement amounts.

Company	Assets	Liabilities	Equity
Bose	$150	$ 30	$ (a)
Vogue	$ (b)	$100	$300

Solution

a. $120 **b.** $400

Part 2: Use the *expanded accounting equation* to compute the missing financial statement amounts.

Company	Assets	Liabilities	Owner, Capital	Owner, Withdrawals	Revenues	Expenses
Tesla	$200	$ 80	$100	$ 5	$ (a)	$40
YouTube	$400	$160	$220	$ (b)	$120	$90

Solution

a. $65 **b.** $10

Do More: QS 1-7, QS 1-8, E 1-9, E 1-10, E 1-11

Transaction Analysis

P1

Analyze business transactions using the accounting equation.

Business activities are described in terms of transactions and events. **External transactions** are exchanges of value between two entities, which cause changes in the accounting equation. An example is the sale of the *AppleCare Protection Plan* by **Apple**. **Internal transactions** are exchanges within an entity, which may or may not affect the accounting equation. An example is **Target**'s use of its supplies, which are reported as expenses when used. **Events** are happenings that affect the accounting equation *and* are reliably measured. They include business events such as changes in the market value of certain assets and liabilities and natural events such as fires that destroy assets and create losses.

This section uses the accounting equation to analyze 11 transactions and events of FastForward, a start-up consulting (service) business, in its first month of operations. **Remember that after each transaction and event, assets always equal liabilities plus equity.**

Transaction 1: Investment by Owner On December 1, Chas Taylor forms a consulting business named FastForward and it is set up

as a corporation. FastForward evaluates the performance of footwear and accessories. Taylor owns and manages the business, which will publish online reviews and consult with clubs, athletes, and others who purchase **Nike** and **Adidas** products.

***Real companies** are in bold magenta*

Taylor invests $30,000 cash in the new company in exchange for its common stock, and deposits the cash in a bank account opened under the name of FastForward. After this transaction, cash (an asset) and equity each equals $30,000. Equity is increased by the owner's investment (stock issuance), which is included in that column and titled Common Stock. The effect of this transaction on FastForward is shown in the accounting equation as follows (we label equity entries).

	Assets	=	Liabilities	+	Equity
	Cash	=			C. Taylor, Capital
(1)	+$30,000	=			+$30,000 Owner investment

Transaction 2: Purchase Supplies for Cash FastForward uses $2,500 of its cash to buy supplies of Nike and Adidas footwear for performance testing over the next few months. This transaction is an exchange of cash, an asset, for another kind of asset, supplies. It simply changes the form of assets from cash to supplies. The decrease in cash is exactly equal to the increase in supplies. The supplies of footwear are assets because of the expected future benefits from performance tests.

	Assets			=	Liabilities	+	Equity
	Cash	+	Supplies	=			C. Taylor, Capital
Old Bal.	$30,000			=			$30,000
(2)	−2,500	+	$2,500				
New Bal.	$27,500	+	$ 2,500	=			$30,000
	$30,000				$30,000		

Transaction 3: Purchase Equipment for Cash FastForward spends $26,000 to acquire equipment for testing footwear. Like Transaction 2, Transaction 3 is an exchange of one asset, cash, for another asset, equipment. The equipment is an asset because of its expected future benefits from testing footwear. This purchase changes the makeup of assets but does not change the asset total. The accounting equation remains in balance.

	Assets					=	Liabilities	+	Equity
	Cash	+	**Supplies**	+	**Equipment**	=			**C. Taylor, Capital**
Old Bal.	$27,500	+	$2,500			=			$30,000
(3)	−26,000			+	$26,000				
New Bal.	$ 1,500	+	$2,500	+	$ 26,000	=			$30,000
			$30,000						$30,000

Transaction 4: Purchase Supplies on Credit Taylor decides more supplies of footwear and accessories are needed. These additional supplies cost $7,100, but FastForward has only $1,500 in cash. Taylor arranges to purchase them on credit from CalTech Supply Company. Thus, FastForward acquires supplies in exchange for a promise to pay for them later. This purchase increases assets by $7,100 in supplies, and liabilities (called *accounts payable* to CalTech Supply) increase by the same amount.

Point: Supplies bought "on credit" are received now and then cash is paid for them later.

Point: Accounts payable are amounts owed to others for items purchased on credit.

	Assets					=	Liabilities	+	Equity
	Cash	+	**Supplies**	+	**Equipment**	=	**Accounts Payable**	+	**C. Taylor, Capital**
Old Bal.	$1,500	+	$2,500	+	$26,000	=			$30,000
(4)		+	7,100				+$7,100		
New Bal.	$1,500	+	$9,600	+	$26,000	=	$ 7,100	+	$30,000
			$37,100						$37,100

Transaction 5: Provide Services for Cash FastForward plans to earn revenues by selling online ad space and consulting with clients

about footwear and accessories. In its first job, FastForward provides consulting services and immediately collects $4,200 cash. The accounting equation reflects this increase in cash of $4,200 and in equity of $4,200. This increase in equity is shown in the far right column under Revenues because the cash received is earned by providing consulting services.

	Assets					=	Liabilities	+	Equity		
	Cash	+	Supplies	+	Equipment	=	Accounts Payable	+	C. Taylor, Capital	+	Revenues
Old Bal.	$1,500	+	$9,600	+	$26,000	=	$7,100	+	$30,000		
(5)	+4,200									+	$4,200 Consulting
New Bal.	$5,700	+	$9,600	+	$26,000	=	$7,100	+	$30,000	+	$ 4,200
			$41,300						$41,300		

Transactions 6 and 7: Payment of Expenses in Cash

FastForward pays $1,000 to rent facilities for the month of December. The rental payment is shown in the following accounting equation as Transaction 6. FastForward also pays the biweekly $700 salary of the company's only employee. This is shown in the accounting equation as Transaction 7. Both Transactions 6 and 7 are December expenses for FastForward. The costs of both rent and salary are expenses, not assets, because their benefits are used in December (they have no future benefits after December). The accounting equation shows that both transactions reduce cash and equity. The far right column shows these decreases as Expenses.

Expenses decrease equity.

	Assets					=	Liabilities	+	Equity				
	Cash	+	Supplies	+	Equipment	=	Accounts Payable	+	C. Taylor, Capital	+	Revenues	–	Expenses
Old Bal.	$5,700	+	$9,600	+	$26,000	=	$7,100	+	$30,000	+	$4,200		
(6)	−1,000											–	$1,000 Rent
Bal.	4,700	+	9,600	+	26,000	=	7,100	+	30,000	+	4,200	–	1,000
(7)	– 700											–	700 Salaries
New Bal.	$4,000	+	$9,600	+	$26,000	=	$7,100	+	$30,000	+	$4,200	–	$ 1,700
			$39,600						$39,600				

Point: Expense recognition principle requires that expenses are recognized when the revenue they help generate is recorded.

Transaction 8: Provide Services and Facilities for Credit

FastForward provides consulting services of $1,600 and rents its test facilities for an additional $300 to Adidas on credit. Adidas is

billed for the $1,900 total. This transaction creates a new asset, called *accounts receivable,* from Adidas. Accounts receivable is increased instead of cash because the payment has not yet been received. Equity is increased from the two revenue components shown in the Revenues column of the accounting equation.

Point: Accounts receivable are amounts owed by customers for services or items sold on credit.

Point: Transaction 8, like 5, records revenue when work is performed, not necessarily when cash is received.

	Assets							=	Liabilities	+	Equity				
	Cash	+	Accounts Receivable	+	Supplies	+	Equipment	=	Accounts Payable	+	C. Taylor, Capital	+	Revenues	–	Expenses
Old Bal.	$4,000			+	$9,600	+	$26,000	=	$7,100	+	$30,000	+	$4,200	–	$1,700
(8)		+	$1,900									+	1,600 Consulting		
												+	300 Rental		
New Bal.	$4,000	+	$ 1,900	+	$9,600	+	$26,000	=	$7,100	+	$30,000	+	$6,100	–	$1,700
	$41,500								$41,500						

Transaction 9: Receipt of Cash from Accounts Receivable

The client in Transaction 8 (Adidas) pays $1,900 to FastForward 10 days after it is billed for consulting services. Transaction 9 does not change the total amount of assets and does not affect liabilities or equity. It converts the receivable (an asset) to cash (another asset). It does not create new revenue. Revenue was recognized when FastForward performed the services in Transaction 8, not when the cash is collected.

Point: Transaction 9 involved no added client work, so no added revenue is recorded.

Point: Receipt of cash is not always a revenue.

	Assets							=	Liabilities	+	Equity				
	Cash	+	Accounts Receivable	+	Supplies	+	Equipment	=	Accounts Payable	+	C. Taylor, Capital	+	Revenues	–	Expenses
Old Bal.	$4,000	+	$1,900	+	$9,600	+	$26,000	=	$7,100	+	$30,000	+	$6,100	–	$1,700
(9)	+1,900	–	1,900												
New Bal.	$5,900	+	$ 0	+	$9,600	+	$26,000	=	$7,100	+	$30,000	+	$6,100	–	$1,700
	$41,500								$41,500						

Transaction 10: Payment of Accounts Payable FastForward pays CalTech Supply $900 cash as partial payment for its earlier

$7,100 purchase of supplies (Transaction 4), leaving $6,200 unpaid. This transaction decreases FastForward's cash by $900 and decreases its liability to CalTech Supply by $900. Equity does not change. This event does not create an expense even though cash flows out of FastForward (instead the expense is recorded when FastForward uses these supplies).

	Assets							=	Liabilities	+	Equity				
	Cash	+	Accounts Receivable	+	Supplies	+	Equipment	=	Accounts Payable	+	C. Taylor, Capital	+	Revenues	−	Expenses
Old Bal.	$5,900	+	$ 0	+	$9,600	+	$26,000	=	$7,100	+	$30,000	+	$6,100	−	$1,700
(10)	−900								−900						
New Bal.	$5,000	+	$ 0	+	$9,600	+	$26,000	=	$6,200	+	$30,000	+	$6,100	−	$1,700
	$40,600								$40,600						

Transaction 11: Payment of Cash Dividend

page 14

FastForward declares and pays a $200 cash dividend to its owner (the only shareholder). Dividends (decreases in equity) are not reported as expenses because they do not help earn revenue. Because dividends are not expenses, they are not used in computing net income.

Withdrawals decrease equity.

	Assets							=	Liabilities	+	Equity						
	Cash	+	Accounts Receivable	+	Supplies	+	Equipment	=	Accounts Payable	+	C. Taylor, Capital	−	C. Taylor, Withdrawals	+	Revenues	−	Expenses
Old Bal.	$5,000	+	$ 0	+	$9,600	+	$26,000	=	$6,200	+	$30,000			+	$6,100	−	$1,700
(11)	−200											−	$200 Owner Withdrawals				
New Bal.	$4,800	+	$ 0	+	$9,600	+	$26,000	=	$6,200	+	$30,000	−	$200	+	$6,100	−	$1,700
	$40,400								$40,400								

Summary of Transactions

Exhibit 1.9 shows the effects of these 11 transactions of FastForward using the accounting equation. Assets equal liabilities plus equity after each transaction.

	Assets							Liabilities		Equity					
	Cash	+	Accounts Receivable	+	Supplies	+	Equipment	= Accounts Payable	+	C. Taylor, Capital	−	C. Taylor, Withdrawals	+	Revenues	− Expenses
(1)	$30,000							=		$30,000					
(2)	− 2,500			+	$2,500										
Bal.	27,500			+	2,500			=		30,000					
(3)	−26,000					+	$26,000								
Bal.	1,500			+	2,500	+	26,000	=		30,000					
(4)				+	7,100			=	+$7,100						
Bal.	1,500			+	9,600	+	26,000	=	7,100	+ 30,000					
(5)	+ 4,200												+	$4,200	
Bal.	5,700			+	9,600	+	26,000	=	7,100	+ 30,000			+	4,200	
(6)	− 1,000														− $1,000
Bal.	4,700			+	9,600	+	26,000	=	7,100	+ 30,000			+	4,200	− 1,000
(7)	− 700														− 700
Bal.	4,000			+	9,600	+	26,000	=	7,100	+ 30,000			+	4,200	− 1,700
(8)		+	$1,900										+	1,600	
													+	300	
Bal.	4,000	+	1,900	+	9,600	+	26,000	=	7,100	+ 30,000				6,100	− 1,700
(9)	+ 1,900	−	1,900												
Bal.	5,900	+	0	+	9,600	+	26,000	=	7,100	+ 30,000			+	6,100	− 1,700
(10)	− 900							− 900							
Bal.	5,000	+	0	+	9,600	+	26,000	=	6,200	+ 30,000			+	6,100	− 1,700
(11)	− 200										−	$200			
Bal.	$ 4,800	+	$ 0	+	$ 9,600	+	$ 26,000	=	$ 6,200	+ $ 30,000	−	$ 200	+	$6,100	− $ 1,700

EXHIBIT 1.9

Summary of Transactions Using the Accounting Equation

Larry W. Smith/EPA-EFE/Shutterstock

Decision Insight

Measurement and Recognition Revenues for the **Kansas City Chiefs**, **Los Angeles Rams**, **Green Bay Packers**, and other professional sports teams include ticket sales, television broadcasts, concessions, and advertising. Revenues from ticket sales are earned when the team plays each game. Advance ticket sales are not revenues; instead, they are a liability until the team plays the game for which the ticket was sold. At that point, the liability is removed and revenues are reported. ■

NEED-TO-KNOW 1-4

Transaction Analysis

P1

Assume Tata Company began operations on January 1 and page 15 completed the following transactions during its first month of operations. Show the effects of each transaction in a table like Exhibit 1.9.

Jan. 1 Jamsetji Tata invested $4,000 cash in Tata Company in exchange for its common stock.

5 The company purchased $2,000 of equipment on credit.

14 The company provided $540 of services for a client on credit.

21 The company paid $250 cash for an employee's salary.

Do More: QS 1-10, QS 1-11,E 1-12, E 1-13, E 1-14, E 1-15

Solution

	Assets						=	Liabilities	+	Equity						
	Cash	+	Accounts Receivable	+	Equipment		=	Accounts Payable	+	J. Tata, Capital	–	J. Tata, Withdrawals	+	Revenues	–	Expenses
Jan. 1	$4,000						=			$4,000						
Jan. 5				+	$2,000			+$2,000								
Bal.	4,000			+	2,000		=	2,000	+	4,000						
Jan. 14		+	$540										+	$540		
Bal.	4,000	+	540	+	2,000		=	2,000	+	4,000			+	540		
Jan. 21	−250														–	$250
Bal.	3,750	+	540	+	2,000		=	2,000	+	4,000			+	540	–	250
			$6,290									$6,290				

FINANCIAL STATEMENTS

P2

Identify and prepare basic financial statements and explain how they interrelate.

Financial statements are prepared in the order below using the 11 transactions of FastForward. (These statements are *unadjusted*—we

explain this in Chapters 2 and 3.) The four financial statements and their purposes follow.

Financial Statement	Layout	Purpose
Income statement	Revenues – Expenses Net income	Describes a company's revenues and expenses and computes net income or loss over a period of time.
Statement of owner's equity	Beg. capital + Owner investments + Net income – Withdrawals End. capital	Explains changes in owner's equity from owner investments, net income (or loss), and any withdrawals over a period of time.
Balance sheet	Assets = Liabilities + Equity	Describes a company's financial position (types and amounts of assets, liabilities, and equity) *at a point in time.*
Statement of cash flows	+/– Operating C.F. +/– Investing C.F. +/– Financing C.F. Change in cash	Identifies cash inflows (receipts) and cash outflows (payments) over a period of time.

Income Statement

FastForward's income statement for December is shown at the top of Exhibit 1.10. Information about revenues and expenses is taken from the Equity columns of Exhibit 1.9. Revenues are reported first on the income statement. They include consulting revenues of $5,800 from Transactions 5 and 8 and rental revenue of $300 from Transaction 8. Expenses are reported after revenues. Rent and salary expenses are from Transactions 6 and 7. Expenses are the costs to generate the revenues reported. **Net income** occurs when revenues exceed expenses. A **net loss** occurs when expenses exceed revenues. Net income (or loss) is shown at the bottom of the statement and is the amount reported in December. Shareholders' investments and dividends are *not* part of income.

FASTFORWARD
Income Statement
For Month Ended December 31, 2021

Revenues		
Consulting revenue ($4,200 + $1,600)	$ 5,800	
Rental revenue	300	
Total revenues		$ 6,100
Expenses		
Rent expense	1,000	
Salaries expense	700	
Total expenses		1,700
Net income		**$ 4,400**

FASTFORWARD
Statement of Owner's Equity
For Month Ended December 31, 2021

C. Taylor, Capital, December 1, 2021		$ 0
Plus: Investments by owner	$30,000	
Net income	**4,400**	34,400
		34,400
Less: Withdrawals by owner		200
C. Taylor, Capital, December 31, 2021		**$34,200**

FASTFORWARD
Balance Sheet
December 31, 2021

Assets		Liabilities	
Cash	**$ 4,800**	Accounts payable	$ 6,200
Supplies	9,600	Total liabilities	6,200
Equipment	26,000	**Equity**	
		C. Taylor, Capital	**34,200**
Total assets	$40,400	Total liabilities and equity	$ 40,400

FASTFORWARD
Statement of Cash Flows
For Month Ended December 31, 2021

Cash flows from operating activities		
Cash received from clients ($4,200 + $1,900)	$ 6,100	
Cash paid for expenses ($2,500 + $900 + $1,000 + $700)	(5,100)	
Net cash provided by operating activities		$ 1,000
Cash flows from investing activities		
Cash paid for equipment	(26,000)	
Net cash used by investing activities		(26,000)
Cash flows from financing activities		
Cash investments by owner	30,000	
Cash withdrawals by owner	(200)	
Net cash provided by financing activities		29,800
Net increase in cash		$ 4,800
Cash balance, December 1, 2021		0
Cash balance, December 31, 2021		**$ 4,800**

EXHIBIT 1.10

Financial Statements and Their Links

Point: A statement's heading identifies the company, the statement title, and the date or time period.

Point: Arrow lines show how the statements are linked. ① Net income is used to compute retained earnings. ② Retained earnings is used to prepare the balance sheet. ③ Cash from the balance sheet is used to reconcile the statement of cash flows.

Point: The income statement, the statement of retained earnings, and the statement of cash flows are prepared for a period of time. The balance sheet is prepared as of a *point* in time.

Point: A single ruled line means an addition or subtraction. Final totals are double underlined. Negative amounts may or may not be in parentheses.

Key terms are in bold and defined again in the glossary

Point: Net income is sometimes called *earnings* or profit.

Statement of Retained Earnings

The statement of retained earnings reports how retained earnings changes over the reporting period. This statement shows beginning retained earnings, events that increase it (net income), and events that decrease it (dividends and net loss). Ending retained earnings is computed in this statement and is carried over and reported on the balance sheet. FastForward's statement of retained earnings is the second report in Exhibit 1.10. The beginning balance is measured as of the start of business on December 1. It is zero because FastForward did not exist before then. An existing business reports a beginning balance equal to the prior period's ending balance (such as from November 30). FastForward's statement shows the $4,400 of net income for the period, which links the income statement to the statement of retained earnings (see line ①). The statement also reports the $200 cash dividend and FastForward's end-of-period retained earnings balance.

teekid/iStockphoto.com

Balance Sheet

FastForward's balance sheet is the third report in Exhibit 1.10. This statement shows FastForward's financial position at the end of the business day on December 31. The left side of the balance sheet lists FastForward's assets: cash, supplies, and equipment. The upper right side of the balance sheet shows that FastForward owes $6,200 to creditors. Any other liabilities (such as a bank loan) would be listed here. The equity balance is $34,200. Line ② shows the link between the ending balance of the statement of retained earning and the retained earnings balance on the balance sheet. (This presentation of the balance sheet is called the *account form:* assets on the left and liabilities and equity on the right. Another presentation is the *report form:* assets on top, followed by liabilities and then equity at the bottom. Both are acceptable.) As always, the accounting equation balances: Assets of $40,400 = Liabilities of $6,200 + Equity of $34,200.

Statement of Cash Flows

FastForward's statement of cash flows is the final report in Exhibit 1.10. The first section reports cash flows from *operating activities*. It shows the $6,100 cash received from clients and the $5,100 cash paid for supplies, rent, and employee salaries. Outflows are in parentheses to denote subtraction. Net cash provided by operating activities for December is $1,000. The second section reports *investing activities,* which involve buying and selling assets such as land and equipment that are held for *long-term use* (typically more than one year). The only investing activity is the $26,000 purchase of equipment. The third

section shows cash flows from *financing activities,* which include *long-term* borrowing and repaying of cash from lenders and the cash investments from, and dividends to, shareholders. FastForward reports $30,000 from the owner's initial investment and a $200 cash dividend. The net cash effect of all financing transactions is a $29,800 cash inflow. The final part of the statement shows an increased cash balance of $4,800. The ending balance is also $4,800 as it started with no cash—see line ③ .

Point: Payment for supplies is an operating activity because supplies are expected to be used up in short-term operations (typically less than one year).

Point: Investing activities refer to long-term asset investments by the company, not to owner investments.

Greg Epperson/Shutterstock

Decision Insight

Big Data The SEC keeps an online database called **EDGAR** (**sec.gov/edgar**) that has accounting information for thousands of companies, such as **Columbia Sportswear**, that issue stock to the public. The annual report filing for most publicly traded U.S. companies is known as Form 10-K, and the quarterly filing is Form 10-Q. Information services such as **Finance.Yahoo.com** offer online data and analysis. ■

NEED-TO-KNOW 1-5

Financial Statements

P2

Prepare the (a) income statement, (b) statement of retained earnings, and (c) balance sheet for Accel using the following information from its current year ended December 31.

Cash	$17,000	B. Accel, Capital, Dec. 31, prior year	$58,000
Accounts receivable	5,000	Withdrawals	12,500
Equipment	27,000	Revenues	41,000
Land	30,000	Wages expense	21,000
Accounts payable	7,500	Rent expense	7,000
Wages payable	13,000	Owner investments	0

Solution

ACCEL
Income Statement
For Current Year Ended December 31

Revenues	$ 41,000
Expenses	
Wages expense	$ 21,000
Rent expense	7,000
Total expenses	28,000
Net income	**$13,000**

ACCEL
Statement of Owner's Equity
For Current Year Ended December 31

B. Accel, Capital, December 31, prior year	$ 58,000
Plus: Investments by owner	0
Net income	**13,000**
	71,000
Less: Withdrawals by owner	12,500
B. Accel, Capital, December 31, current year	**$58,500**

ACCEL
Balance Sheet
December 31

Assets		Liabilities	
Cash	$17,000	Accounts payable	$ 7,500
Accounts receivable	5,000	Wages payable	13,000
Equipment	27,000	Total liabilities	20,500
Land	30,000	**Equity**	
		B. Accel, Capital	58,500
Total assets	$79,000	Total liabilities and equity	$79,000

Do More: QS 1-12 through QS 1-19, E 1-16 through E 1-24

Decision Analysis *(at the end of each chapter) covers ratios for decision-making using real company data. Instructors can skip this section and cover all ratios in Chapter 13*

Decision Analysis Return on Assets

A2

Compute and interpret return on assets.

We organize financial statement analysis into four areas: (1) liquidity and efficiency, (2) solvency, (3) profitability, and (4) market prospects —Chapter 13 has a ratio listing with definitions and groupings by area. When analyzing ratios, we use a company's prior year ratios and competitor ratios to evaluate performance.

This chapter presents a profitability measure: return on assets. Return on assets helps evaluate if management is effectively using assets to generate net income. **Return on assets (ROA),** also called *return on investment* (*ROI*), is defined in Exhibit 1.11.

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Average total assets}}$$

EXHIBIT 1.11

Return on Assets

Net income is from the annual income statement, and average total assets is computed by adding the beginning and ending amounts for that same period and dividing by 2. **Nike** reports total net income of $4,029 million for the current year. At the beginning of the current year its total assets are $22,536 million, and at the end of the current year assets total $23,717 million. **Nike's** return on assets for the current year is

page 19

$$\text{Return on assets} = \frac{\$4{,}029 \text{ million}}{(\$22{,}536 \text{ million} + \$23{,}717 \text{ million})/2} = 17.4\%$$

Is a 17.4% return on assets good or bad for Nike? To help answer this question, we compare (benchmark) Nike's return with its prior performance and the return of its competitor, **Under Armour** (see Exhibit 1.12). Nike shows a pattern of positive returns that reflects effective use of assets. Nike has outperformed Under Armour in each of the last three years. Under Armour had a negative ROA in the previous two years due to net losses.

Return on Assets	Current Year	1 Year Ago	2 Years Ago
Nike	17.4%	8.4%	19.0%
Under Armour	2.0%	(1.1)%	(1.3)%

EXHIBIT 1.12

Nike and Under Armour Returns

Decision Maker requires critical thinking to make decisions

Decision Maker

Business Owner You own a winter ski resort that earns a 21% return on its assets. An opportunity to purchase a winter ski equipment manufacturer is offered to you. This manufacturer earns a 14% return on its assets. The industry return for competitors of this manufacturer is 9%. Do you purchase this manufacturer? ■ *Answer:* The 14% return on assets for the manufacturer exceeds the 9% industry return. This is positive for a potential purchase. Also, this purchase is an opportunity to spread your risk over two businesses. Still, you should hesitate to purchase a business whose 14% return is lower than your current 21% return. You might better direct efforts to increase investment in your resort if it can earn more than the 14% alternative.

Comprehensive Need-to-Know is a review of key chapter content

NEED-TO-KNOW 1-6

COMPREHENSIVE

Transaction Analysis, Statement Preparation, and Return on Assets

Jasmine Worthy started a haircutting business called Expressions. The following events occurred during its first month of business.

a. Dec. 1 Worthy invested $3,000 cash and $15,000 of equipment in Expressions in exchange for its common stock.

b. Dec. 2 Expressions paid $600 cash for furniture for the shop.

c. Dec. 3 Expressions paid $500 cash to rent space in a strip mall for December.

d. Dec. 4 Purchased $1,200 of equipment on credit (recorded a accounts payable).

e. Dec. 15 Expressions opened for business on December 5. Cash received from haircutting services in the first week and a half of business (ended December 15) was $825.

f. Dec. 16 Expressions provided $100 of haircutting services on credit.

g. Dec. 17 Expressions received a $100 check for services previously rendered on credit.

h. Dec. 18 Expressions paid $125 cash to an assistant for hours worked for the grand opening.

i. Dec. 31 Cash received from services provided during the second half of December was $930.

j. Dec. 31 Expressions paid $400 cash toward the accounts payable from December 4.

k. Dec. 31 Expressions paid a $900 cash dividend to Worthy (sole shareholder).

Required

1. Show the effects of each transaction in a table like Exhibit 1.9.

2. Prepare an income statement for December.

3. Prepare a statement of retained earnings for December.

4. Prepare a balance sheet as of December 31.

5. Prepare a statement of cash flows for December.

6. Determine the return on assets ratio for December.

SOLUTION

1.

	Assets							=	Liabilities	+	Equity						
	Cash	+	Accounts Receivable	+	Furniture	+	Equipment	=	Accounts Payable	+	J. Worthy, Capital	−	J. Worthy, Withdrawals	+	Revenues	−	Expenses
a.	$3,000						$15,000				$18,000						
b.	− 600			+	$600												
Bal.	2,400			+	600	+	15,000	=			18,000						
c.	− 500															−	$500
Bal.	1,900			+	600	+	15,000	=			18,000					−	500
d.						+	1,200		+$1,200								
Bal.	1,900			+	600	+	16,200	=	1,200	+	18,000					−	500
e.	+ 825													+	$ 825		
Bal.	2,725			+	600	+	16,200	=	1,200	+	18,000			+	825	−	500
f.		+	$100											+	100		
Bal.	2,725	+	100	+	600	+	16,200	=	1,200	+	18,000			+	925	−	500
g.	+ 100	−	100														
Bal.	2,825	+	0	+	600	+	16,200	=	1,200	+	18,000			+	925	−	500
h.	− 125															−	125
Bal.	2,700	+	0	+	600	+	16,200	=	1,200	+	18,000			+	925	−	625
i.	+ 930													+	930		
Bal.	3,630	+	0	+	600	+	16,200	=	1,200	+	18,000			+	1,855	−	625
j.	− 400								− 400								
Bal.	3,230	+	0	+	600	+	16,200	=	800	+	18,000			+	1,855	−	625
k.	− 900											−	$900				
Bal.	$ 2,330	+	0	+	$ 600	+	$ 16,200	=	$ 800	+	$ 18,000	−	$ 900	+	$1,855	−	$625

2.

EXPRESSIONS
Income Statement
For Month Ended December 31

Revenues		
Services revenue		$ 1,855
Expenses		
Rent expense	$500	
Wages expense	125	
Total expenses		625
Net income		**$1,230**

3.

EXPRESSIONS
Statement of Owner's Equity
For Month Ended December 31

J. Worthy, Capital, December 1*		$ 0
Plus: Investments by owner	$18,000	
Net income	**1,230**	19,230
		19,230
Less: Withdrawals by owner		900
J. Worthy, Capital, December 31		**$18,330**

*If Expressions had existed before December 1, the beginning capital balance would equal the prior period's ending balance.

4.

EXPRESSIONS
Balance Sheet
December 31

Assets		**Liabilities**	
Cash	$ 2,330	Accounts payable	$ 800
Furniture	600	**Equity**	
Equipment	16,200	J. Worthy, Capital	**18,330**
Total assets	$19,130	Total liabilities and equity	$19,130

5.

EXPRESSIONS
Statement of Cash Flows
For Month Ended December 31

Cash flows from operating activities		
Cash received from customers	$1,855	
Cash paid for expenditures ($500 + $125 + $400)	(1,025)	
Net cash provided by operating activities		$ 830
Cash flows from investing activities		
Cash paid for furniture	(600)	
Net cash used by investing activities		(600)
Cash flows from financing activities		
Cash investments by owner	3,000	
Cash withdrawals by owner	(900)	
Net cash provided by financing activities		2,100
Net increase in cash		$2,330
Cash balance, December 1		0
Cash balance, December 31		$2,330

6. Return on assets = $\frac{\text{Net income}}{\text{Average assets}} = \frac{\$1,230}{(\$18,000^* + \$19,130)/2} = \frac{\$1,230}{\$18,565} = \mathbf{6.63\%}$

*Uses the initial $18,000 investment as the beginning balance for the *start-up period only*.

Summary: Cheat Sheet

ACCOUNTING USES

External users: Do not directly run the organization and have limited access to its accounting information. Examples are lenders, shareholders, external auditors, nonexecutive employees, labor unions, regulators, voters, donors, suppliers, and customers.

Internal users: Directly manage organization operations. Examples are the CEO and other executives, research and development managers, purchasing managers, production managers, and other managerial-level employees.

Private accounting: Accounting employees working for businesses.

Public accounting: Offering audit, tax, and advisory services to others.

ETHICS AND ACCOUNTING

Fraud triangle: Three factors that push a person to commit fraud.

- **Opportunity:** Must be able to commit fraud with a low risk of getting caught.
- **Pressure,** or incentive: Must feel pressure or have incentive to commit fraud.
- **Rationalization,** or attitude: Justifies fraud or does not see its criminal nature.

Common business entities:

	Sole Proprietorship	Partnership
Number of owners	1 owner; easy to set up.	2 or more, called *partners*; easy to set up.
Business taxation	No additional business income tax.	No additional business income tax.
Owner liability	Unlimited liability. Owner is personally liable for proprietorship debts.	Unlimited liability. Partners are jointly liable for partnership debts.
Legal entity	*Not* a separate legal entity.	*Not* a separate legal entity.
Business life	Business ends with owner death or choice.	Business ends with a partner death or choice.

	Corporation	Limited Liability Company (LLC)
Number of owners	1 or more, called *shareholders*; can get many investors by selling **stock** or **shares** of corporate ownership.	1 or more, called *members*.
Business taxation	Additional corporate income tax.	No additional business income tax.
Owner liability	Limited liability. Owners, called **shareholders** (or **stockholders**), are not liable for corporate acts and debts.	Limited liability. Owners, called **members**, are not personally liable for LLC debts.
Legal entity	A separate entity with the same rights and responsibilities as a person.	A separate entity with the same rights and responsibilities as a person.
Business life	Indefinite.	Indefinite.

TRANSACTION ANALYSIS

Assets: Resources a company owns or controls that are expected to yield future benefits.

Liabilities: Creditors' claims on assets. These are obligations to provide assets, products, or services to others.

Equity: Shareholder claim on assets. It consists of:

+ Owner, Capital	**Owner investments** are inflows of cash and other net assets from owner contributions, which increase equity.
− Owner, Withdrawals	**Owner withdrawals** are outflows of cash and other assets to owners for personal use, which reduce equity.
+ Revenues	**Revenues** increase equity (via net income) from sales of products and services to customers; examples are sales of products, consulting services provided, facilities rented to others, and commissions from services.
− Expenses	**Expenses** decrease equity (via net income) from costs of providing products and services to customers; examples are costs of employee time, use of supplies, advertising, utilities, and insurance fees.

Accounting equation: Applies to all transactions and events, to all companies and organizations, and to all points in time.

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$

Expanded accounting equation:

$$\text{Assets} = \text{Liabilities} + \overbrace{\text{Owner, Capital} - \text{Owner, Withdrawals} + \text{Revenues} - \text{Expenses}}^{\text{Equity}}$$

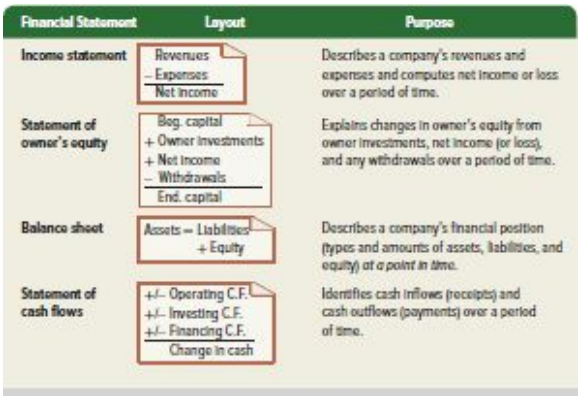
Summary of transactions:

Financial effects of the following transactions are shown in the table using the expanded accounting equation.

Transaction 1: Investment by owner
Transaction 2: Purchase supplies for cash
Transaction 3: Purchase equipment for cash
Transaction 4: Purchase supplies on credit
Transaction 5: Provide services for cash
Transactions 6 and 7: Payment of expenses in cash
Transaction 8: Provide services and facilities for credit
Transaction 9: Receipt of cash from accounts receivable
Transaction 10: Payment of accounts payable
Transaction 11: Payment of cash dividends

	Assets				= Liabilities +		Equity			
	Cash	+ Accounts Receivable	+ Supplies	+ Equipment	= Accounts Payable	+ C. Taylor, Capital	− C. Taylor, Withdrawals	+ Revenues	− Expenses
(1)	$30,000				=	$30,000			
(2)	− 2,500		+ $2,500						
Bal.	27,500		+ 2,500		=	30,000			
(3)	− 26,000			+ $26,000					
Bal.	1,500		+ 2,500	+ 26,000	=	30,000			
(4)			+ 7,100		= +$7,100				
Bal.	1,500		+ 9,600	+ 26,000	=	7,100	+ 30,000		
(5)	+ 4,200							+ $4,200	
Bal.	5,700		+ 9,600	+ 26,000	=	7,100	+ 30,000	+ 4,200	
(6)	− 1,000								− $1,000
Bal.	4,700		+ 9,600	+ 26,000	=	7,100	+ 30,000	+ 4,200	− 1,000
(7)	− 700								− 700
Bal.	4,000		+ 9,600	+ 26,000	=	7,100	+ 30,000	+ 4,200	− 1,700
(8)		+ $1,900						+ 1,600	
								+ 300	
Bal.	4,000	+ 1,900	+ 9,600	+ 26,000	=	7,100	+ 30,000	6,100	− 1,700
(9)	+ 1,900	− 1,900							
Bal.	5,900	+ 0	+ 9,600	+ 26,000	=	7,100	+ 30,000	+ 6,100	− 1,700
(10)	− 900				− 900				
Bal.	5,000	+ 0	+ 9,600	+ 26,000	=	6,200	+ 30,000	+ 6,100	− 1,700
(11)	− 200						− $200		
Bal.	$ 4,800	+ $ 0	+ $ 9,600	+ $ 26,000	=	$ 6,200	+ $ 30,000	− $ 200 + $ 6,100	− $ 1,700

FINANCIAL STATEMENTS



Financial Statement	Layout	Purpose
Income statement	Revenues − Expenses Net income	Describes a company's revenues and expenses and computes net income or loss over a period of time.
Statement of owner's equity	Beg. capital + Owner investments + Net income − Withdrawals End. capital	Explains changes in owner's equity from owner investments, net income (or loss), and any withdrawals over a period of time.
Balance sheet	Assets = Liabilities + Equity	Describes a company's financial position (types and amounts of assets, liabilities, and equity) *at a point in time.*
Statement of cash flows	+/− Operating C.F. +/− Investing C.F. +/− Financing C.F. Change in cash	Identifies cash inflows (receipts) and cash outflows (payments) over a period of time.

Key Terms conclude each chapter (a complete glossary is available in Connect)

Key Terms

Accounting (3)

Accounting equation (9)

Assets (9)

Audit (7)

Auditors (6)

Balance sheet (15)

Bookkeeping (3)

Business entity assumption (8)

Common stock (8)

Conceptual framework (7)

Corporation (8)

Cost constraint (8)

Cost principle (7)

Cost-benefit constraint (8)

Data analytics (5)

Data visualization (5)

Net loss (17)

Owner investments (10)

Partnership (8)

Proprietorship (8)

Recordkeeping (3)

Retained earnings (10)

Return on assets (ROA) (18)

Revenue recognition principle (7)

Revenues (10)

Securities and Exchange Commission (SEC) (7)

Shareholders (8)

Shares (8)

Sole proprietorship (8)

Statement of cash flows (15)

Statement of retained earnings (15)

Stock (8)

Stockholders (8)

Time period assumption (8)

Multiple Choice Quiz

1. A building is offered for sale at $500,000 but is currently assessed at $400,000. The purchaser of the building believes the building is worth $475,000, but ultimately purchases the building for $450,000. The purchaser records the building at:

a. $50,000.

b. $400,000.

c. $450,000.

d. $475,000.

e. $500,000.

2. On December 30 of the current year, **KPMG** signs a $150,000 contract to provide accounting services to one of its clients in *the next year*. KPMG has a December 31 year-end. Which accounting principle or assumption requires KPMG to record the accounting services revenue from this client in *the next year* and not in the current year?

a. Business entity assumption

b. Revenue recognition principle

c. Monetary unit assumption

d. Cost principle

e. Going-concern assumption

3. **Brunswick** borrows $50,000 cash from Third National Bank. How does this transaction affect the accounting equation for Brunswick?

a. Assets increase by $50,000; liabilities increase by $50,000; no effect on equity.

b. Assets increase by $50,000; no effect on liabilities; equity increases by $50,000.

c. Assets increase by $50,000; liabilities decrease by $50,000; no effect on equity.

d. No effect on assets; liabilities increase by $50,000; equity increases by $50,000.

e. No effect on assets; liabilities increase by $50,000; equity decreases by $50,000.

4. **Geek Squad** performs services for a customer and bills the customer for $500. How would Geek Squad record this transaction?

a. Accounts receivable increase by $500; revenues increase by $500.

b. Cash increases by $500; revenues increase by $500.

c. Accounts receivable increase by $500; revenues decrease by $500.

d. Accounts receivable increase by $500; accounts payable increase by $500.

e. Accounts payable increase by $500; revenues increase by $500.

5. If the assets of a company increase by $100,000 during the year and its liabilities increase by $35,000 during the same year, then the change in equity of the company during the year must have been a(n):

a. Increase of $135,000.

b. Decrease of $135,000.

c. Decrease of $65,000.

d. Increase of $65,000.

ANSWERS TO MULTIPLE CHOICE QUIZ

1. c; $450,000 is the actual cost incurred.

2. b; revenue is recorded when services are provided.

3. a

4. a

5. d;

Assets	=	Liabilities	+	Equity
+$100,000	=	+$35,000	+	?

Change in equity = $100,000 – $35,000 = $65,000

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

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QUICK STUDY

QS 1-1

Understanding accounting

C1

Choose the term or phrase below that best completes each statement.

- **a.** Accounting
- **b.** Identifying
- **c.** Recording
- **d.** Communicating
- **e.** Governmental
- **f.** Artificial
- **g.** Language of business
- **h.** Recordkeeping (bookkeeping)

1. _____ helps accountants by performing repetitive tasks such as entering invoice data.

2. _____ requires that we input, measure, and log transactions and events.

3. _____ is the recording of transactions and events, either manually or electronically.

QS 1-2

Identifying accounting users

C1

Identify the following users as either External users or Internal users.

- **a.** Customers
- **b.** Suppliers
- **c.** External auditors
- **d.** Business press
- **e.** Managers
- **f.** District attorney

g . Shareholders

h. Lenders

i. Controllers

j. FBI and IRS

k. Consumer group

l. Voters

QS 1-3

Applying the fraud triangle

C2

Identify the fraud triangle risk factor (Opportunity, Pressure, or Rationalization) in each situation.

1. The business has no cameras or security devices at its warehouse.
2. Managers are expected to grow business or be fired.
3. A worker sees other employees regularly take inventory for personal use.
4. No one matches the cash in the register to receipts when shifts end.
5. Officers are told to report rising income or risk layoffs.
6. A worker feels that fellow employees are not honest.

QS 1-4

Identifying principles, assumptions, and constraints **C2**

Identify each of the following as an accounting Principle, Assumption, or Constraint.

1. Full disclosure
2. Time period
3. Going-concern

4. Revenue recognition

QS 1-5

Identifying attributes of businesses

C2

Complete the following table with either a *yes* or *no* regarding the attributes of a sole proprietorship, partnership, corporation, and limited liability company (LLC).

Attribute Present	Sole Proprietorship	Partnership	Corporation	LLC
1. Business taxed	____	____	____	____
2. Limited liability	____	____	____	____
3. Legal entity	____	____	____	____

QS 1-6

Identifying accounting principles and assumptions

C2

Identify the accounting principle or assumption that best explains each situation.

1. In December of this year, Chavez Landscaping received a customer's order and cash prepayment to install sod at a house that would not be ready for installation until March of *next year*. Chavez should record the revenue from the customer order in March of *next year,* not in December of this year.
2. If $51,000 cash is paid to buy land, the land is reported on the buyer's balance sheet at $51,000.
3. Mike Derr owns both Sailing Passions and Dockside Digs. In preparing financial statements for Dockside Digs, Mike makes sure that the expense transactions of Sailing Passions are kept separate from Dockside Digs's transactions and financial statements.

QS 1-7

Applying the accounting equation **A1**

a. Total assets of Charter Company equal $700,000 and its equity is $420,000. What is the amount of its liabilities?

b. Total assets of Martin Marine equal $500,000 and its liabilities and equity amounts are equal to each other. What is the amount of its liabilities? What is the amount of its equity?

QS 1-8

Applying the accounting equation

A1

1. Use the accounting equation to compute the missing financial statement amounts *(a)*, *(b)*, and *(c)*.

	A	B	C	D
1	Company	Assets =	Liabilities +	Equity
2	1	$ 75,000	$ *(a)*	$ 40,000
3	2	*(b)*	25,000	70,000
4	3	85,000	20,000	*(c)*

2. Use the expanded accounting equation to compute the missing financial statement amounts *(a)* and *(b)*.

	A	B	C	D	E	F	G
1							
2	Company	Assets	Liabilities	Owner, Capital	Owner, Withdrawals	Revenues	Expenses
3	1	$ 40,000	$ 16,000	$ 20,000	$ 0	*(a)*	$ 8,000
4	2	$ 80,000	$ 32,000	$ 44,000	*(b)*	$ 24,000	$ 18,000

QS 1-9

Determining effects of transactions on equity

P1

Determine whether each of the following transactions increases or decreases equity.

a. Owner invested cash in the company.

b. Incurred maintenance expenses.

c. Performed services for a client.

d. Incurred employee wage expenses.

QS 1-10

Identifying effects of transactions using accounting equation—revenues and expenses

P1

Create a table similar to Exhibit 1.9. Then use additions and subtractions to show the dollar effects of each transaction on individual items of the accounting equation.

Assets			=	Liabilities	+	Equity					
Cash	+	Accounts Receivable	=	Accounts Payable	+	Owner, Capital	−	Owner, Withdrawals	+	Revenues	−	Expenses

a. The company completed consulting work for a client page 25 and immediately collected $5,500 cash.

b. The company completed commission work for a client and sent a bill for $4,000 to be received within 30 days.

c. The company paid an assistant $1,400 cash as wages for the period.

d. The company collected $1,000 cash as a partial payment for the amount owed by the client in transaction *b*.

e. The company paid $700 cash for this period's cleaning services.

QS 1-11

Identifying effects of transactions using accounting equation—assets and liabilities

P1

Assets				=	Liabilities	+	Equity				
Cash	+ Supplies	+ Equipment	+ Land	=	Accounts Payable	+	Owner, Capital	− Owner, Withdrawals	+ Revenues	− Expenses	

Create a table similar to Exhibit 1.9. Then use additions and subtractions to show the dollar effects of each transaction on individual items of the accounting equation.

a. The owner invested $15,000 cash in the company in exchange for its common stock.

b. The company purchased supplies for $500 cash.

c. The owner invested $10,000 of equipment in the company in exchange for more common stock.

d. The company purchased $200 of additional supplies on credit.

e. The company purchased land for $9,000 cash.

QS 1-12

Identifying items with financial statements

P2

Indicate in which financial statement each item would most likely appear: income statement, balance sheet, or statement of cash flows.

a. Assets

b. Cash from operating activities

c. Equipment

d. Expenses

e. Liabilities

f. Net decrease (or increase) in cash

g. Revenues

h. Total liabilities and equity

QS 1-13

Identifying income and equity accounts

P2

Classify each of the following items as revenues, expenses, or dividends.

1. Utilities expense
2. Service revenue
3. Wages expense
4. Cash dividends
5. Rent expense
6. Rental revenue
7. Insurance expense
8. Consulting revenue

QS 1-14

Identifying assets, liabilities, and equity **P2**

Classify each of the following items as assets, liabilities, or equity.

1. Land
2. Wages payable
3. Equipment
4. Accounts payable
5. Accounts receivable
6. Supplies

QS 1-15

Preparing an income statement

P2

On December 31, Hawkin's records show the following accounts. Use this information to prepare a December income statement for Hawkin.

Cash	$ 5,100	Accounts payable	$6,000	Services revenue	$16,000
Accounts receivable	600	Common stock	6,900	Wages expense	8,000
Supplies	2,000	Retained earnings, December 1	4,000	Rent expense	1,500
Equipment	14,000	Dividends	1,000	Utilities expense	700

QS 1-16

Preparing a statement of retained earnings **P2**

Use the information in QS 1-15 to prepare a statement of retained earnings for Hawkin for the month ended December 31. *Hint:* Net income is $5,800.

QS 1-17

Preparing a balance sheet **P2**

Use the information in QS 1-15 to prepare a December 31 balance sheet for Hawkin. *Hint:* Retained Earnings on December 31 equals $8,800.

QS 1-18

Preparing a statement of cash flows

P2

Use the following information to prepare a statement of cash flows for Studio One for the month ended December 31. The cash balance at the start of December 1 was $1,000.

page 26

Cash withdrawals by owner	$ 2,000	Cash paid for equipment	$ 3,000
Cash received from customers	23,500	Cash paid for truck	22,000
Cash investments by owner	11,000	Cash paid for expenditures	6,000

QS 1-19

Classifying items on the statement of cash flows

P2

Identify the following cash flows as reported under either operating activities, investing activities, or financing activities.

1. Cash purchase of equipment
2. Cash paid for land
3. Cash paid for advertising
4. Cash paid for wages
5. Cash paid on account payable to supplier
6. Cash received from clients
7. Cash paid for rent
8. Cash investment by owner

QS 1-20

Interpreting return on assets

A2

Return on assets for Deutsche Auto for each of the last three years follows. Over the three-year period shown, did the company's return on assets improve or worsen?

	Current Year	1 Year Ago	2 Years Ago
Return on assets	13.5%	11.2%	8.9%

QS 1-21

Computing and interpreting return on assets

A2

Home Demo reports the following results. (a) Compute Home Demo's return on assets. (b) Is Home Demo's return on assets better than the 11% return of Lows Hardware (a competitor)?

Sales	$95 billion	Net income	$8 billion	Average total assets	$42 billion

Select Exercises and Quick Studies have Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

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EXERCISES

Exercise 1-1

Classifying activities reflected in the accounting system **C1**

Classify the following activities as part of the Identifying, Recording, or Communicating aspects of accounting.

1. Analyzing and interpreting reports.
2. Presenting financial information.
3. Keeping a log of service costs.
4. Measuring the costs of a product.
5. Preparing financial statements.
6. Acquiring knowledge of revenue transactions.
7. Observing transactions and events.
8. Registering cash sales of products sold.

Exercise 1-2

Identifying accounting users and uses

C1

Part A. Identify the following questions as most likely to be asked by an Internal user or an External user of accounting information.

1. Which inventory items are out of stock?
2. Should we make a five-year loan to that business?

3. What are the costs of our product's ingredients?
4. Should we buy, hold, or sell a company's stock?
5. Should we spend additional money for redesign of our product?
6. Which firm reports the highest sales and income?
7. What are the costs of our service to customers?

Part B. Identify the following users as either an Internal user or an External user.

1. Research and development executive
2. Human resources executive
3. Politician
4. Shareholder
5. Distribution manager
6. Creditor
7. Production supervisor
8. Purchasing manager

Exercise 1-3

Describing accounting responsibilities

C1

Determine whether each of the following accounting duties page 27 mainly involves financial accounting, managerial accounting, or tax accounting.

1. Internal auditing.
2. External auditing.
3. Cost accounting.
4. Budgeting.
5. Enforcing tax laws.
6. Planning transactions to minimize taxes.

7. Preparing external financial statements.
8. Analyzing external financial reports.

Exercise 1-4

Learning the language of business

C1 C2

Match each of the descriptions with the term or phrase it best reflects.

A. Audit

B. GAAP

C. Ethics

D. FASB

E. SEC

F. Public accountants

G. Net income

H. IASB

1. An assessment of whether financial statements follow GAAP.
2. Amount a business earns in excess of all expenses and costs associated with its sales and revenues.
3. A group that sets accounting principles in the United States.
4. Accounting professionals who provide services to many clients.
5. Principles that determine whether an action is right or wrong.

Exercise 1-5

Identifying ethical terminology

C2

Match each of the descriptions with the term or phrase it best reflects.

A. Ethics

B. Fraud triangle

C. Prevention

D. Internal controls

E. Audit

1. Examines whether financial statements are prepared using GAAP.
2. Procedures set up to protect company property and equipment, ensure reliable accounting, promote efficiency, and encourage adherence to policies.
3. A less expensive and more effective means to stop fraud.
4. Three factors push a person to commit fraud: opportunity, pressure, and rationalization.
5. Beliefs that distinguish right from wrong.

Exercise 1-6

Distinguishing business organizations

C2

Determine whether each description best refers to a sole proprietorship, partnership, corporation, or limited liability company (LLC).

a. Micah and Nancy own Financial Services, which pays a business income tax. Micah and Nancy do not have personal responsibility for the debts of Financial Services.

b. Riley and Kay own Speedy Packages, a courier service. Both are personally liable for the debts of the business.

c. IBC Services does not have separate legal existence apart from the one person who owns it.

d. Trent Company is owned by Trent Malone, who is personally liable for the company's debts.

e. Ownership of Zander Company is divided into 1,000 shares of stock. The company pays a business income tax.

f. Physio Products does not pay a business income tax and has one owner. The owner has unlimited liability for business debt.

g. AJ Company pays a business income tax and has two owners.

h. Jeffy Auto is a separate legal entity from its owner, but it does not pay a business income tax.

Exercise 1-7

Identifying accounting principles and assumptions

C2

Identify the accounting principle or assumption that best reflects each situation.

1. A company reports details behind financial statements that would impact users' decisions.

2. Financial statements reflect the assumption that the business continues operating.

3. A company records the expenses incurred to generate the revenues reported.

4 . Each business is accounted for separately from its owner or owners.

5. Revenue is recorded when products and services are delivered.

6. Information is based on actual costs incurred in transactions.

Exercise 1-8

Applying measurement principle and revenue recognition principle

C2

a. Byrde Co. purchased a truck. The seller asked for $11,000, but Byrde paid only $10,000 after negotiation. The owner of Byrde Co. believes he got a great deal and the truck is really worth $15,000. What amount does Byrde record on its financial statements for the truck?

b. Snell Co. performs services for a client in May and bills the client $1,000. In June, Snell receives a partial payment of $300 cash. In July, the remaining $700 cash is received. Determine the monthly revenue recorded in May, June, and July applying revenue recognition principle.

Exercise 1-9

Using the accounting equation

A1

Determine the missing amount from each of the separate situations *a, b,* and *c* below.

	A		B		C
1	Assets	=	Liabilities	+	Equity
2	$ *(a)*		$ 20,000		$ 45,000
3	100,000		34,000		*(b)*
4	154,000		*(c)*		40,000

Exercise 1-10

Using the accounting equation

A1

Check (*c*) Beg. equity, $60,000

Answer the following questions. *Hint:* Use the accounting equation.

a. At the beginning of the year, Addison Company's assets are $300,000 and its equity is $100,000. During the year, assets increase $80,000 and liabilities increase $50,000. What is the equity at year-end?

b. Office Store Co. has assets equal to $123,000 and liabilities equal to $47,000 at year-end. What is the equity for Office Store Co. at year-end?

c. At the beginning of the year, Quaker Company's liabilities equal $70,000. During the year, assets increase by $60,000, and at year-end assets equal $190,000. Liabilities decrease

$5,000 during the year. What are the beginning and ending amounts of equity?

Exercise 1-11

Determining effect of transactions on accounting equation

A1

Answer the following questions. *Hint:* Use the accounting equation.

a. On January 1, Lumia Company's liabilities are $60,000 and its equity is $40,000. On January 3, Lumia purchases and installs solar panel assets costing $10,000. For the panels, Lumia pays $4,000 cash and promises to pay the remaining $6,000 in six months. What is the total of Lumia's assets after the solar panel purchase?

b. On March 1, ABX Company's assets are $100,000 and its liabilities are $30,000. On March 5, ABX is fined $15,000 for failing emission standards. ABX immediately pays the fine in cash. After the fine is paid, what is the amount of equity for ABX?

c. On August 1, Lola Company's assets are $30,000 and its liabilities are $10,000. On August 4, Lola issues a sustainability report. On August 5, ownership invests $3,000 cash and $7,000 of equipment in Lola. After the investment, what is the amount of equity for Lola?

Exercise 1-12

Analysis using the accounting equation

P1

Zen began a new consulting firm on January 5. Following is a financial summary, including balances, for each of the company's first five transactions (using the accounting equation form).

	Assets							= Liabilities	+	Equity		
Transaction	Cash	+	Accounts Receivable	+	Supplies	+	Equipment	= Accounts Payable	+	Zen, Capital	+	Revenues
____ 1.	$40,000	+	$ 0	+	$ 0	+	$ 0	= $ 0	+	$40,000	+	$ 0
____ 2.	38,000	+	0	+	3,000	+	0	= 1,000	+	40,000	+	0
____ 3.	30,000	+	0	+	3,000	+	8,000	= 1,000	+	40,000	+	0
____ 4.	30,000	+	6,000	+	3,000	+	8,000	= 1,000	+	40,000	+	6,000
____ 5.	31,000	+	6,000	+	3,000	+	8,000	= 1,000	+	40,000	+	7,000

Identify the explanation from *a* through *j* that best describes each transaction *1* through *5*.

a. The company purchased equipment for $8,000 cash.

b. The company received $40,000 cash from a bank loan.

c. The owner invested $1,000 cash in the business in exchange for its common stock.

d. The owner invested $40,000 cash in the business in exchange for its common stock.

e. The company purchased supplies for $3,000 by paying $2,000 cash and putting $1,000 on credit.

f. The company billed a customer $6,000 for services provided.

g. The company purchased equipment worth $8,000 on credit.

h. The company provided services for $1,000 cash.

i . The company sold supplies for $3,000 and received $2,000 cash and $1,000 on credit.

j. The company provided services for $6,000 cash.

Exercise 1-13

Identifying effects of transactions on the accounting equation

P1

The following table shows the effects of transactions *1* through *5* on the assets, liabilities, and equity of Mulan's Boutique.

	Assets							=	Liabilities	+	Equity		
	Cash	+	Accounts Receivable	+	Supplies	+	Land	=	Accounts Payable	+	Mulan, Capital	+	Revenues
	$21,000	+	$ 0	+	$3,000	+	$19,000	=	$ 0	+	$43,000	+	$ 0
___ 1.	−4,000					+	4,000						
___ 2.				+	1,000				+1,000				
___ 3.		+	1,900									+	1,900
___ 4.	−1,000								−1,000				
___ 5.	+1,900	−	1,900										
	$17,900	+	$ 0	+	$4,000	+	$23,000	=	$ 0	+	$43,000	+	$1,900

Identify the explanation from *a* through *j* that best describes each transaction *1* through *5*.

a. The company purchased $1,000 of supplies on credit.

b. The company collected $1,900 cash from an account receivable.

c. The company sold land for $4,000 cash.

d. The company paid $1,000 cash for land.

e. The company purchased supplies for $1,000 cash.

f. The company purchased land for $4,000 cash.

g. The company billed a client $1,900 for services provided.

h. The company paid $1,000 cash toward an account payable.

i. The owner invested $1,900 cash in the business in exchange for its common stock.

j. The company sold supplies for $1,900 on credit.

Exercise 1-14

Identifying effects of transactions on the accounting equation

P1

For each transaction *a* through *f,* identify its impact on the accounting equation (select from *1* through *5* below).

1. Decreases an asset and decreases equity.

2. Increases an asset and increases a liability.
3. Decreases an asset and decreases a liability.
4. Increases an asset and decreases an asset.
5. Increases an asset and increases equity.

a. The company pays cash toward an account payable.
b. The company purchases equipment on credit.
c. The owner invests cash in the business.
d. The company pays workers for wages earned.
e. The company purchases supplies for cash.
f. The company provides services for cash.

Exercise 1-15

Identifying effects of transactions using the accounting equation

P1

Check (1) Ending balances: Cash, $42,780; Expenses, $5,030

Ming Chen started a business and had the following transactions in June. Create the following table similar to Exhibit 1.9 and use additions and subtractions to show the dollar effects of the transactions on individual items of the accounting equation. Show new balances after each transaction.

Assets					=	Liabilities	+	Equity						
Cash	+	Accounts Receivable	+	Equipment	=	Accounts Payable	+	M. Chen, Capital	–	M. Chen, Withdrawals	+	Revenues	–	Expenses

a. Owner invested $60,000 cash in the company along with $15,000 of equipment in exchange for its common stock.
b. The company paid $1,500 cash for rent of office space for the month.
c. The company purchased $10,000 of additional equipment on credit (payment due within 30 days).

d. The company completed work for a client and immediately collected $2,500 cash.

e. The company completed work for a client and sent a bill for $8,000 to be received within 30 days.

f. The company purchased additional equipment for $6,000 cash.

g. The company paid an assistant $3,000 cash as wages for the month.

h. The company collected $5,000 cash as a partial payment for the amount owed by the client in transaction *e.*

i. The company paid $10,000 cash to settle the liability created in transaction *c.*

j. The company paid $1,000 cash in dividends to the owner (sole shareholder).

Exercise 1-16

Computing net income using accounting equation

P2

Shep Company's records show the following information for the current year.

	Beginning of Year	End of Year
Total assets	$50,000	$80,000
Total liabilities	$22,000	$35,000

Determine net income (loss) for each of the following separate situations.

a. Additional common stock of $3,000 was issued, and dividends of $7,000 were paid during the current year.

b. Additional common stock of $15,000 was issued, and no dividends were paid during the current year.

c. No additional common stock was issued, and dividends of $12,000 were paid during the current year.

Exercise 1-17

Reporting cash flows and determining effects

P2

For each transaction, (*a*) determine whether the transaction appears on the statement of cash flows under cash flows from operating activities, cash flows from investing activities, or cash flows from financing activities and (*b*) indicate whether the transaction is a cash outflow or cash inflow.

1. Cash received from client for performing services.
2. Cash investment from the owner.
3. Cash paid for this month's rent.
4. Cash paid for equipment.
5. Cash paid for employee wages.
6. Cash paid to settle long-term loan.

Exercise 1-18

Preparing an income statement

P2

On December 1, Jasmin Ernst organized Ernst Consulting. On December 3, the owner contributed $84,000 in assets in exchange for its common stock to launch the business. On December 31, the company's records show the following items and amounts. Use this information to prepare a December income statement for the business.

Cash	$11,360	Cash withdrawals by owner	$ 2,000
Accounts receivable	14,000	Consulting revenue	14,000
Office supplies	3,250	Rent expense	3,550
Office equipment	18,000	Salaries expense	7,000
Land	46,000	Telephone expense	760
Accounts payable	8,500	Miscellaneous expenses	580
Owner investments	84,000		

Check Net income, $2,110

Exercise 1-19

Preparing a statement of retained earnings **P2**

Use the information in Exercise 1-18 to prepare a December statement of retained earnings for Ernst Consulting. *Hint:* Retained Earnings on December 1 was $0.

Exercise 1-20

Preparing a balance sheet **P2**

Use the information in Exercise 1-18 to prepare a December 31 balance sheet for Ernst Consulting. *Hint:* The solution to Exercise 1-19 can help.

Exercise 1-21

Preparing a statement of cash flows

P2

Use the information in Exercise 1-18 to prepare a December statement of cash flows for Ernst Consulting. Assume the following additional information.

a. The owner's initial investment consists of $38,000 cash and $46,000 in land in exchange for its common stock.

b. The company's $18,000 equipment purchase is paid in cash.

c. Cash paid to employees is $1,750. (The accounts payable balance of $8,500 consists of the $3,250 office supplies purchase and $5,250 in employee salaries yet to be paid.)

d. The company's rent expense, telephone expense, and miscellaneous expenses are paid in cash.

e. No cash has yet been collected on the $14,000 consulting revenue earned.

Check Net increase in cash, $11,360

Exercise 1-22

Preparing consecutive statements of retained earnings

P2

Jarvis began operations on January 1, Year 1, and its Retained Earnings balance on that date was $0. In its first two years of operations, it reported the following at its December 31 year-end. Prepare the statement of retained earnings for (*a*) Year 1 and (*b*) Year 2.

	Year 1	Year 2
Net income	$30,000	$50,000
Jarvis, Withdrawals	$ 8,000	$14,000

Exercise 1-23

Linking the income statement and statement of retained earnings

P2

Terrell Co. reported the following data at the end of its first year of operations on December 31. (*a*) Prepare its year-end income statement. (*b*) Prepare its year-end statement of retained earnings using net income calculated in part *a*. *Hint:* Retained Earnings on January 1 was $0.

Equipment	$18,000	Terrell, Withdrawals	$ 5,000	Salaries expense	$37,000
Accounts payable	7,000	Services revenue	48,000	Advertising expense	3,000
Owner investments	22,000	Rent revenue	9,000	Utilities expense	1,000

Exercise 1-24

Linking the statement of retained earnings and balance sheet

P2

Mahomes Co. reported the following data at the end of its first year of operations on December 31. (*a*) Prepare its year-end statement of retained earnings. (*b*) Prepare its year-end balance sheet using

retained earnings calculated in part *a*. *Hint:* Retained Earnings on January 1 was $0.

Cash	$6,000	Land	$34,000	Dividends	$22,000
Accounts receivable	7,000	Accounts payable	3,000	Net income	60,000
Equipment	9,000	Common stock	15,000		

Exercise 1-25

Analyzing return on assets

A2

Swiss Group reports net income of $40,000 for the year. At the beginning of the year, Swiss Group had $200,000 in assets. By the end of the year, assets had grown to $300,000. What is Swiss Group's return on assets for the current year? Did Swiss Group perform better or worse than its competitors if competitors average an 11% return on assets?

*Problem Set **B**, located at the end of **Problem Set A**, is provided for each problem to reinforce the learning process*

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PROBLEM SET A

Problem 1-1A

Identifying effects of transactions on financial statements

P1

Identify how each of the following separate transactions *1* through *10* affects financial statements. For increases, place a "+" *and* the dollar amount in the column or columns. For decreases, place a "−" *and* the dollar amount in the column or columns. Some cells may contain both an increase (+) and a decrease (−) along with dollar amounts. The first transaction is completed as an example.

Required

a. For the balance sheet, identify how each transaction affects total assets, total liabilities, and total equity. For the income statement, identify how each transaction affects net income.

b. For the statement of cash flows, identify how each transaction affects cash flows from operating activities, cash flows from investing activities, and cash flows from financing activities.

		a.				b.		
		Balance Sheet			Income Statement	Statement of Cash Flows		
	Transaction	Total Assets	Total Liab.	Total Equity	Net Income	Operating Activities	Investing Activities	Financing Activities
1	Owner invests $900 cash in business in exchange for stock	+900		+900				+900
2	Receives $700 cash for services provided							
3	Pays $500 cash for employee wages							
4	Buys $100 of equipment on credit							
5	Purchases $200 of supplies on credit							
6	Buys equipment for $300 cash							
7	Pays $200 on accounts payable							
8	Provides $400 of services on credit							
9	Pays $50 cash in dividends							
10	Collects $400 cash on accounts receivable							

Problem 1-2A

Computing missing information using accounting knowledge

A1

The following financial statement information is from five separate companies.

	Company A	Company B	Company C	Company D	Company E
Beginning of year					
Assets	$55,000	$34,000	$24,000	$60,000	$119,000
Liabilities	24,500	21,500	9,000	40,000	?
End of year					
Assets	58,000	40,000	?	85,000	113,000
Liabilities	?	26,500	29,000	24,000	70,000
Changes during the year					
Stock issuances	6,000	1,400	9,750	?	6,500
Net income (loss)	8,500	?	8,000	14,000	20,000
Cash dividends	3,500	2,000	5,875	0	11,000

Required

1. Answer the following questions about Company A.

a. What is the amount of equity at the beginning of the year?

b. What is the amount of equity at the end of the year?

c. What is the amount of liabilities at the end of the year?

Check (1*b*) $41,500

2. Answer the following questions about Company B.

a. What is the amount of equity at the beginning of the year?

b. What is the amount of equity at the end of the year?

c. What is net income for the year?

(2*c*) $1,600

(3) $55,875

3. Compute the amount of assets for Company C at the end of the year.

4. Compute the amount of stock issuances for Company D during the year.

5. Compute the amount of liabilities for Company E at the beginning of the year.

Problem 1-3A

Preparing an income statement

P2

As of December 31 of the current year, Armani Company's page 33 records show the following.

Cash	$10,000	Retained earnings, Dec. 31, current year	$ 5,000
Accounts receivable	9,000	Dividends	13,000
Supplies	7,000	Consulting revenue	33,000
Equipment	4,000	Rental revenue	22,000
Accounts payable	11,000	Salaries expense	20,000
Common stock	14,000	Rent expense	12,000
Retained earnings, Dec. 31, prior year	3,000	Selling and administrative expenses	8,000

Required

Prepare the income statement for Armani Company for the current year ended December 31.

Check Net income, $15,000

Problem 1-4A

Preparing a statement of retained earnings **P2**

Use the information in Problem 1-3A to prepare the statement of retained earnings for Armani Company for the current year ended December 31.

Problem 1-5A

Preparing a balance sheet

P2

Use the information in Problem 1-3A to prepare the current year-end balance sheet for Armani Company.

Problem 1-6A

Preparing a statement of cash flows

P2

Following is selected financial information of Kia Company for the current year ended December 31.

Cash used by investing activities	$(2,000)	Cash from operating activities	$6,000
Net increase in cash	1,200	Cash, December 31, prior year	2,300
Cash used by financing activities	(2,800)		

Required

Prepare the statement of cash flows for Kia Company for the current year ended December 31.

Check Cash balance, Dec. 31, current year, $3,500

Problem 1-7A

Analyzing transactions and preparing financial statements

P1 P2

Gabi Gram started The Gram Co., a new business that began operations on May 1. The Gram Co. completed the following transactions during its first month of operations.

May 1 G. Gram invested $40,000 cash in the company in exchange for its common stock.

1 The company rented a furnished office and paid $2,200 cash for May's rent.

3 The company purchased $1,890 of equipment on credit.

5 The company paid $750 cash for this month's cleaning services.

8 The company provided consulting services for a client and immediately collected $5,400 cash.

12 The company provided $2,500 of consulting services for a client on credit.

15 The company paid $750 cash for an assistant's salary for the first half of this month.

20 The company received $2,500 cash payment for the services provided on May 12.

22 The company provided $3,200 of consulting services on credit.

25 The company received $3,200 cash payment for the services provided on May 22.

26 The company paid $1,890 cash for the equipment purchased on May 3.

27 The company purchased $80 of equipment on credit.

28 The company paid $750 cash for an assistant's salary for the second half of this month.

30 The company paid $300 cash for this month's telephone bill.

30 The company paid $280 cash for this month's utilities.

31 The company paid $1,400 cash in dividends to the owner (sole shareholder).

Check (1) Ending balances: Cash, $42,780; Express, $5,030

Required

1. Create the following table similar to Exhibit 1.9. Enter page 34 the effects of each transaction on the accounts of the accounting equation by recording dollar increases and decreases in the appropriate columns. Determine the final total for each account and verify that the equation is in balance.

	Assets					=	Liabilities	+	Equity						
Date	Cash	+	Accounts Receivable	+	Equipment	=	Accounts Payable	+	Common Stock	–	Dividends	+	Revenues	–	Expenses

(2) Net income, $6,070; Total assets, $44,750

2. Prepare the income statement and the statement of retained earnings for the month of May, and the balance sheet as of May 31.

3. Prepare the statement of cash flows for the month of May.

Problem 1-8A

Analyzing effects of transactions

P1 P2

Lita Lopez started Biz Consulting, a new business, and completed the following transactions during its first year of operations.

a. Lita Lopez invested $70,000 cash and equipment valued at $10,000 in the company in exchange for its common stock.

b. The company purchased a building for $40,000 cash.

c. The company purchased equipment for $15,000 cash.

d. The company purchased $1,200 of supplies and $1,700 of equipment on credit.

e. The company paid $500 cash for advertising expenses.

f. The company completed a financial plan for a client and billed that client $2,800 for the service.

g. The company designed a financial plan for another client and immediately collected a $4,000 cash fee.

h. The company paid $3,275 cash in dividends to the owner (sole shareholder).

i. The company received $1,800 cash as partial payment from the client described in transaction *f*.

j. The company made a partial payment of $700 cash on the equipment purchased in transaction *d*.

k. The company paid $1,800 cash for the secretary's wages for this period.

Required

page 35

1. Create the following table similar to Exhibit 1.9. Use additions and subtractions within the table to show the dollar effects of each transaction on individual items of the accounting equation. Show new balances after each transaction.

Check (1) Ending balances: Cash, $14,525; Expenses, $2,300; Accounts Payable, $2,200

Assets					=	Liabilities	+	Equity				
Cash	+ Accounts Receivable	+ Supplies	+ Equipment	+ Building	=	Accounts Payable	+ Common Stock	– Dividends	+ Revenues	– Expenses		

2. Determine the company's net income.

Net income $4,500

Problem 1-9A

Analyzing transactions and preparing financial statements

P1 P2

Sanyu Sony started a new business and completed these transactions during December.

Dec. 1 Sanyu Sony transferred $65,000 cash from a personal savings account to a checking account in the name of Sony Electric in exchange for its common stock.

2 The company paid $1,000 cash for the December rent.

3 The company purchased $13,000 of electrical equipment by paying $4,800 cash and agreeing to pay the $8,200 balance in 30 days.

5 The company purchased supplies by paying $800 cash.

6 The company completed electrical work and immediately collected $1,200 cash for these services.

8 The company purchased $2,530 of office equipment on credit.

15 The company completed electrical work on credit in the amount of $5,000.

18 The company purchased $350 of supplies on credit.

20 The company paid $2,530 cash for the office equipment purchased on December 8.

24 The company billed a client $900 for electrical work completed; the balance is due in 30 days.

28 The company received $5,000 cash for the work completed on December 15.

29 The company paid the assistant's salary of $1,400 cash for this month.

30 The company paid $540 cash for this month's utility bill.

31 The company paid $950 cash in dividends to the owner (sole shareholder).

Required

1. Create the following table similar to Exhibit 1.9. Use additions and subtractions within the table to show the dollar effects of each transaction on individual items of the accounting equation. Show new balances after each transaction.

Check (1) Ending balances: Cash, $59,180; Accounts Payable, $8,550

	Assets					= Liabilities	+ Equity			
Date	Cash	+ Accounts Receivable	+ Supplies	+ Office Equipment	+ Electrical Equipment	= Accounts Payable	+ Common Stock	− Dividends	+ Revenues	− Expenses

2. Prepare the income statement and the statement of retained earnings for the current month, and the balance sheet as of the end of the month.

(2) Net income, $4,160; Total assets, $76,760

3. Prepare the statement of cash flows for the current month.

Analysis Component

4. Assume that the owner investment transaction on December 1 was $49,000 cash instead of $65,000 and that Sony Electric obtained another $16,000 in cash by borrowing it from a bank. Compute the dollar effect of this change on the month-end amounts for (*a*) total assets, (*b*) total liabilities, and (*c*) total equity.

Problem 1-10A

Determining expenses, liabilities, equity, and return on assets

A1 A2

Kyzera manufactures, markets, and sells cellular telephones. The average total assets for Kyzera is $250,000. In its most recent year, Kyzera reported net income of $65,000 on revenues of $475,000.

Required

1. What is Kyzera's return on assets?
2. Does return on assets seem satisfactory for Kyzera given that its competitors average a 12% return on assets?
3. What are total expenses for Kyzera in its most recent year?
4. What is the average total amount of liabilities plus equity for Kyzera?

Check (3) $410,000 (4) $250,000

Problem 1-11A

Computing and interpreting return on assets

A2

Coca-Cola and **PepsiCo** both produce and market beverages that are direct competitors. Key financial figures for these businesses for a recent year follow.

Key Figures ($ millions)	Coca-Cola	PepsiCo
Sales	$46,542	$66,504
Net income	8,634	6,462
Average assets	76,448	70,518

Check (1*a*) 11.3%; (1*b*) 9.2%

Required

1. Compute return on assets for (*a*) Coca-Cola and (*b*) PepsiCo.

2. Which company is more successful in its total amount of sales to consumers?
3. Which company is more successful in returning net income from its assets invested?

PROBLEM SET B

Problem 1-1B

Identifying effects of transactions on financial statements

P1

Identify how each of the following separate transactions *1* through *10* affects financial statements. For increases, place a "+" *and* the dollar amount in the column or columns. For decreases, place a "−" *and* the dollar amount in the column or columns. Some cells may contain both an increase (+) and a decrease (−) along with dollar amounts. The first transaction is completed as an example.

Required

a. For the balance sheet, identify how each transaction affects total assets, total liabilities, and total equity. For the income statement, identify how each transaction affects net income.

b. For the statement of cash flows, identify how each transaction affects cash flows from operating activities, cash flows from investing activities, and cash flows from financing activities.

		a.				b.		
		Balance Sheet			Income Statement	Statement of Cash Flows		
	Transaction	Total Assets	Total Liab.	Total Equity	Net Income	Operating Activities	Investing Activities	Financing Activities
1	Owner invests $800 cash in business in exchange for stock	+800		+800				+800
2	Purchases $100 of supplies on credit							
3	Buys equipment for $400 cash							
4	Provides services for $900 cash							
5	Pays $400 cash for rent incurred							
6	Buys $200 of equipment on credit							
7	Pays $300 cash for wages incurred							
8	Pays $50 cash in dividends							
9	Provides $600 of services on credit							
10	Collects $600 cash on accounts receivable							

Problem 1-2B

Computing missing information using accounting knowledge

A1

The following financial statement information is from five separate companies.

	Company V	Company W	Company X	Company Y	Company Z
Beginning of year					
Assets	$54,000	$ 80,000	$141,500	$92,500	$144,000
Liabilities	25,000	60,000	68,500	51,500	?
End of year					
Assets	59,000	100,000	186,500	?	170,000
Liabilities	36,000	?	65,800	42,000	42,000
Changes during the year					
Stock issuances	5,000	20,000	?	48,100	60,000
Net income (or loss)	?	40,000	18,500	24,000	32,000
Cash dividends	5,500	2,000	0	20,000	8,000

Required

1. Answer the following questions about Company V.

a. What is the amount of equity at the beginning of the year?

b. What is the amount of equity at the end of the year?

c. What is the net income or loss for the year?

Check (1*b*) $23,000

2. Answer the following questions about Company W.

a. What is the amount of equity at the beginning of the year?

b. What is the amount of equity at the end of the year?

c. What is the amount of liabilities at the end of the year?

(2*c*) $22,000

3. Compute the amount of stock issuances for Company X during the year.

4. Compute the amount of assets for Company Y at the end of the year.

5. Compute the amount of liabilities for Company Z at the beginning of the year.

(4) $135,100

Problem 1-3B

Preparing an income statement

P2

As of December 31 of the current year, Audi Company's records show the following.

	Company V	Company W	Company X	Company Y	Company Z
Beginning of year					
Assets	$54,000	$ 80,000	$141,500	$92,500	$144,000
Liabilities	25,000	60,000	68,500	51,500	?
End of year					
Assets	59,000	100,000	186,500	?	170,000
Liabilities	36,000	?	65,800	42,000	42,000
Changes during the year					
Stock issuances	5,000	20,000	?	48,100	60,000
Net income (or loss)	?	40,000	18,500	24,000	32,000
Cash dividends	5,500	2,000	0	20,000	8,000

Required

Prepare the income statement for Audi Company for the current year ended December 31.

Check Net income, $3,000

Problem 1-4B

Preparing a statement of retained earnings **P2**

Use the information in Problem 1-3B to prepare the statement of retained earnings for Audi Company for the current year ended December 31.

Problem 1-5B

Preparing a balance sheet **P2**

Use the information in Problem 1-3B to prepare the current year-end balance sheet for Audi Company.

Problem 1-6B

Preparing a statement of cash flows

P2

Selected financial information of Banji Company for the current year ended December 31 follows.

Cash from investing activities	$1,600	Cash used by operating activities	$(3,000)
Net increase in cash	400	Cash, December 31, prior year	1,300
Cash from financing activities	1,800		

Required

Prepare the statement of cash flows for Banji Company for the current year ended December 31.

Problem 1-7B

Analyzing transactions and preparing financial statements

P1 P2

Nina Niko launched a new business, Niko's Maintenance Co., that began operations on June 1. The following transactions were completed by the company during that first month.

June 1 Nina Niko invested $130,000 cash in the company in exchange for its common stock.

2 The company rented a furnished office and paid $6,000 cash for June's rent.

4 The company purchased $2,400 of equipment on credit.

6 The company paid $1,150 cash for this month's advertising of the opening of the business.

8 The company completed maintenance services for a customer and immediately collected $850 cash.

14 The company completed $7,500 of maintenance services for City Center on credit.

16 The company paid $800 cash for an assistant's salary for the first half of the month.

20 The company received $7,500 cash payment for services completed for City Center on June 14.

21 The company completed $7,900 of maintenance services for Paula's Beauty Shop on credit.

24 The company completed $675 of maintenance services for Build-It Coop on credit.

25 The company received $7,900 cash payment from Paula's Beauty Shop for the work completed on June 21.

26 The company made payment of $2,400 cash for equipment purchased on June 4.

28 The company paid $800 cash for an assistant's salary for the second half of this month.

29 The company paid $4,000 cash in dividends to the owner (sole shareholder).

30 The company paid $150 cash for this month's telephone bill.

30 The company paid $890 cash for this month's utilities.

Required

Check (1) Ending balances: Cash, $130,060; Expenses, $9,790

1. Create the following table similar to Exhibit 1.9. Enter the effects of each transaction on the accounts of the accounting equation by recording dollar increases and decreases in the appropriate columns. Determine the final total for each account and verify that the equation is in balance.

	Assets					=	Liabilities	+	Equity						
Date	Cash	+	Accounts Receivable	+	Equipment	=	Accounts Payable	+	Common Stock	–	Dividends	+	Revenues	–	Expenses

(2) Net income, $7,135; Total assets, $133,135

2. Prepare the income statement and the statement of retained earnings for the month of June, and the balance sheet as of June 30.

3. Prepare the statement of cash flows for the month of June.

Problem 1-8B

Analyzing effects of transactions

P1 P2

Neva Nadal started a new business, Nadal Computing, and completed the following transactions during its first year of operations.

a. Neva Nadal invested $90,000 cash and equipment valued at $10,000 in the company in exchange for its common stock.

b. The company purchased a building for $50,000 cash.

c. The company purchased equipment for $25,000 cash.

d. The company purchased $1,200 of supplies and $1,700 of equipment on credit.

e. The company paid $750 cash for advertising expenses.

f. The company completed a financial plan for a client and billed that client $2,800 for the service.

g. The company designed a financial plan for another client and immediately collected a $4,000 cash fee.

h. The company paid $11,500 cash in dividends to the owner (sole shareholder).

i. The company received $1,800 cash from the client described in transaction *f*.

j. The company made a payment of $700 cash on the equipment purchased in transaction *d*.

k. The company paid $2,500 cash for the secretary's wages.

Required

Check (1) Ending balances: Cash, $5,350; Expenses, $3,250; Accounts Payable, $2,200

1. Create the following table similar to Exhibit 1.9. Use page 39 additions and subtractions within the table to show the dollar effects of each transaction on individual items of the accounting equation. Show new balances after each transaction.

Assets					=	Liabilities	+	Equity				
Cash	+ Accounts Receivable	+ Supplies	+ Equipment	+ Building	=	Accounts Payable	+	Common Stock	– Dividends	+ Revenues	– Expenses	

2. Determine the company's net income.

(2) Net income, $3,550

Problem 1-9B

Analyzing transactions and preparing financial statements

P1 P2

Rivera Roofing Company, owned by Reyna Rivera, began operations in July and completed these transactions during that first month of operations.

July 1 Reyna Rivera invested $80,000 cash in the company in exchange for its common stock.

2 The company paid $700 cash for the July rent.

3 The company purchased roofing equipment for $5,000 by paying $1,000 cash and agreeing to pay the $4,000 balance in 30 days.

6 The company purchased supplies for $600 cash.

8 The company completed work for a customer and immediately collected $7,600 cash for the work.

10 The company purchased $2,300 of office equipment on credit.

15 The company completed work for a customer on credit in the amount of $8,200.

17 The company purchased $3,100 of supplies on credit.

23 The company paid $2,300 cash for the office equipment purchased on July 10.

25 The company billed a customer $5,000 for work completed; the balance is due in 30 days.

28 The company received $8,200 cash for the work completed on July 15.

30 The company paid an assistant's salary of $1,560 cash for this month.

31 The company paid $295 cash for this month's utility bill.

31 The company paid $1,800 cash in dividends to the owner (sole shareholder).

Required

1. Create the following table similar to Exhibit 1.9. Use additions and subtractions within the table to show the dollar effects of each transaction on individual items of the accounting equation. Show new balances after each transaction.

Check (1) Ending balances: Cash, $87,545; Accounts Payable, $7,100

	Assets					=	Liabilities	+	Equity				
Date	Cash	+ Accounts Receivable	+ Supplies	+ Office Equipment	+ Roofing Equipment	=	Accounts Payable	+	Common Stock	− Dividends	+ Revenues	− Expenses	

2. Prepare the income statement and the statement of retained earnings for the month of July, and the balance sheet as of July 31.

(2) Net income, $18,245; Total assets, $103,545

3. Prepare the statement of cash flows for the month of July.

Analysis Component

4. Assume that the $5,000 purchase of roofing equipment on July 3 was financed from an owner investment of another $5,000 cash in the business in exchange for more common stock (instead of the purchase conditions described in the transaction above). Compute the dollar effect of this change on the month-end amounts for (*a*) total assets, (*b*) total liabilities, and (*c*) total equity.

Problem 1-10B

Determining expenses, liabilities, equity, and return on assets

A1 A2

Ski-Doo Company manufactures, markets, and sells snowmobiles and snowmobile equipment and accessories. The average total assets for Ski-Doo is $3,000,000. In its most recent year, Ski-Doo reported net income of $201,000 on revenues of $1,400,000.

Required

1. What is Ski-Doo Company's return on assets?
2. Does return on assets seem satisfactory for Ski-Doo given that its competitors average a 9.5% return on assets?
3. What are the total expenses for Ski-Doo Company in its most recent year?

Check (3) $1,199,000

(4) $3,000,000

4. What is the average total amount of liabilities plus equity for Ski-Doo Company?

Problem 1-11B

Computing and interpreting return on assets

A2

AT&T and **Verizon** produce and market telecommunications products and are competitors. Key financial figures for these businesses for a recent year follow.

Key Figures ($ millions)	AT&T	Verizon
Sales	$126,723	$110,875
Net income	4,184	10,198
Average assets	269,868	225,233

Required

1. Compute return on assets for (*a*) AT&T and (*b*) Verizon.

Check (1*a*) 1.6%; (1*b*) 4.5%

2. Which company is more successful in the total amount of sales to consumers?

3. Which company is more successful in returning net income from its assets invested?

Analysis Component

4. Write a one-paragraph memorandum explaining which company you would invest your money in and why. (Limit your explanation to the information provided.)

***Serial Problem** starts here and follows the same company throughout the text. It is available in Connect.*

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connect

SERIAL PROBLEM

Business Solutions

P1

SP 1 On October 1, 2021, Santana Rey launched a computer services company, **Business Solutions**, that is organized as a corporation and provides consulting services, computer system installations, and custom program development.

Alexander Image/Shutterstock

Required

Create a table like Exhibit 1.9 using these headings: Cash; Accounts Receivable; Computer Supplies; Computer System; Office Equipment;

Accounts Payable; Common Stock; Dividends; Revenues; and Expenses. Use additions and subtractions within the table to show the dollar effects for each of the following transactions on the individual items of the accounting equation. Show new balances after each transaction.

Oct. 1 S. Rey invested $45,000 cash, a $20,000 computer system, and $8,000 of office equipment in the company in exchange for its common stock.

3 The company purchased $1,420 of computer supplies on credit.

6 The company billed Easy Leasing $4,800 for services performed in installing a new web server.

8 The company paid $1,420 cash for the computer supplies purchased on credit on October 3.

10 The company hired a part-time assistant.

12 The company billed Easy Leasing another $1,400 for services performed.

15 The company received $4,800 cash from Easy Leasing as partial payment toward its account.

17 The company paid $805 cash to repair its computer equipment.

20 The company paid $1,728 cash for advertisements published on Facebook.

22 The company received $1,400 cash from Easy Leasing toward its account.

28 The company billed IFM Company $5,208 for services performed.

31 The company paid $875 cash for the assistant's wages for this month.

31 The company paid $3,600 cash in dividends to the owner (sole shareholder).

Check Ending balances: Cash, $42,772; Revenues, $11,408; Expenses, $3,408

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments (1) do not require instructors to know Tableau, (2) are accessible to introductory students, (3) do not require Tableau software, and (4) run in **Connect**. All are auto-gradable. Chapter 1 analytics assignments follow.

Tableau DA 1-1 Quick Study, Applying the accounting equation, A1—similar to QS 1-7.

Tableau DA 1-2 Exercise, Applying the accounting equation and identifying balance sheet accounts, A1, P2—similar to QS 1-8 and Exercise 1-9.

Tableau DA 1-3 Mini-Case, Preparing an income statement, A1, P2—similar to QS 1-15 and Exercise 1-18.

Accounting Analysis (AA) *assignments refine analysis and critical-thinking skills and are* ***auto-gradable*** *in Connect. They can be assigned for each chapter or as a group for a financial statement analysis project.*

Accounting Analysis connect

COMPANY ANALYSIS
A1 A2

AA 1-1 Key financial figures for **Apple**'s two most recent fiscal years follow.

$ millions	Current Year	Prior Year
Liabilities + Equity	$338,516	$365,725
Net income	55,256	59,531
Revenues	260,174	265,595

Required

1. What is the total amount of assets invested in Apple in the current year?
2. What is Apple's return on assets for the current year?
3. How much are total expenses for Apple for the current year?
4. Is Apple's current year return on assets better or worse than competitors' average return of 10%?

COMPARATIVE ANALYSIS

A1 A2

AA 1-2 Key comparative figures for both **Apple** and **Google** follow.

	Apple		Google	
$ millions	Current Year	Prior Year	Current Year	Prior Year
Liabilities + Equity	$338,516	$365,725	$275,909	$232,792
Net income	55,256	59,531	34,343	30,736
Revenues	260,174	265,595	161,857	136,819

Required

1. What is the total amount of assets invested for the current year in (*a*) Apple and (*b*) Google?
2. What is the current year return on assets for (*a*) Apple and (*b*) Google?
3. How much are current year expenses for (*a*) Apple and (*b*) Google?
4. Is the current year return on assets better than the 10% return of competitors for (*a*) Apple and (*b*) Google?
5. Relying only on return on assets, would we invest in Google or Apple?

Note: Reference to **Google** throughout the text refers to **Alphabet Inc.,** as Google is a wholly owned subsidiary of Alphabet.

EXTENDED ANALYSIS

A1 A2

AA 1-3 **Samsung** is a leading global manufacturer that competes with **Apple** and **Google**. Key financial figures for Samsung follow.

	Samsung		Apple	Google
$ millions	Current Year	Prior Year	Current Year	Current Year
Average assets	$296,845	$282,723	$352,121	$254,351
Net income	18,653	38,049	55,256	34,343
Revenues	197,691	209,163	260,174	161,857

Required

1. What is the return on assets for Samsung in the (*a*) current year and (*b*) prior year?
2. Does Samsung's return on assets exhibit a favorable or unfavorable change?
3. Is Samsung's current year return on assets better or worse than that for (*a*) Apple and (*b*) Google?

Discussion Questions

1. What is the purpose of accounting in society?
2. Technology is increasingly used to process accounting data. Why then must we study and understand accounting?
3. Identify four kinds of external users and describe how they use accounting information.
4. What are at least three questions business owners and managers might be able to answer by looking at accounting information?
5. Identify three actual businesses that offer services and three actual businesses that offer products.
6. Describe the internal role of accounting for organizations.

7. Identify three types of services typically offered by accounting professionals.
8. What type of accounting information might be useful to the marketing managers of a business?
9. Why is accounting described as a service activity?
10. What are some accounting-related professions?
11. How do ethics rules affect auditors' choice of clients?
12. What work do tax accounting professionals perform in addition to preparing tax returns?
13. What does the concept of *objectivity* imply for information reported in financial statements?
14. A business reports its own office stationery on the balance sheet at its $400 cost, although it cannot be sold for more than $10 as scrap paper. Which accounting principle and/or assumption justifies this treatment?
15. Why is the revenue recognition principle needed? What does it demand?
16. Describe the four basic forms of business organization and their key attributes.
17. Define (*a*) *assets,* (*b*) *liabilities,* (*c*) *equity,* and (*d*) *net assets.*
18. What events or transactions change equity?
19. Identify the two main categories of accounting principles.
20. What do accountants mean by the term *revenue?*
21. Define *net income* and explain its computation.
22. Identify the four basic financial statements of a business.
23. What information is reported in an income statement?
24. Give two examples of expenses a business might incur.
25. What is the purpose of the statement of retained earnings?
26. What information is reported in a balance sheet?

27. The statement of cash flows reports on what major activities?

28. Define and explain return on assets.

Beyond the Numbers (BTN) assignments refine communication, conceptual, analysis, and research skills and can help develop an active learning environment.

Beyond the Numbers

ETHICS CHALLENGE

C2

BTN 1-1 Tana Thorne works in a public accounting firm and hopes to eventually be a partner. The management of Allnet Company invites Thorne to prepare a bid to audit Allnet's financial statements. In discussing the audit fee, Allnet's management suggests a fee range in which the amount depends on the reported profit of Allnet. The higher its profit, the higher will be the audit fee paid to Thorne's firm.

Required

1. Identify the parties potentially affected by this audit and the fee plan proposed.
2. What are the ethical factors in this situation? Explain.
3. Would you recommend that Thorne accept this audit fee arrangement? Why or why not?
4. Describe some ethical considerations guiding your recommendation.

COMMUNICATING IN PRACTICE

C1 C2

APPLE

BTN 1-2 Refer to **Apple**'s financial statements in Appendix A. Assume that the owners, sometime during their first five years of business, desire to expand their computer product services to meet business demand regarding computing services. They eventually decide to meet with their banker to discuss a loan to allow Apple to expand and offer computing services.

Required

1. Prepare a half-page report outlining the information you would request from the owners if you were the loan officer.
2. Indicate whether the information you request and your loan decision are affected by the form of business organization for Apple.

TEAMWORK IN ACTION

C1

BTN 1-3 Teamwork is important in today's business world. Successful teams schedule convenient meetings, maintain regular communications, and cooperate with and support their members. This assignment aims to establish support/learning teams, initiate discussions, and set meeting times.

Required

1. Form teams and open a team discussion to determine a regular time and place for your team to meet between each scheduled class meeting. Notify your instructor via a memorandum or e-mail message as to when and where your team will hold regularly scheduled meetings.
2. Develop a list of telephone numbers, LinkedIn pages, and/or e-mail addresses of your teammates.

ENTREPRENEU RIAL DECISION

A1 A2

BTN 1-4 Refer to this chapter's opening feature about **Netflix**. Assume that the owner decides to open a new company with an innovative mobile app devoted to microblogging for accountants and those learning accounting. This new company will be called AccountApp.

Required

page 43

1. AccountApp obtains a $500,000 loan, and the owner contributes $250,000 in total from his own savings in exchange for ownership of the new company.

a. What is the new company's total amount of liabilities plus equity?

b. What is the new company's total amount of assets?

Check (2) 10.7%

2. If the new company earns $80,250 in net income in the first year of operation, compute its return on assets (assume average assets equal $750,000). Assess its performance if competitors average a 10% return.

2 Accounting for Business Transactions

Chapter Preview

SYSTEM OF ACCOUNTS

C1 Source documents

Types of accounts

General ledger

NTK 2-1

DEBITS AND CREDITS

C2 T-account

Debits and credits

Normal balance

NTK 2-2

RECORDING TRANSACTIONS

A1 Journalizing and posting

Processing transactions—Examples

NTK 2-3

FINANCIAL REPORTING

P1 Trial balance preparation and use

Financial statement preparation

A2 Debt ratio

NTK 2-4

Learning Objectives

CONCEPTUAL

C1 Describe an account and its use in recording transactions.

C2 Define *debits* and *credits* and explain double-entry accounting.

ANALYTICAL

A1 Analyze and record transactions and their impact on financial statements.

A2 Compute the debt ratio and describe its use in analyzing financial condition.

PROCEDURAL

P1 Prepare financial statements from a trial balance.

Stitch in Time

"Drive loyalty and relevance for customers"—**KATRINA LAKE**

SAN FRANCISCO—Katrina Lake planned to pursue a health care career until she came up with a business idea as part of a class project. "I looked at people like [Google founders] Larry Page and Sergey Brin," recalls Katrina, "It took me a while to think that this was a path that was available to me." Katrina believed in her idea and launched her business, **Stitch Fix** (**Stitchfix.com**). Stitch Fix is an online subscription service that sends stylish clothes to customers' homes.

Katrina's business has taken off. Stitch Fix already has over 2 million customers, and the company recently began offering its stock for sale to the public (ticker: SFIX), which makes Katrina the youngest woman ever to take a company public. Admits Katrina, "We've been underestimated before."

Katrina explains that accounting is one key to her success. In the early stages of her business, Katrina set up an accounting system to track sales and expenses. She also made sure her financial reports were top quality to attract investors. Katrina asserts that reliable numbers cause "people [investors] to pay more attention."

Katrina is among the best at using accounting analytics to predict customer preferences. Much of what drives Stitch Fix's success is its algorithm that recommends clothing to customers. This drives additional sales and further subscription revenue. Katrina says that her use of accounting analytics is "what makes this company special!"

Sources: *Stitch Fix website*, January 2021; *CNN*, July 2018; *Time.com*, May 2018

Dia Dipasupil/Getty Images

BASIS OF FINANCIAL STATEMENTS

C1

Describe an account and its use in recording transactions.

Business transactions and events are the starting points of financial statements. The process to go from transactions and events to financial statements includes the following.

- Identify each transaction and event from source documents.
- Analyze each transaction and event using the accounting equation.
- Record relevant transactions and events in a journal.
- Post journal information to ledger accounts.
- Prepare and analyze the trial balance and financial statements.

Source Documents

Source documents identify and describe transactions and events entering the accounting system. They can be in hard copy or electronic form. Examples are sales receipts, checks, purchase orders, bills from suppliers, payroll records, and bank statements. For example, cash registers record each sale on a tape or electronic file. This record is a source document for recording sales in the accounting system. Source documents are objective and reliable evidence about transactions and events and their amounts.

Point: Accounting records are also called *accounting books* or the books.

"Account" Underlying Financial Statements

An **account** is a record of increases and decreases in a specific asset, liability, equity, revenue, or expense. The **general ledger,** or simply **ledger,** is a record of all accounts and their balances. The ledger is often in electronic form. While most companies' ledgers have similar accounts, a company often uses one or more unique accounts to match its type of operations. Exhibit 2.1 shows common asset, liability, and equity accounts.

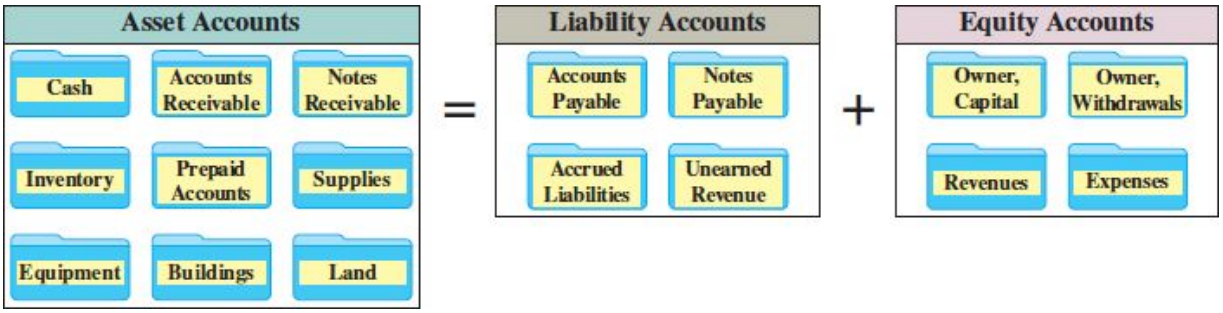


EXHIBIT 2.1

Asset Accounts Assets are resources owned or controlled page 46 by a company. Resources have expected future benefits. Most accounting systems include (at a minimum) separate accounts for the assets described here.

Cash A *Cash* account shows a company's cash balance. All increases and decreases in cash are recorded in the Cash account. It includes money and any funds that a bank accepts for deposit (coins, checks, money orders, and checking account balances).

Accounts Receivable *Accounts receivable* are held by a seller and are promises of payment from customers to sellers. Accounts receivable are increased by *credit sales* or *sales on credit* (or *on account*). They are decreased by customer payments. We record all increases and decreases in receivables in the Accounts Receivable account. When there are multiple customers, separate records are kept for each, titled Accounts Receivable—'Customer Name'.

Notes Receivable A *note receivable,* or promissory note, is a written promise of another entity to pay a specific sum of money on a specified future date to the holder of the note; the holder has an asset recorded in a Notes Receivable account. It is different than accounts receivable because it comes from a *formal contract called a promissory note.* Notes receivable usually require interest, whereas accounts receivable do not.

Prepaid Accounts *Prepaid accounts* (or *prepaid expenses*) are assets from prepayments of future expenses (expenses expected to be incurred in future accounting periods). When the expenses are later incurred, the amounts in prepaid accounts are transferred to expense accounts. Common examples of prepaid accounts are prepaid insurance, prepaid rent, and prepaid services. Prepaid accounts expire with the passage of time (such as with rent) or through use (such as with prepaid gift cards). Chapter 3 covers prepaid accounts in detail.

Supplies Accounts *Supplies* are assets until they are used. When they are used up, their costs are reported as expenses. Unused

supplies are recorded in a Supplies asset account. Supplies often are grouped by purpose—for example, office supplies and store supplies.

Equipment Accounts *Equipment* is an asset. Its cost is allocated over time to expense, called *depreciation*. Equipment often is grouped by its purpose—for example, office equipment and store equipment.

Buildings Accounts *Buildings* such as stores, offices, warehouses, and factories are assets. Cost of buildings is allocated over time to expense, called *depreciation*. When several buildings are owned, separate accounts are sometimes kept for each of them.

Land The cost of *land* is recorded in a Land account. The cost of buildings located on the land is separately recorded in building accounts.

Decision Insight

Women Entrepreneurs "Do-goodr" Jasmine Crowe (in photo), the founder and CEO of **Goodr**, works to reduce food waste and combat hunger. The Center for Women's Business Research reports women-owned businesses (1) total more than 11 million and employ nearly 20 million workers, (2) generate $2.5 trillion in annual sales and tend to embrace technology, and (3) are philanthropic—70% of owners volunteer at least once per month. ■

Jasmine Crowe, Founder and CEO of Goodr

Liability Accounts Liabilities are obligations to transfer page 47 assets or provide products or services to others. They are claims by creditors against assets. **Creditors** are individuals and organizations that have rights to receive payments from a company. **Debtors** are those who owe money. Common liability accounts are described here.

Accounts Payable *Accounts payable* are promises to pay later. Payables can come from purchases *on credit* or *on account* of merchandise for resale, supplies, equipment, and services. We record all increases and decreases in payables in the Accounts Payable

account. When there are multiple suppliers, separate records are kept for each, titled Accounts Payable—'Supplier Name'.

Notes Payable A *note payable* is a written promissory note to pay a future amount. Notes payable are different from accounts payable because they come from a *formal contract called a promissory note* and usually require interest.

Unearned Revenue Accounts **Unearned revenue** is a liability that is recorded when customers pay in advance for products or services. Examples of unearned revenue include magazine subscriptions collected in advance by a publisher, rent collected in advance by a landlord, and season ticket sales by sports teams. The seller would record these in liability accounts such as Unearned Subscriptions and Unearned Rent. When products and services are later delivered, unearned revenue is transferred to revenue.

Point: Two words that almost always identify liability accounts: "payable," meaning liabilities that must be paid, and "unearned," meaning liabilities that must be fulfilled.

Accrued Liabilities *Accrued liabilities* are amounts owed that are not yet paid. Examples are wages payable, taxes payable, and interest payable. These often are recorded in separate liability accounts by the same title.

Equity Accounts The owner's claim on a company's assets is called *equity,* or *stockholders' equity*, or *shareholders'*. Equity is the owner's *residual interest* in the assets of a business after subtracting liabilities. Equity is impacted by four types of accounts, as shown in Exhibit 2.2.

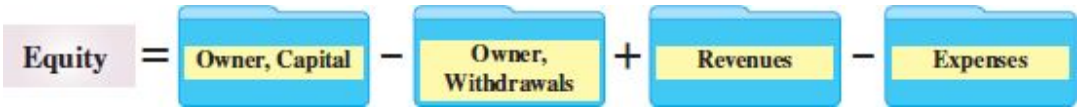


EXHIBIT 2.2

Equity Accounts

Owner Investments When an owner invests in a company, it increases both assets and equity. The increase to equity is recorded

in the account titled **Common Stock.** Owner investments are not revenues of the business.

Owner Distributions When a corporation distributes assets to its owners, it decreases both company assets and total equity. The decrease to equity is recorded in an account titled **Dividends. Dividends are not expenses of the business; they are simply the opposite of owner investments.**

Revenue Accounts Sales of products and services to customers are recorded in revenue accounts, which increase equity. Examples of revenue accounts are Sales, Commissions Revenue, Professional Fees Revenue, Rent Revenue, and Interest Revenue. **Revenues always increase equity.** Account titles can differ: Product sales are called *net sales* at Apple, *revenues* at Google, and *revenue* at Samsung. *Revenues* or *fees* is commonly used with service businesses, and *net sales* or *sales* is used with product businesses.

Expense Accounts Costs of providing products and services page 48 are recorded in expense accounts, which decrease equity. Examples of expense accounts are Advertising Expense, Salaries Expense, Rent Expense, Utilities Expense, and Insurance Expense. **Expenses always decrease equity.** A variety of revenues and expenses are in the *chart of accounts* at the end of this book.

Ledger and Chart of Accounts

The collection of all accounts and their balances is called a *ledger* (or *general ledger*). A company's size and diversity of operations affect the number of accounts needed. A small company can have as few as 20 accounts; a large company can require thousands. The **chart of accounts** is a list of all ledger accounts with an identification number assigned to each account. Exhibit 2.3 shows a common numbering system of accounts for a smaller business.

EXHIBIT 2.3

Typical Chart of Accounts

These account numbers have a three-digit code that is useful in recordkeeping. In this example, the first digit of asset accounts is a 1, the first digit of liability accounts is a 2, and so on. The second and third digits relate to the accounts' subcategories. Exhibit 2.4 shows a partial chart of accounts for FastForward.

Chart of Accounts

Assets		Liabilities		Equity					
						Revenues		Expenses	
101	Cash	201	Accounts payable	301	C. Taylor, Capital	403	Consulting revenue	622	Salaries expense
106	Accounts receivable	236	Unearned consulting revenue	302	C. Taylor, Withdrawals	406	Rental revenue	637	Insurance expense
126	Supplies							640	Rent expense
128	Prepaid insurance							652	Supplies expense
167	Equipment							690	Utilities expense

EXHIBIT 2.4

Partial Chart of Accounts for FastForward

Sam Wasson/Getty Images

Decision Insight

Unearned Revenue Many professional sports teams have over $100 million in advance ticket sales in *Unearned Revenue*. When a team plays its home games, it settles this liability to its ticket holders and then transfers the amount earned to *Ticket Revenue*. Teams such as the

Seattle Storm, **Minnesota Lynx**, and **L.A. Sparks** of the Women's National Basketball Association have unearned revenue. ■

NEED-TO-KNOW 2-1

Classifying Accounts

C1 ▶

Classify each of the following accounts as either an asset (A), liability (L), or equity (EQ) account.

1. Prepaid Rent
2. Common Stock
3. Note Receivable
4. Accounts Payable
5. Accounts Receivable
6. Equipment
7. Interest Payable
8. Unearned Revenue
9. Land
10. Prepaid Insurance
11. Wages Payable
12. Rent Payable

Solution

1. A **2.** EQ **3.** A **4.** L **5.** A **6.** A **7.** L **8.** L **9.** A **10.** A **11.** L **12.** L

Do More: QS 2-1, QS 2-2, QS 2-3,E 2-1, E 2-2, E 2-3, E 2-4

DOUBLE-ENTRY ACCOUNTING

C2

Define *debits* and *credits* and explain double-entry accounting.

Debits and Credits

A **T-account** represents a ledger account and is used to show the effects of transactions. Its name comes from its shape like the letter **T**. The layout of a T-account is shown in Exhibit 2.5.

The left side of an account is called the **debit** side, or *Dr*. The right side is called the **credit** side, or *Cr*. To enter amounts on the left side of an account is to *debit* the account. To enter amounts on the right side is to *credit* the account. The term *debit* or *credit,* by itself, does not mean increase or decrease. Whether a debit or a credit is an increase or decrease depends on the account.

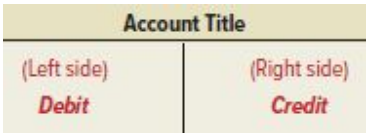


EXHIBIT 2.5

The T-Account

Point: Debit and credit are accounting directions for left and right.

The difference between total debits and total credits for an account, including any beginning balance, is the **account balance.** When total debits exceed total credits, the account has a *debit balance*. It has a *credit balance* when total credits exceed total debits. When total debits equal total credits, the account has a *zero balance*.

Double-Entry System

Double-entry accounting demands the accounting equation remain in balance, which means that for each transaction:

- **At least two accounts are involved, with at least one debit and one credit.**
- **Total amount debited must equal total amount credited.**

This means total debits must equal total credits for all entries, and total debit account balances in the ledger must equal total credit account balances. The system for recording debits and credits follows the accounting equation—see Exhibit 2.6.

Assets		=	Liabilities		+	Equity	
Debit for increases	Credit for decreases		Debit for decreases	Credit for increases		Debit for decreases	Credit for increases
+ Normal	–		–	+ Normal		–	+ Normal

EXHIBIT 2.6

Debits and Credits in the Accounting Equation

Net increases or decreases on one side have equal net effects on the other side. For example, a net increase in assets must include an equal net increase on the liabilities and equity side. Some transactions affect only one side of the equation, such as acquiring a land asset by giving up a cash asset, but their net effect on this one side is zero.

Point: Assets are on the left-hand side of the equation and thus increase on the left. Liabilities and equity are on the right-hand side of the equation and thus increase on the right.

The left side is the *normal balance* side for assets; the right side is the ***normal balance*** side for liabilities and equity. This matches their

layout in the accounting equation, where assets are on the left side and liabilities and equity are on the right.

Equity increases from revenues and owner investments (stock issuances), and it decreases from expenses and dividends. We see this by expanding the accounting equation to include debits and credits in double-entry form, as shown in Exhibit 2.7.

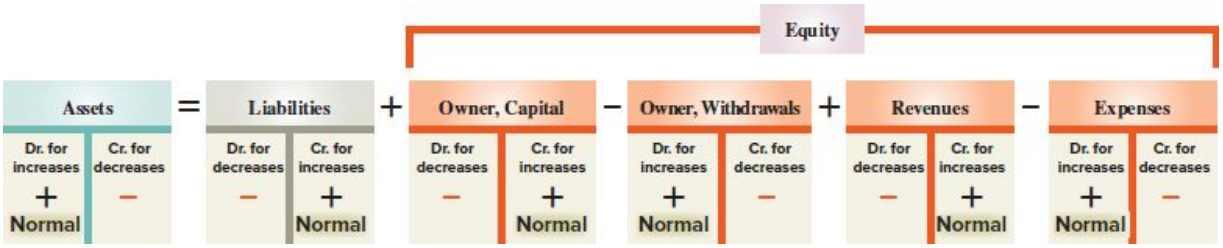


EXHIBIT 2.7

Debit and Credit Effects for Component Accounts

Increases (credits) to common stock and revenues *increase* equity; increases (debits) to dividends and expenses *decrease* equity. The normal balance of each account is the side where *increases* are recorded.

The T-account for FastForward's Cash account, reflecting page 50 its first 11 transactions (from Exhibit 1.9), is shown in Exhibit 2.8. The total increases (debits) in its Cash account are $36,100, and the total decreases (credits) are $31,300. Total debits exceed total credits by $4,800, resulting in its ending debit balance of $4,800.

Point: DrEAD means debit (**Dr**) is the normal balance side for **E**xpense, **A**sset, and **D**ividend accounts; credit the others.

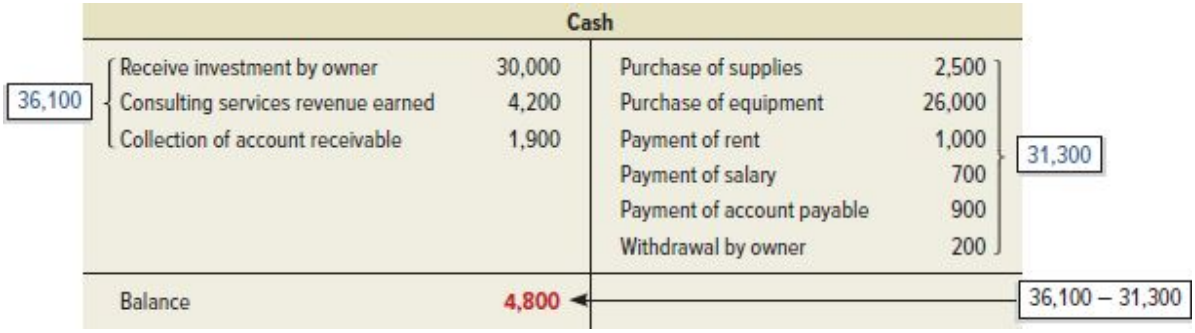


EXHIBIT 2.8

Computing the Balance for a T-Account

Point: The ending balance is on the side with the larger dollar amount.

NEED-TO-KNOW 2-2

Normal Account Balance

C2 

Identify the normal balance (debit [Dr] or credit [Cr]) for each of the following accounts.

1. Prepaid Rent
2. Common Stock
3. Note Receivable
4. Accounts Payable
5. Accounts Receivable
6. Equipment
7. Interest Payable
8. Unearned Revenue
9. Land
10. Prepaid Insurance
11. Dividends
12. Utilities Expense

Solution

1. Dr. **2.** Cr. **3.** Dr. **4.** Cr. **5.** Dr. **6.** Dr. **7.** Cr. **8.** Cr. **9.** Dr. **10.** Dr. **11.** Dr. **12.** Dr.

Do More:: QS 2-4, QS 2-5, QS 2-6, QS 2-7, E 2-5

ANALYZING AND PROCESSING TRANSACTIONS

This section covers analyzing, recording, and posting transactions.

A1

Analyze and record transactions and their impact on financial statements.

Journalizing and Posting Transactions

The four steps of processing transactions are shown in Exhibit 2.9. Steps 1 and 2—transaction analysis and the accounting equation—were already covered. This section focuses on steps 3 and 4. Step 3 is to record each transaction chronologically in a journal. A **journal** is a complete record of each transaction in one place. It also shows debits and credits for each transaction. Recording transactions in a journal is called **journalizing.** Step 4 is to transfer (or *post*) entries from the journal to the ledger. Transferring journal entry information to the ledger is called **posting.**

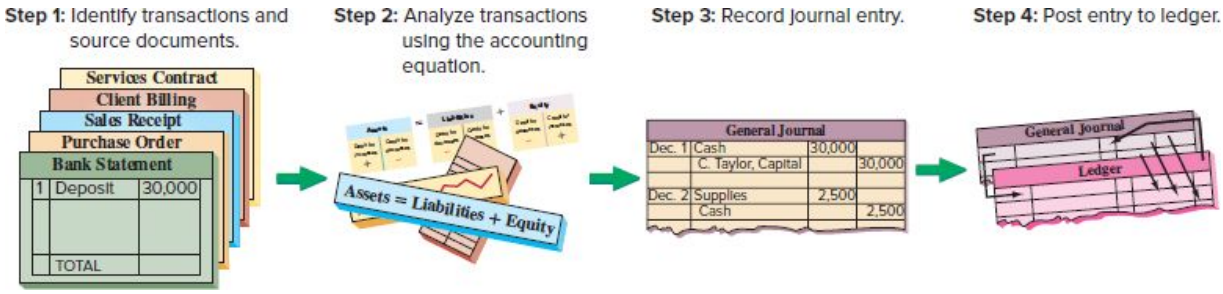


EXHIBIT 2.9

Steps in Processing Transactions

Journalizing Transactions Journalizing transactions page 51 requires an understanding of a journal. While companies can use various journals, every company uses a **general journal.** It can be used to record any transaction. Exhibit 2.10 shows how the first two transactions of FastForward are recorded in a general journal.

To record entries in a general journal, apply these steps; refer to Exhibit 2.10.

ⓐ Date the transaction on the first line of each journal entry.

ⓑ Enter titles of accounts debited and then enter amounts in the Debit column on the same line. Account titles are taken from the chart of accounts.

ⓒ Enter titles of accounts credited and then enter amounts in the Credit column on the same line. Account titles are from the chart of accounts and are indented to separate them from debited accounts.

ⓓ Enter a brief explanation of the transaction on the line below the entry.

General Journal

Date	Account Titles and Explanation	PR	Debit	Credit
2021 ⓐ Dec. 1	ⓑ Cash		30,000	
	ⓒ C. Taylor, Capital			30,000
	Receive investment by owner. ⓓ			
Dec. 2	Supplies		2,500	
	Cash			2,500
	Purchase supplies for cash.			

EXHIBIT 2.10

Partial General Journal

When a transaction is first recorded, the **posting reference (PR) column** is left blank (in a manual system). Later, when posting entries to the ledger, the identification numbers of the individual ledger accounts are entered in the PR column.

Balance Column Account T-accounts are simple and show how the accounting process works. However, actual accounting systems need more structure and therefore use a different formatting of T-accounts, called **balance column accounts,** shown in Exhibit 2.11.

General Ledger

Cash					Account No. 101
Date	Explanation	PR	Debit	Credit	Balance
2021 Dec. 1		G1	30,000		30,000
Dec. 2		G1		2,500	27,500
Dec. 3		G1		26,000	1,500
Dec. 10		G1	4,200		5,700

EXHIBIT 2.11

Cash Account in Balance Column Format

The balance column account format is similar to a T-account in having columns for debits and credits. It is different in including transaction date and explanation columns. It also has a column where the balance of the account after each entry is recorded. FastForward's Cash account in Exhibit 2.11 is debited on December 1 for the $30,000 owner investment, yielding a $30,000 debit balance. The account is credited on December 2 for $2,500, yielding a $27,500 debit balance. On December 3, it is credited for $26,000, and its debit balance is reduced to $1,500. The Cash account is debited for $4,200 on December 10, and its debit balance increases to $5,700; and so on.

The heading of the Balance column does not show whether it is a debit or credit balance. Instead, an account is assumed to have a *normal balance*. Unusual events can sometimes temporarily create an abnormal balance. An *abnormal balance* is a balance on the side where decreases are recorded. For example, a customer might mistakenly overpay a bill.

Posting Journal Entries Step 4 of processing transactions is to post journal entries to ledger accounts. All entries are posted to the ledger before financial statements are prepared so that account balances are up-to-date. When entries are posted to the ledger, the debits in journal entries are transferred into ledger accounts as debits, and credits are transferred into ledger accounts as credits. Exhibit 2.12 shows *four parts to **posting** a journal entry*. Ⓐ Identify the ledger account(s) that is debited in the entry. In the ledger, enter the entry date, the journal and page in its PR column, the debit amount, and the new balance of the ledger account. (*G* shows it came from the general journal.) Ⓑ Enter the ledger account number in the PR column of the journal. Parts Ⓒ and Ⓓ repeat the first two steps for credit entries and amounts. The posting process creates a link between the ledger and the journal entry. This link is a useful cross-reference for tracing an amount from one record to another.

Point: Posting is automatic with accounting software.

Point: The fundamental concepts of a manual system are identical to those of a computerized information system.

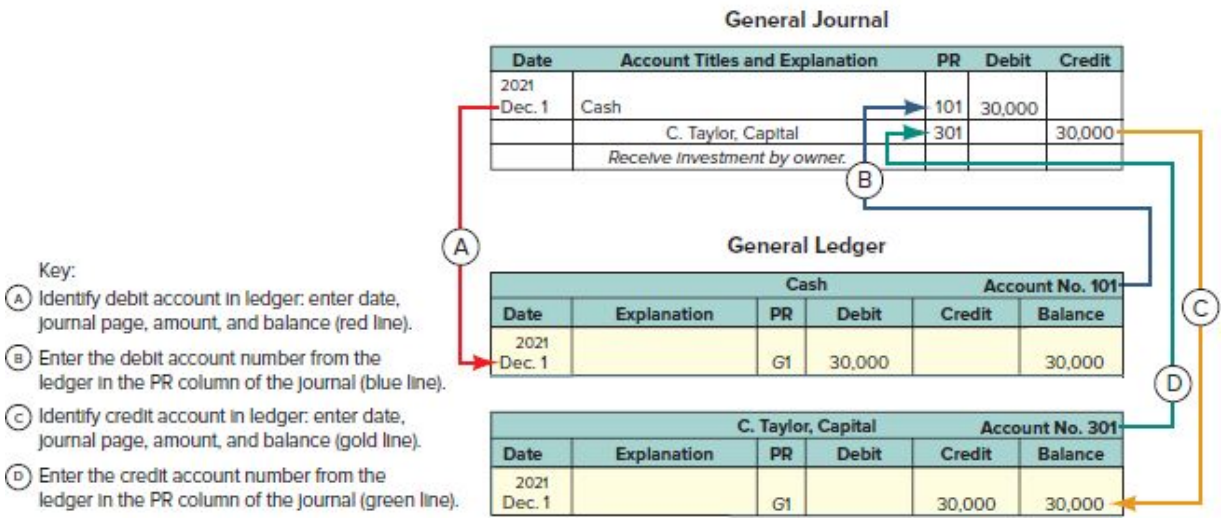


EXHIBIT 2.12

Posting an Entry to the Ledger

Ekaphon maneechot/Shutterstock

Analytics Insight

Blockchain Ledger Blockchain, the technology used to authenticate and track Bitcoin transactions, could radically change accounting systems. This technology unlocks the potential for a new type of ledger that is constantly verified, and one that cannot be changed without others noticing. Blockchain presents a unique opportunity for those with accounting knowledge, as they are highly desired to help build, implement, maintain, and audit this new technology. ■

Processing Transactions—An Example

We use FastForward to show how double-entry accounting is used in analyzing and processing transactions. Analysis of each transaction follows the four steps of Exhibit 2.9.

Step 1 Identify transactions and source documents.

Step 2 Analyze the transaction using the accounting equation.

Step 1 Record the journal entry.

Step 1 Post the entry (for simplicity, we use T-accounts as ledger accounts).

Study each transaction before moving to the next. The first 11 transactions are from Chapter 1, and we analyze five additional December transactions of FastForward (numbered 12 through 16).

Point: In Need-to-Know 2-5, we show how to use balance column accounts for the ledger.

1. Receive Investment by Owner

1 IDENTIFY FastForward receives $30,000 cash from Chas Taylor as an owner investment.

2 ANALYZE

Assets	=	Liabilities	+	Equity
Cash				C. Taylor, Capital
+30,000	=	0		+30,000

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(1)	Cash	101	30,000	
	C. Taylor, Capital	301		30,000

4 POST

Cash		101	
(1)	30,000		

C. Taylor, Capital		301	
		(1)	30,000

2. Purchase Supplies for Cash

1 IDENTIFY FastForward pays $2,500 cash for supplies.

2 ANALYZE

Assets			=	Liabilities	+	Equity
Cash		Supplies				
−2,500		+2,500	=	0	+	0

Changes the composition of assets but not the total.

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(2)	Supplies	126	2,500	
	Cash	101		2,500

4 POST

Supplies		126	
(2)	2,500		

Cash		101	
(1)	30,000	(2)	2,500

3. Purchase Equipment for Cash

1 IDENTIFY FastForward pays $26,000 cash for equipment.

2 ANALYZE

Assets			=	Liabilities	+	Equity
Cash		Equipment				
−26,000		+26,000	=	0	+	0

Changes the composition of assets but not the total.

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(3)	Equipment	167	26,000	
	Cash	101		26,000

4 POST

Equipment		167	
(3)	26,000		

Cash		101	
(1)	30,000	(2)	2,500
		(3)	26,000

4. Purchase Supplies on Credit

1 IDENTIFY FastForward purchases $7,100 of supplies on credit from a supplier.

2 ANALYZE

Assets	=	Liabilities	+	Equity
Supplies		Accounts Payable		
+7,100	=	+7,100	+	0

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(4)	Supplies	126	7,100	
	Accounts Payable	201		7,100

4 POST

Supplies			126
(2)	2,500		
(4)	7,100		

Accounts Payable			201
		(4)	7,100

5. Provide Services for Cash

1 IDENTIFY FastForward provides consulting services and immediately collects $4,200 cash.

2 ANALYZE

Assets	=	Liabilities	+	Equity
Cash				Consulting Revenue
+4,200	=	0		+4,200

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(5)	Cash	101	4,200	
	Consulting Revenue	403		4,200

4 POST

Cash			101
(1)	30,000	(2)	2,500
(5)	4,200	(3)	26,000

Consulting Revenue			403
		(5)	4,200

6. Payment of Expense in Cash

1 IDENTIFY FastForward pays $1,000 cash for December rent.

2 ANALYZE

Assets	=	Liabilities	+	Equity
Cash				Rent Expense
−1,000	=	0		−1,000

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(6)	Rent Expense	640	1,000	
	Cash	101		1,000

4 POST

Rent Expense			640
(6)	1,000		

Cash			101
(1)	30,000	(2)	2,500
(5)	4,200	(3)	26,000
		(6)	1,000

7. Payment of Expense in Cash

1 IDENTIFY FastForward pays $700 cash for employee salary.

2 ANALYZE

Assets	=	Liabilities	+	Equity
Cash				Salaries Expense
−700	=	0		−700

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(7)	Salaries Expense	622	700	
	Cash	101		700

4 POST

Salaries Expense		622
(7)	700	

Cash		101	
(1)	30,000	(2)	2,500
(5)	4,200	(3)	26,000
		(6)	1,000
		(7)	700

Point: *Salary* usually refers to compensation of a fixed amount for a given time period. *Wages* is compensation based on time worked.

8. Provide Consulting and Rental Services on Credit

1 IDENTIFY FastForward provides consulting services of $1,600 and rents its test facilities for $300. The customer is billed $1,900 for these services.

2 ANALYZE

Assets	=	Liabilities	+	Equity	
Accounts Receivable				Consulting Revenue	Rental Revenue
+1,900	=	0		+1,600	+300

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(8)	Accounts Receivable	106	1,900	
	Consulting Revenue	403		1,600
	Rental Revenue	406		300

4 POST

Accounts Receivable		106
(8)	1,900	

Consulting Revenue		403
	(5)	4,200
	(8)	1,600

Rental Revenue		406
	(8)	300

Point: Revenue is recognized when products and services are provided, not necessarily when the customer pays.

Point: Transaction 8 is a compound journal entry, which is an entry that affects three or more accounts.

9. Receipt of Cash from Accounts Receivable

1 IDENTIFY FastForward receives $1,900 cash from the customer billed in Transaction 8.

2 ANALYZE

Assets			=	Liabilities	+	Equity
Cash		Accounts Receivable				
+1,900		−1,900	=	0	+	0

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(9)	Cash	101	1,900	
	Accounts Receivable	106		1,900

4 POST

Cash			101
(1)	30,000	(2)	2,500
(5)	4,200	(3)	26,000
(9)	1,900	(6)	1,000
		(7)	700

Accounts Receivable			106
(8)	1,900	(9)	1,900

10. Partial Payment of Accounts Payable

1 IDENTIFY FastForward pays $900 cash toward the accounts payable of Transaction 4.

2 ANALYZE

Assets	=	Liabilities	+	Equity
Cash		Accounts Payable		
−900	=	−900	+	0

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(10)	Accounts Payable	201	900	
	Cash	101		900

4 POST

Accounts Payable			201
(10)	900	(4)	7,100

Cash			101
(1)	30,000	(2)	2,500
(5)	4,200	(3)	26,000
(9)	1,900	(6)	1,000
		(7)	700
		(10)	900

11. Payment of Cash Dividend

page 55

1 IDENTIFY C. Taylor withdraws $200 cash from FastForward for personal use.

2 ANALYZE

Assets	=	Liabilities	+	Equity
				C. Taylor, Withdrawals
Cash				
−200	=	0		−200

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(11)	C. Taylor, Withdrawals	302	200	
	Cash	101		200

4 POST

C. Taylor, Withdrawals			302
(11)	200		

Cash			101
(1)	30,000	(2)	2,500
(5)	4,200	(3)	26,000
(9)	1,900	(6)	1,000
		(7)	700
		(10)	900
		(11)	200

Point: Withdrawals always decrease equity.

12. Receipt of Cash for Future Services

1 IDENTIFY FastForward receives $3,000 cash in advance of providing consulting services to a customer.

2 ANALYZE

Assets	=	Liabilities	+	Equity
Cash		Unearned Consulting Revenue		
+3,000	=	+3,000	+	0

Accepting $3,000 cash requires FastForward to perform future services and is a liability. No revenue is recorded until services are provided.

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(12)	Cash	101	3,000	
	Unearned Consulting Revenue	236		3,000

4 POST

Cash		101	
(1)	30,000	(2)	2,500
(5)	4,200	(3)	26,000
(9)	1,900	(6)	1,000
(12)	3,000	(7)	700
		(10)	900
		(11)	200

Unearned Consulting Revenue		236	
		(12)	3,000

Point: "Unearned" accounts are liabilities that must be fulfilled.

13. Pay Cash for Future Insurance Coverage

1 IDENTIFY FastForward pays $2,400 cash (insurance premium) for a 24-month insurance policy. Coverage begins on December 1.

2 ANALYZE

Assets		=	Liabilities	+	Equity
Cash	Prepaid Insurance				
−2,400	+2,400	=	0	+	0

Changes the composition of assets from cash to prepaid insurance. Expense is recorded as insurance coverage expires.

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(13)	Prepaid Insurance	128	2,400	
	Cash	101		2,400

4 POST

Prepaid Insurance		128	
(13)	2,400		

Cash		101	
(1)	30,000	(2)	2,500
(5)	4,200	(3)	26,000
(9)	1,900	(6)	1,000
(12)	3,000	(7)	700
		(10)	900
		(11)	200
		(13)	2,400

14. Purchase Supplies for Cash

1 IDENTIFY FastForward pays $120 cash for supplies.

2 ANALYZE

Assets		=	Liabilities	+	Equity
Cash	Supplies				
−120	+120	=	0	+	0

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(14)	Supplies	126	120	
	Cash	101		120

4 POST

Supplies 126

(2)	2,500		
(4)	7,100		
(14)	120		

Cash 101

(1)	30,000	(2)	2,500
(5)	4,200	(3)	26,000
(9)	1,900	(6)	1,000
(12)	3,000	(7)	700
		(10)	900
		(11)	200
		(13)	2,400
		(14)	120

15. Payment of Expense in Cash

1 IDENTIFY FastForward pays $305 cash for December utilities expense.

2 ANALYZE

Assets	=	Liabilities	+	Equity
				Utilities Expense
Cash				
−305	=	0		−305

3 RECORD

Date	Account Titles and Explanation	PR	Debit	Credit
(15)	Utilities Expense	690	305	
	Cash	101		305

4 POST

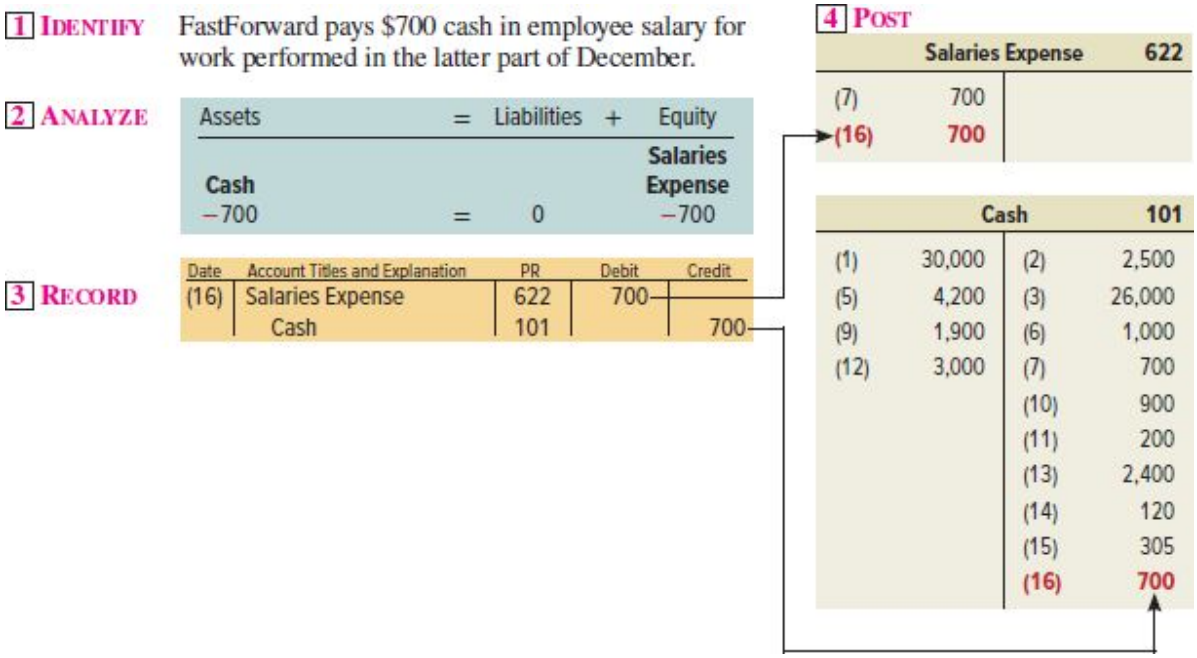
Utilities Expense 690

(15)	305		

Cash 101

(1)	30,000	(2)	2,500
(5)	4,200	(3)	26,000
(9)	1,900	(6)	1,000
(12)	3,000	(7)	700
		(10)	900
		(11)	200
		(13)	2,400
		(14)	120
		(15)	305

16. Payment of Expense in Cash

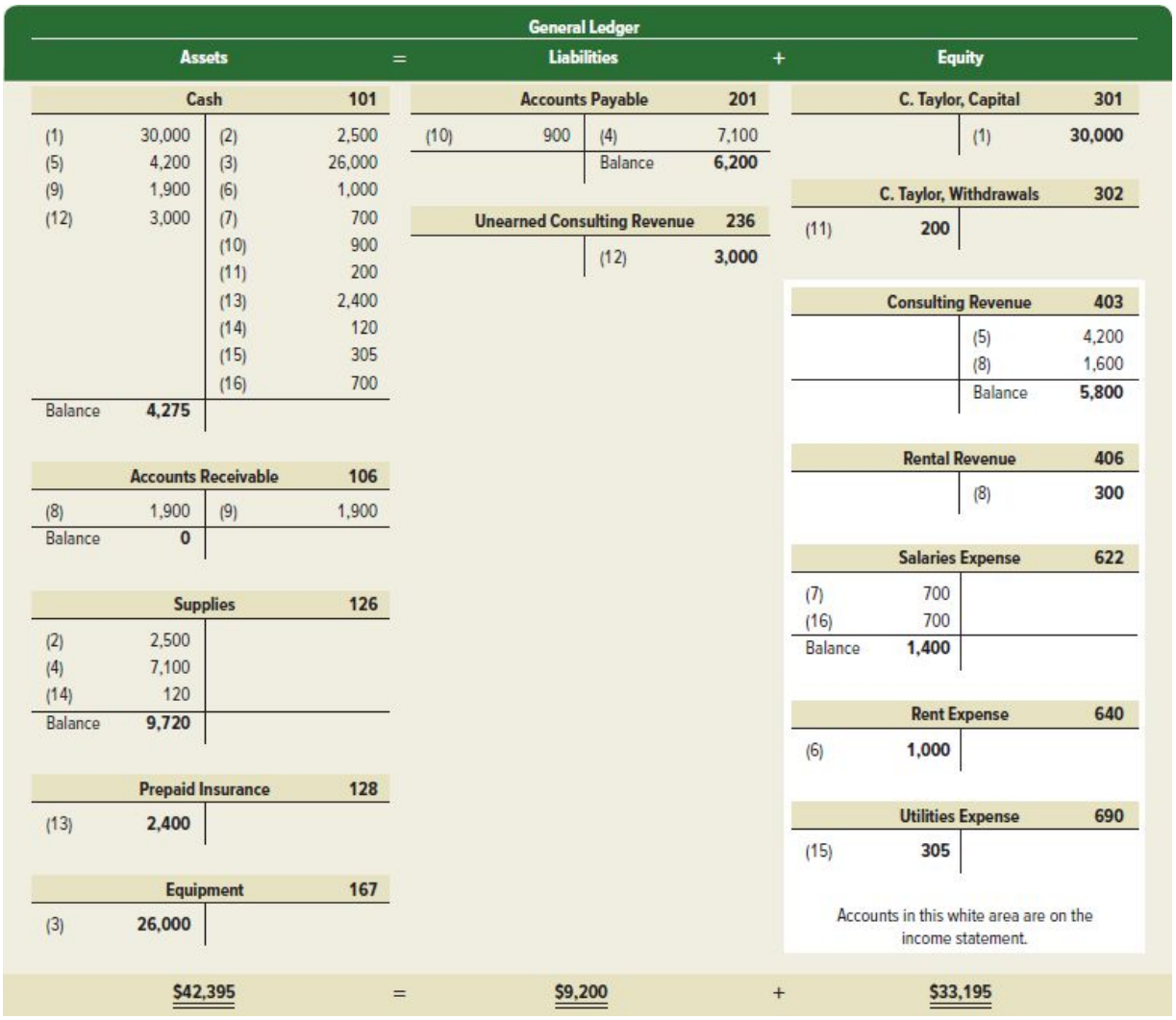


Debit and Credit Rules

Accounts	Increase (normal bal.)	Decrease
Asset	Debit	Credit
Liability	Credit	Debit
Owner, Capital	Credit	Debit
Withdrawals	Debit	Credit
Revenue	Credit	Debit
Expense	Debit	Credit

Summarizing Transactions in a Ledger

Exhibit 2.13 shows the ledger accounts (in T-account form) of FastForward after all 16 transactions are recorded and posted and the balances computed. The accounts are grouped into three columns following the accounting equation: assets, liabilities, and equity.



General Ledger

Assets = **Liabilities** + **Equity**

Cash 101

(1)	30,000	(2)	2,500
(5)	4,200	(3)	26,000
(9)	1,900	(6)	1,000
(12)	3,000	(7)	700
		(10)	900
		(11)	200
		(13)	2,400
		(14)	120
		(15)	305
		(16)	700
Balance	**4,275**		

Accounts Receivable 106

(8)	1,900	(9)	1,900
Balance	**0**		

Supplies 126

(2)	2,500
(4)	7,100
(14)	120
Balance	**9,720**

Prepaid Insurance 128

(13)	**2,400**

Equipment 167

(3)	**26,000**

Accounts Payable 201

(10)	900	(4)	7,100
		Balance	**6,200**

Unearned Consulting Revenue 236

(12)	**3,000**

C. Taylor, Capital 301

(1)	**30,000**

C. Taylor, Withdrawals 302

(11)	**200**

Consulting Revenue 403

(5)	4,200
(8)	1,600
Balance	**5,800**

Rental Revenue 406

(8)	**300**

Salaries Expense 622

(7)	700
(16)	700
Balance	**1,400**

Rent Expense 640

(6)	**1,000**

Utilities Expense 690

(15)	**305**

Accounts in this white area are on the income statement.

$42,395 = **$9,200** + **$33,195**

EXHIBIT 2.13

Ledger for FastForward (in T-Account Form)

- Totals for the three columns obey the accounting equation:
  - Assets equal **$42,395** ($4,275 + $0 + $9,720 + $2,400 + $26,000).
  - Liabilities equal **$9,200** ($6,200 + $3,000).
  - Equity equals **$33,195** ($30,000 − $200 + $5,800 + $300 − $1,400 − $1,000 − $305).
- The accounting equation is: $42,395 = $9,200 + $33,195.

- Common stock, dividends, revenue, and expense accounts reflect transactions that change equity.
- Revenue and expense account balances are reported in the income statement.

NEED-TO-KNOW 2-3

Recording Transactions

A1

Tata Company began operations on January 1 and completed the following transactions. For each transaction, (a) analyze the transaction using the accounting equation, (b) record the journal entry, and (c) post the entry using T-accounts as ledger accounts.

Jan. 1 Jamsetji Tata invested $4,000 cash in the Tata Company in exchange for common stock.

5 Tata Company purchased $2,000 of equipment on credit.

14 Tata Company provided $540 of services for a client on credit.

Solution

Jan. 1 Receive Investment by Owner

a ANALYZE

Assets	=	Liabilities	+	Equity
				J. Tata, Capital
Cash				
+4,000	=	0		+4,000

b RECORD

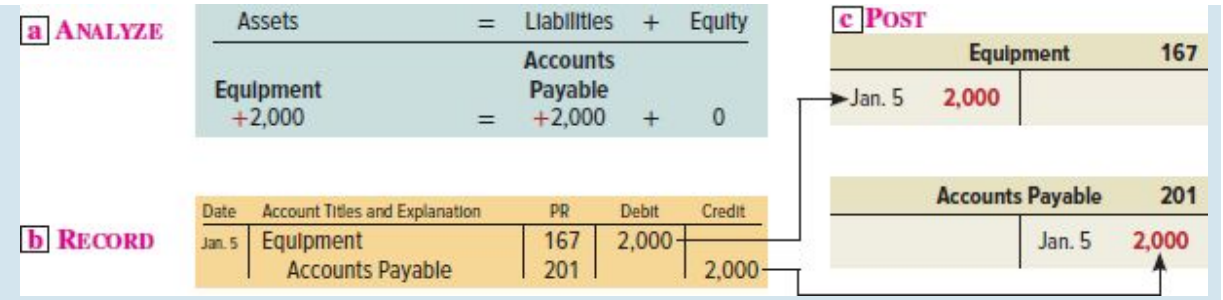
Date	Account Titles and Explanation	PR	Debit	Credit
Jan. 1	Cash	101	4,000	
	J. Tata, Capital	301		4,000

c POST

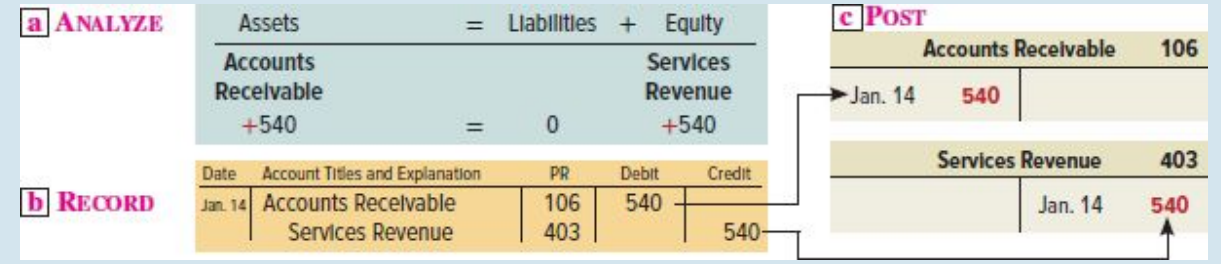
Cash		101
Jan. 1	4,000	

J. Tata, Capital		301
	Jan. 1	4,000

Jan. 5 Purchase Equipment on Credit



Jan. 14 Provide Services on Credit



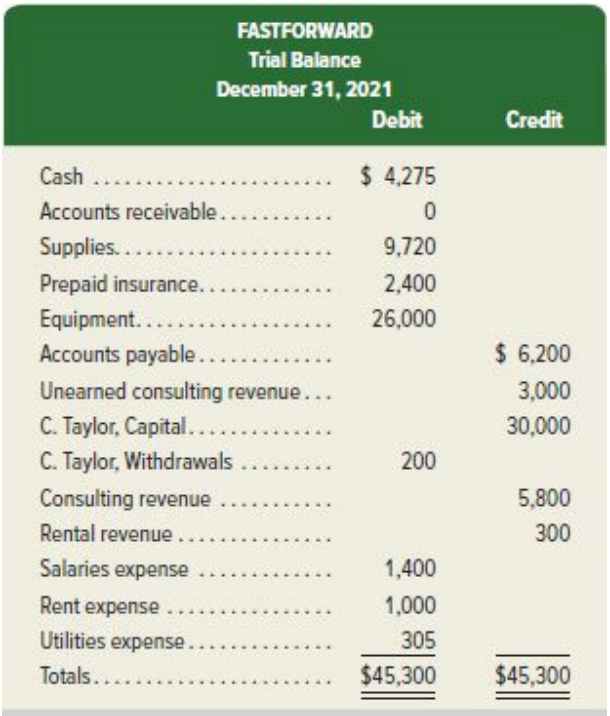
Do More:: QS 2-8 through QS 2-11, E 2-6 through E 2-11, E 2-13, E 2-15 through E 2-19

TRIAL BALANCE AND FINANCIAL STATEMENTS

P1

Prepare financial statements from a trial balance.

A **trial balance** is a list of all ledger accounts and their balances at a point in time. It is *not* a financial statement but a tool for checking equality of debits and credits in the ledger. Exhibit 2.14 shows the trial balance for FastForward after its 16 entries are posted to the ledger. (This is an *unadjusted* trial balance. Chapter 3 explains adjustments.)



FASTFORWARD
Trial Balance
December 31, 2021

	Debit	Credit
Cash	$ 4,275	
Accounts receivable	0	
Supplies	9,720	
Prepaid insurance	2,400	
Equipment	26,000	
Accounts payable		$ 6,200
Unearned consulting revenue		3,000
C. Taylor, Capital		30,000
C. Taylor, Withdrawals	200	
Consulting revenue		5,800
Rental revenue		300
Salaries expense	1,400	
Rent expense	1,000	
Utilities expense	305	
Totals	$45,300	$45,300

EXHIBIT 2.14

Trial Balance (Unadjusted)

Preparing a Trial Balance

Preparing a trial balance has three steps.

1. List each account title and its amount (from the ledger) in the trial balance.
2. Compute the total of debit balances and the total of credit balances.
3. Verify (*prove*) total debit balances equal total credit balances.

The total of debit balances equals the total of credit balances for the trial balance in Exhibit 2.14. Equality of these two totals does not guarantee that no errors were made. For example, the column totals will be equal when a debit or credit of a correct amount is made to a wrong account. Another error not identified with a trial balance is when equal debits and credits of an incorrect amount are entered.

Searching for Errors If the trial balance does not balance (when its columns are not equal), the error(s) must be found and corrected. An efficient way to search for an error is to check the journalizing, posting, and trial balance preparation in *reverse order.* Step 1 is to verify that the trial balance columns are correctly added. If step 1 does not find the error, step 2 is to verify that account balances are accurately entered from the ledger. Step 3 is to see whether a debit (or credit) balance is mistakenly listed in the trial balance as a credit (or debit). A clue to this error is when the difference between total debits and total credits equals twice the amount of the incorrect account balance. Step 4 is to recompute each account balance in the ledger. Step 5 is to verify that each journal entry is properly posted. Step 6 is to verify that the original journal entry has equal debits and credits. At this point, the errors should be uncovered.

Example: If a credit to Unearned Revenue was incorrectly posted to the Revenue ledger account, would the ledger still balance? Answer: The ledger would balance, but liabilities would be understated, equity would be overstated, and income would be overstated.

Financial Statements Prepared from Trial Balance

Financial Statements across Time How financial statements are linked in time is shown in Exhibit 2.15. A balance sheet reports an organization's financial position at a *point in time*. The income statement, statement of retained earnings, and statement of cash flows report financial performance over a *period of time*. The three statements in the middle column of Exhibit 2.15 explain how financial position changes from the beginning to the end of a reporting period.

A one-year (annual) reporting period is common, as are semiannual, quarterly, and monthly periods. The one-year reporting period is called the *accounting,* or *fiscal, year*. Businesses whose accounting year begins on January 1 and ends on December 31 are called *calendar-year* companies.

Financial Statement Preparation This section shows how to prepare *financial statements* from the trial balance. (These are

unadjusted statements. Chapter 3 explains adjustments.) We prepare these statements in the following order.

❶ **Income Statement** An income statement reports revenues earned minus expenses incurred over a period of time. FastForward's income statement for December is shown at the top right side of Exhibit 2.16. Information about revenues and expenses is taken from the trial balance on the left side. Net income of $3,395 is the *bottom line* for the income statement. Owner investments and dividends are *not* part of income.

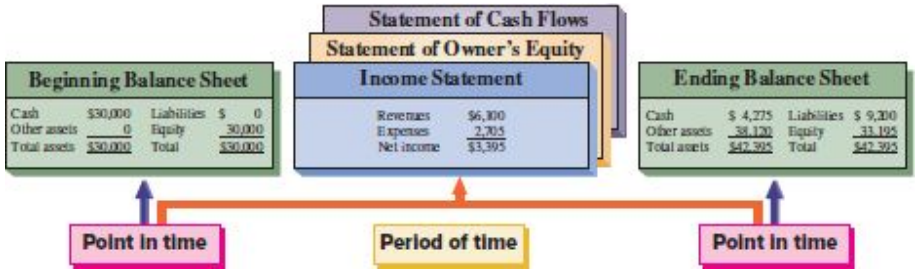


EXHIBIT 2.15

Links between Financial Statements across Time

Point: An income statement is also called an *earnings statement,* a statement of operations, or a P&L (profit and loss) statement. A balance sheet is also called a statement of financial position.

❷ **Statement of Retained Earnings** The statement of retained earnings reports how retained earnings changes over the reporting period. FastForward's statement of retained earnings is the second report in Exhibit 2.16. It shows the $3,395 of net income, the $200 dividend, and the $3,195 end-of-period balance. (The beginning balance in the statement of retained earnings is rarely zero, except in the first period of operations. The beginning balance in January 2022 is $3,195, which is December 2021's ending balance.)

❸ **Balance Sheet** The balance sheet reports the financial position of a company at a point in time. FastForward's balance sheet is the third report in Exhibit 2.16. This statement shows financial condition at the close of business on December 31. The left side of the balance sheet lists its assets: cash, supplies, prepaid insurance, and equipment. The liabilities section of the balance sheet shows that

it owes $6,200 to creditors and $3,000 in services to customers who paid in advance. The equity section shows an ending balance of $33,195. See the link between the ending balance of the statement of retained earnings and the retained earnings balance. (This presentation of the balance sheet is called the *account form:* assets on the left and liabilities and equity on the right. Another presentation is the *report form:* assets on top, followed by liabilities and then equity. Either presentation is acceptable.)

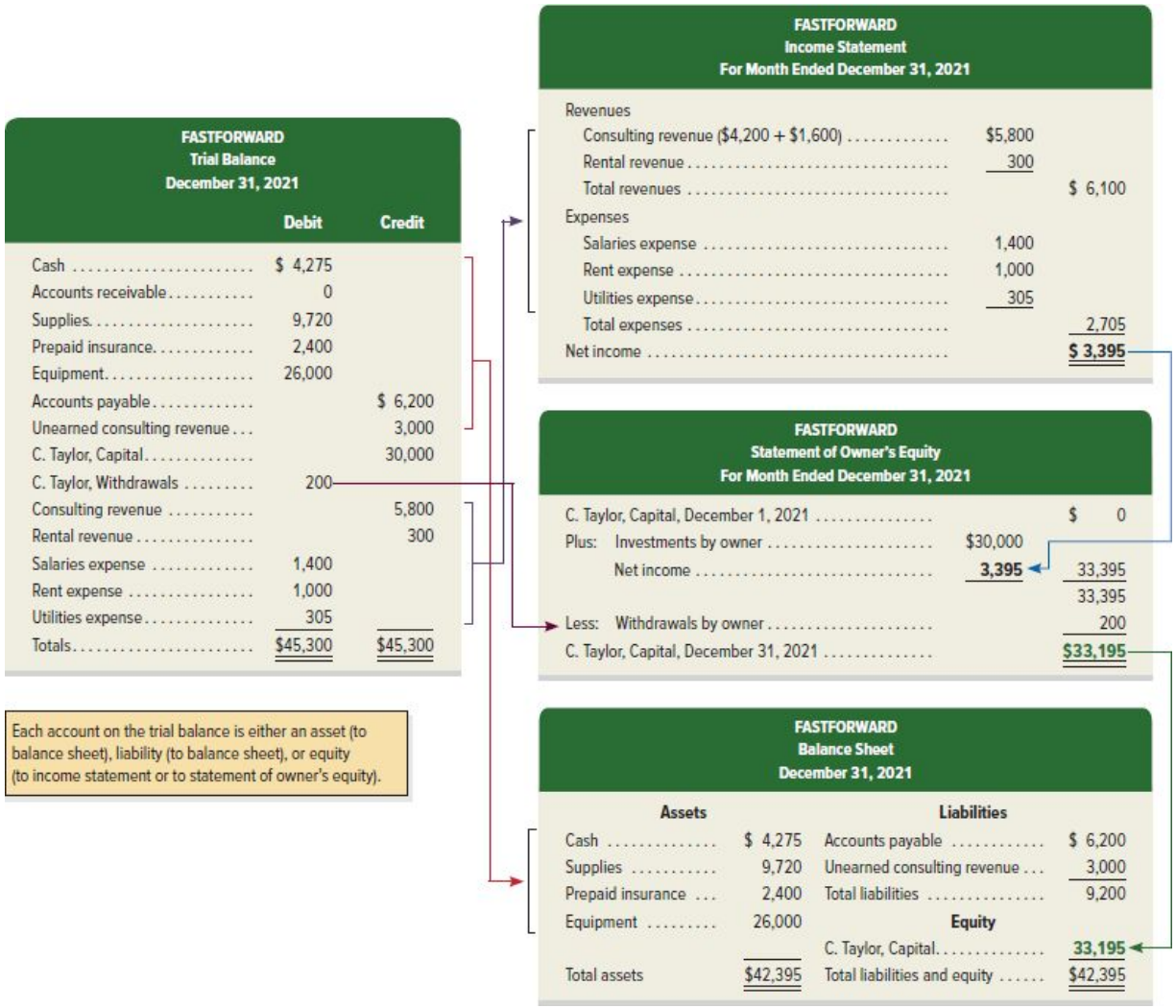


EXHIBIT 2.16

Financial Statements Prepared from Trial Balance

Point: A statement's heading lists the 3 W's: Who—name of organization, What—name of statement, When—point in time or

period of time.

Point: Arrow lines show how the statements are linked.

Point: To foot a column of numbers is to add them.

Presentation Issues Dollar signs are not used in journals and ledgers. They do appear in financial statements and other reports such as trial balances. We usually put dollar signs beside only the first and last numbers in a column.

page 61

Ethical Risk

Accounting Quality Recording valid and accurate transactions enhances the quality of financial statements. Roughly 30% of employees in IT report observing misconduct such as falsifying accounting data. They also report increased incidences of such misconduct in recent years. Source: KPMG. ■

marekuliasz/Shutterstock

NEED-TO-KNOW 2-4

Preparing Trial Balance

P1

Prepare a trial balance for Accel using the following information from its current year ended December 31.

Accounts payable	$ 7,500	Land	$30,000
Wages payable	13,000	Equipment	27,000
Rent expense	7,000	Wages expense	21,000
Cash	17,000	Accounts receivable	5,000
Services revenue	41,000	B. Accel, Capital	58,000
B. Accel, Withdrawals	12,500		

Solution

ACCEL Trial Balance December 31	Debit	Credit
Cash	$ 17,000	
Accounts receivable	5,000	
Equipment	27,000	
Land	30,000	
Accounts payable		$ 7,500
Wages payable		13,000
B. Accel, Capital		58,000
B. Accel, Withdrawals	12,500	
Services revenue		41,000
Rent expense	7,000	
Wages expense	21,000	
Totals	$119,500	$119,500

Do More:: QS 2-12 through QS 2-17, E 2-12, E 2-14, E 2-20 through E 2-28

Decision Analysis Debt Ratio

A2

Compute the debt ratio and describe its use in analyzing financial condition.

It is important to assess a company's risk of failing to pay its debts. Companies finance their assets with either liabilities or equity. A company that finances a relatively large portion of its assets with liabilities is said to have higher *financial leverage*. Higher financial leverage means greater risk because liabilities must be repaid and often require regular interest payments (equity financing does not). One measure of the risk associated with liabilities is the **debt ratio**, as defined in Exhibit 2.17.

$$\text{Debt ratio} = \frac{\text{Total liabilities}}{\text{Total assets}}$$

EXHIBIT 2.17

Debt Ratio

Costco's total liabilities, total assets, and debt ratio for the past three years are shown in Exhibit 2.18. Costco's debt ratio ranges from a low of 0.66 to a high of 0.70. Its ratio exceeds **Walmart**'s in each of the last three years, suggesting a slightly higher-than-average risk from financial leverage. So, is financial leverage good or bad for Costco? The answer: If Costco is making more money with this debt than it is paying the lenders, then it is successfully borrowing money to make more money. A company's use of debt can turn unprofitable quickly if its return from that money drops below the rate it is paying lenders.

Company ($ millions)		Current Year	1 Year Ago	2 Years Ago
Costco	Total liabilities	$29,816	$27,727	$25,268
	Total assets	$45,400	$40,830	$36,347
	Debt ratio	0.66	0.68	0.70
Walmart	Debt ratio	0.64	0.60	0.59

EXHIBIT 2.18

Computation and Analysis of Debt Ratio

Decision Maker

Investor You consider buying stock in **Converse**. As part of your analysis, you compute the company's debt ratio for 2019, 2020, and 2021 as 0.35, 0.74, and 0.94, respectively. Based on the debt ratio, is Converse a low-risk investment? Has the risk of buying Converse stock changed over this period? (The industry debt ratio averages 0.40.) ■

Answer: The debt ratio suggests that Converse's stock is of higher risk than normal and that this risk is rising. The average industry ratio of 0.40 supports this conclusion. The 2021 debt ratio for Converse is twice the industry norm. Also, a debt ratio approaching 1.0 indicates little to no equity.

NEED-TO-KNOW 2-5

COMPREHENSIVE

Journalizing and Posting Transactions, Statement Preparation, and Debt Ratio

Jasmine Worthy started a haircutting business called Expressions. The following events occurred during its first month.

Dec.1 Worthy invested $3,000 cash and $15,000 of equipment in Expressions in exchange for common stock.

2 Expressions paid $600 cash for furniture for the shop.

3 Expressions paid $500 cash to rent space in a strip mall for December.

4 Expressions purchased $1,200 of equipment on credit (recorded as accounts payable).

15 Expressions opened for business on December 5. Cash received from haircutting services in the first week and a half of business (ended December 15) was $825.

16 Expressions provided $100 of haircutting services on credit.

17 Expressions received a $100 check for services previously rendered on credit.

18 Expressions paid $125 to an assistant for hours worked for the grand opening.

31 Cash received from services provided during the second half of December was $930.

31 Expressions paid $400 cash toward the account payable from December 4.

31 Expressions paid a $900 cash dividend to Worthy (sole shareholder).

Required

1. Prepare general journal entries for the transactions. Account numbers are taken from the *Chart of Accounts* near the end of

the text.

2. Post the journal entries from part 1 to ledger accounts.
3. Prepare a trial balance as of December 31.
4. Prepare an income statement for December.
5. Prepare a statement of retained earnings for December.
6. Prepare a balance sheet as of December 31.
7. Determine the debt ratio as of December 31.

Extended Analysis

8. In the coming months, Expressions will have new business transactions. Identify which accounts are debited and which are credited for the following transactions.
   - **a.** Purchase supplies with cash.
   - **b.** Purchase supplies on credit.
   - **c.** Pay cash for future insurance coverage.
   - **d.** Receive cash for services to be provided in the future.

SOLUTION

1. General journal entries.

General Journal

Date	Account Titles and Explanation	PR	Debit	Credit
Dec. 1	Cash	101	3,000	
	Equipment	165	15,000	
	J. Worthy, Capital	301		18,000
	Owner investment.			
2	Furniture	161	600	
	Cash	101		600
	Purchased furniture for cash.			
3	Rent Expense	640	500	
	Cash	101		500
	Paid rent for December.			
4	Equipment	165	1,200	
	Accounts Payable	201		1,200
	Purchased equipment on credit.			
15	Cash	101	825	
	Services Revenue	403		825
	Cash receipts from first half of December.			
16	Accounts Receivable	102	100	
	Services Revenue	403		100
	Record revenue for services provided on credit.			

General Journal

Date	Account Titles and Explanation	PR	Debit	Credit
17	Cash	101	100	
	Accounts Receivable	102		100
	Record cash received as payment on credit.			
18	Wages Expense	623	125	
	Cash	101		125
	Paid wages to assistant.			
31	Cash	101	930	
	Services Revenue	403		930
	Cash receipts from second half of December.			
31	Accounts Payable	201	400	
	Cash	101		400
	Paid cash toward accounts payable.			
31	J. Worthy, Withdrawals	302	900	
	Cash	101		900
	Cash withdrawal by owner.			

2. Post journal entries from part 1 to the ledger accounts (in balance column format). page 63

General Ledger

Cash — Account No. 101

Date	PR	Debit	Credit	Balance
Dec. 1	G1	3,000		3,000
2	G1		600	2,400
3	G1		500	1,900
15	G1	825		2,725
17	G1	100		2,825
18	G1		125	2,700
31	G1	930		3,630
31	G1		400	3,230
31	G1		900	2,330

Accounts Receivable — Account No. 102

Date	PR	Debit	Credit	Balance
Dec. 16	G1	100		100
17	G1		100	0

Furniture — Account No. 161

Date	PR	Debit	Credit	Balance
Dec. 2	G1	600		600

Equipment — Account No. 165

Date	PR	Debit	Credit	Balance
Dec. 1	G1	15,000		15,000
4	G1	1,200		16,200

Accounts Payable — Account No. 201

Date	PR	Debit	Credit	Balance
Dec. 4	G1		1,200	1,200
31	G1	400		800

J. Worthy, Capital — Account No. 301

Date	PR	Debit	Credit	Balance
Dec. 1	G1		18,000	18,000

J. Worthy, Withdrawals — Account No. 302

Date	PR	Debit	Credit	Balance
Dec. 31	G1	900		900

Services Revenue — Account No. 403

Date	PR	Debit	Credit	Balance
Dec. 15	G1		825	825
16	G1		100	925
31	G1		930	1,855

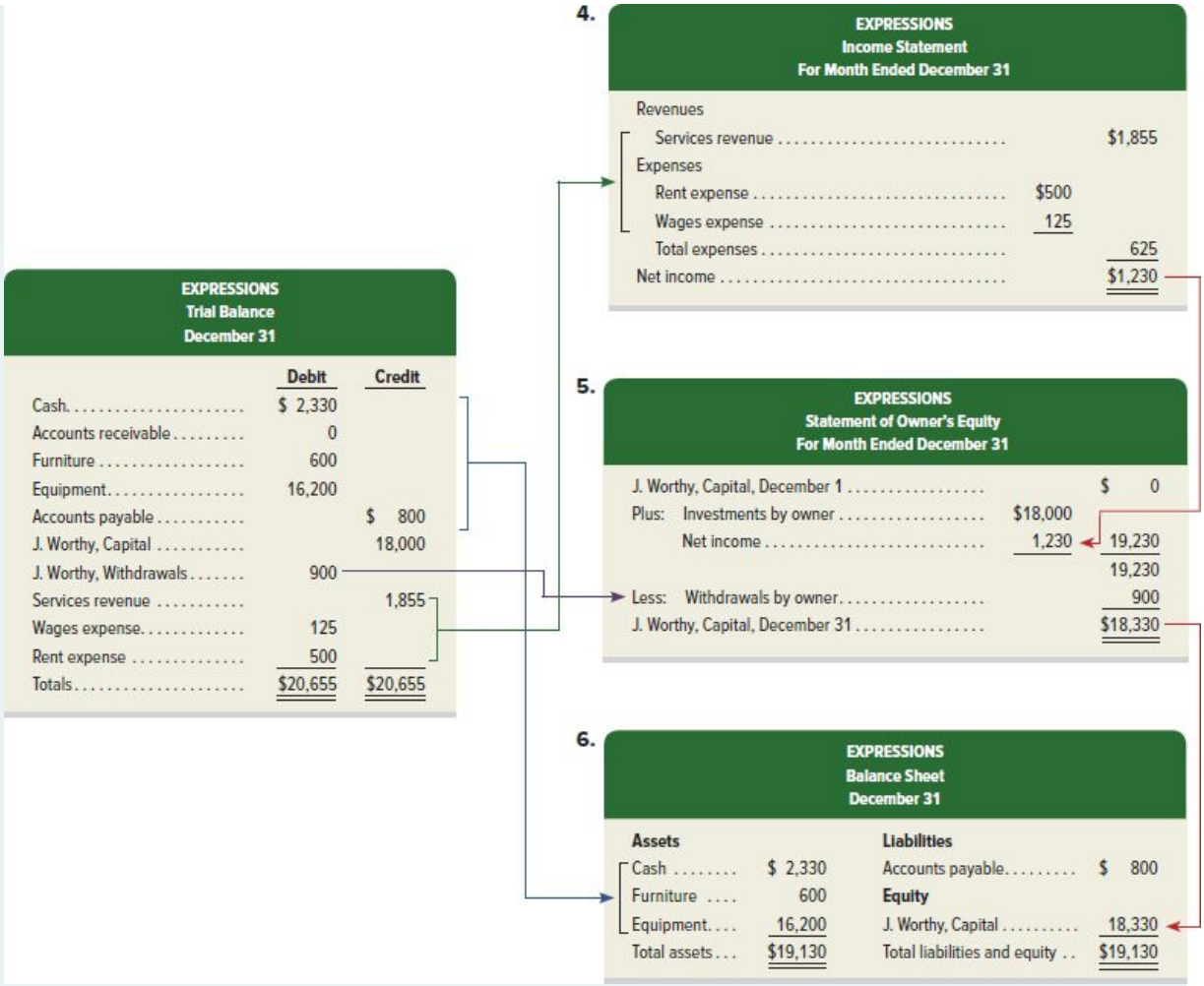
Wages Expense — Account No. 623

Date	PR	Debit	Credit	Balance
Dec. 18	G1	125		125

Rent Expense — Account No. 640

Date	PR	Debit	Credit	Balance
Dec. 3	G1	500		500

3. Prepare a trial balance from the ledger—see how it is used to construct the financial statements. page 64



EXPRESSIONS
Trial Balance
December 31

	Debit	Credit
Cash	$ 2,330	
Accounts receivable	0	
Furniture	600	
Equipment	16,200	
Accounts payable		$ 800
J. Worthy, Capital		18,000
J. Worthy, Withdrawals	900	
Services revenue		1,855
Wages expense	125	
Rent expense	500	
Totals	$20,655	$20,655

4.

EXPRESSIONS
Income Statement
For Month Ended December 31

Revenues		
Services revenue		$1,855
Expenses		
Rent expense	$500	
Wages expense	125	
Total expenses		625
Net income		$1,230

5.

EXPRESSIONS
Statement of Owner's Equity
For Month Ended December 31

J. Worthy, Capital, December 1		$ 0
Plus: Investments by owner	$18,000	
Net income	1,230	19,230
		19,230
Less: Withdrawals by owner		900
J. Worthy, Capital, December 31		$18,330

6.

EXPRESSIONS
Balance Sheet
December 31

Assets		Liabilities	
Cash	$ 2,330	Accounts payable	$ 800
Furniture	600	**Equity**	
Equipment	16,200	J. Worthy, Capital	18,330
Total assets	$19,130	Total liabilities and equity	$19,130

7. Debt ratio $= \frac{\text{Total liabilities}}{\text{Total assets}} = \frac{\$800}{\$19,130} = \mathbf{4.18\%}$

8a. *Supplies debited*

Cash *credited*

8b. Supplies *debited*

Accounts Payable *credited*

8c. Prepaid Insurance *debited*

Cash *credited*

8d. Cash *debited*

Unearned Revenue *credited*

Summary: Cheat Sheet

ACCOUNTING USES

Asset Accounts

Cash: A company's cash balance.

Accounts receivable: Held by a seller; promises of payment from customers to sellers. Accounts receivable are increased by credit sales; often phrased as sales *on account* or *on credit*.

Notes receivable: Held by a lender; a borrower's written promise to pay the lender a specific sum of money on a specified future date.

Prepaid accounts (or **expenses):** Assets that arise from prepayment of future expenses. Examples are prepaid insurance and prepaid rent.

More assets: Supplies, equipment, buildings, and land.

Liability Accounts

Accounts payable: Held by a buyer; a buyer's promise to pay a seller later for goods or services received. More generally, payables arise from purchases of merchandise for resale, supplies, services, and other items.

Notes payable: Held by a borrower; a written promissory note to pay a future amount at a future date.

Unearned revenue: A liability to be settled in the future when a company delivers its products or services. When a customer pays in advance for products or services, the seller records this receipt as unearned revenue.

Accrued liabilities: Amounts owed that are not yet paid. Examples are wages payable, taxes payable, and interest payable.

Equity Accounts

Common stock: When an owner invests in a company, the company increases both assets and equity.

Dividends: When a company pays dividends, it decreases both company assets and total equity.

Revenue: Amounts received from sales of products and services to customers. Revenue increases equity.

Expenses: Costs of providing products and services. Expenses decrease equity.

DEBITS AND CREDITS

Debit: Left side of an account is called the **debit** side, or Dr.

Credit: Right side of an account is called the **credit** side, or Cr.

Double-entry accounting transaction rules:

- At least two accounts are involved, with at least one debit and one credit.
- Total amount debited must equal total amount credited.

Debits and credits in accounting equation:

Net increases or decreases on one side have equal net effects on the other side.

Left side is the normal balance side for assets.

Right side is the normal balance side for liabilities and equity.

RECORDING TRANSACTIONS

Receive owner investment:

Date	Account Titles and Explanation	PR	Debit	Credit
(1)	Cash	101	30,000	
	C. Taylor, Capital	301		30,000

Purchase supplies for cash:

Date	Account Titles and Explanation	PR	Debit	Credit
(2)	Supplies	126	2,500	
	Cash	101		2,500

Purchase equipment for cash:

Date	Account Titles and Explanation	PR	Debit	Credit
(3)	Equipment	167	26,000	
	Cash	101		26,000

Purchase supplies on credit:

Date	Account Titles and Explanation	PR	Debit	Credit
(4)	Supplies	126	7,100	
	Accounts Payable	201		7,100

Provide services for cash:

Date	Account Titles and Explanation	PR	Debit	Credit
(5)	Cash	101	4,200	
	Consulting Revenue	403		4,200

Payment of expenses in cash:

Date	Account Titles and Explanation	PR	Debit	Credit
(6)	Rent Expense	640	1,000	
	Cash	101		1,000

Date	Account Titles and Explanation	PR	Debit	Credit
(7)	Salaries Expense	622	700	
	Cash	101		700

Date	Account Titles and Explanation	PR	Debit	Credit
(15)	Utilities Expense	690	305	
	Cash	101		305

Provide consulting and rental services on credit:

Date	Account Titles and Explanation	PR	Debit	Credit
(8)	Accounts Receivable	106	1,900	
	Consulting Revenue	403		1,600
	Rental Revenue	406		300

Receipt of cash from receivable:

Date	Account Titles and Explanation	PR	Debit	Credit
(9)	Cash	101	1,900	
	Accounts Receivable	106		1,900

Partial payment of accounts payable:

Date	Account Titles and Explanation	PR	Debit	Credit
(10)	Accounts Payable	201	900	
	Cash	101		900

Withdrawal of cash by owner:

Date	Account Titles and Explanation	PR	Debit	Credit
(11)	C. Taylor, Withdrawals	302	200	
	Cash	101		200

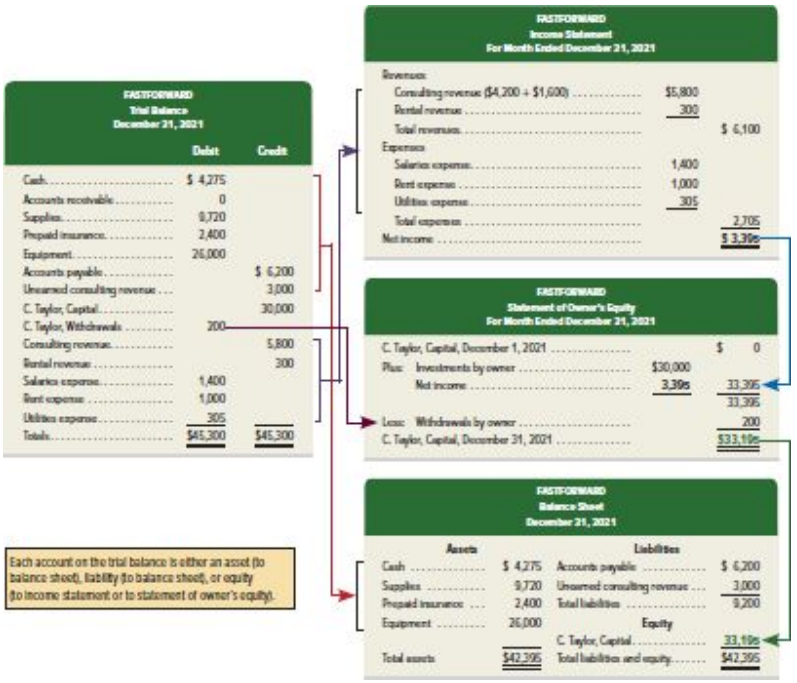
Receipt of cash for future services:

Date	Account Titles and Explanation	PR	Debit	Credit
(12)	Cash	101	3,000	
	Unearned Consulting Revenue	236		3,000

Pay cash for future insurance coverage:

Date	Account Titles and Explanation	PR	Debit	Credit
(13)	Prepaid Insurance	128	2,400	
	Cash	101		2,400

FINANCIAL STATEMENTS



Key Terms

Account (45)

Account balance (49)

Balance column account (51)

Chart of accounts (48)

Compound journal entry (54)

Credit (49)

Creditors (47)

Debit (49)

Debt ratio (61)

Debtors (47)

Double-entry accounting (49)

General journal (51)

General ledger (45)

Journal (50)

Journalizing (50)

Ledger (45)

Posting (50)

Posting reference (PR) column (51)

Source documents (45)

T-account (49)

Trial balance (58)

Unearned revenue (47)

Multiple Choice Quiz

1. Amalia Company received its utility bill for the current period of $700 and immediately paid it. Its journal entry to record this

transaction includes a

a. Credit to Utility Expense for $700.

b. Debit to Utility Expense for $700.

c. Debit to Accounts Payable for $700.

d. Debit to Cash for $700.

e. Credit to Accounts Receivable for $700.

2. On May 1, Ruby Lawn Service collected $2,500 cash from a customer in advance of five months of lawn service. Ruby's journal entry to record this transaction includes a

a. Credit to Unearned Revenue for $2,500.

b. Debit to Services Revenue for $2,500.

c. Credit to Cash for $2,500.

d. Debit to Unearned Revenue for $2,500.

e. Credit to Accounts Payable for $2,500.

3. Liang Shue contributed $250,000 cash and land worth $500,000 to open the new business, Shue Consulting. Which of the following journal entries does Shue Consulting make to record this transaction?

a. Cash 750,000

Common Stock 750,000

b. Common Stock 750,000

Accounts receivable 750,000

c. Cash 250,000

Land 500,000

Common Stock 750,000

d. Common Stock 750,000

Cash 250,000

Land 500,000

4. A trial balance prepared at year-end shows total credits exceed total debits by $765. This discrepancy could have been caused by

   a. An error in the general journal where a $765 increase in Accounts Payable was recorded as a $765 decrease in Accounts Payable.

   b. The ledger balance for Accounts Payable of $7,650 being entered in the trial balance as $765.

   c. A general journal error where a $765 increase in Accounts Receivable was recorded as a $765 increase in Cash.

   d. The ledger balance of $850 in Accounts Receivable was entered in the trial balance as $85.

   e. An error in recording a $765 increase in Cash as a credit.

5. Bon Company has total assets of $1,000,000, liabilities of $400,000, and equity of $600,000. What is its debt ratio?

   a. 250% **c.** 67% **e.** 40%

   b. 167% **d.** 150%

ANSWERS TO MULTIPLE CHOICE QUIZ

1. b; debit Utility Expense for $700, and credit Cash for $700.
2. a; debit Cash for $2,500, and credit Unearned Revenue for $2,500.
3. c
4. d
5. e; Debit ratio = $400,000/$1,000,000 = 40%

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use-different numbers, and instructors can turn this feature on or off.

QUICK STUDY

QS 2-1

Identifying source documents **C1**

Identify the items from the following list that are likely to serve as source documents.

a. Sales receipt

b. Trial balance

c. Balance sheet

d. Prepaid insurance account

e. Invoice from supplier

f. Company revenue account

g. Income statement

h. Bank statement

i. Telephone bill

QS 2-2

Identifying financial statement accounts

C1

Classify each of the following accounts as an Asset, Liability, or Equity account.

a. Cash

b. Prepaid Rent

c. Office Supplies

d. Prepaid Insurance

e. Office Equipment

f. Notes Payable

g. Accounts Payable

h. Unearned Rent Revenue

i. Notes Receivable

QS 2-3

Reading a chart of accounts

C1

A chart of accounts is a list of all ledger accounts and an identification number for each. One example of a chart of accounts is near the end of the book on pages CA and CA-1. Using that chart, identify the following accounts as either an Asset, Liability, Equity, Revenue, or Expense account, along with its identification number.

a. Advertising Expense

b. Rent Revenue

c. Rent Receivable

d. Machinery

e. Accounts Payable

f. Furniture

g. Notes Payable

h. Prepaid Insurance

i. Utilities Expense

QS 2-4

Identifying normal balance

C2

Identify the normal balance (debit or credit) for each of the following accounts.

a. Rideshare Revenue

b. Office Supplies

c. Cash

d. Wages Expense

e. Accounts Receivable

f. Prepaid Rent

g. Wages Payable

h. Building

i. Unearned Revenue

QS 2-5

Linking debit or credit with normal balance **C2**

Indicate whether a debit or credit *decreases* the normal balance of each of the following accounts.

a. Interest Payable

b. Accounts Receivable

c. Prepaid Insurance

d. Buildings

e. Accounts Payable

f. Land

QS 2-6

Analyzing debit or credit by account

C2

Identify whether a debit or credit results in the indicated change for each of the following accounts.

a. To increase Land

b. To decrease Cash

c. To increase Consulting Revenue

d. To increase Salaries Expense

e. To decrease Unearned Revenue

f. To decrease Prepaid Rent

g. To increase Notes Payable

h. To decrease Accounts Receivable

i. To increase Accounts Payable

j. To increase Store Equipment

QS 2-7

Computing T-account balance

C2

Determine the ending balance of each of the following T-accounts.

a.

Cash	
100	50
300	60
20	

b.

Accounts Payable	
2,000	8,000
2,700	

c.

Supplies	
10,000	3,800
1,100	

d.

Accounts Receivable	
600	150
	150
	150
	100

e.

Wages Payable	
	700
700	

f.

Cash	
11,000	4,500
800	6,000
100	1,300

QS 2-8

Analyzing transactions and preparing journal entries

A1

For each transaction, (1) analyze the transaction using the accounting equation, (2) record the transaction in journal entry form, and (3) post the entry using T-accounts to represent ledger accounts. Use the

following partial chart of accounts—account numbers in parentheses: Cash (101); Accounts Receivable (106); Office Supplies (124); Trucks (153); Equipment (167); Accounts Payable (201); Unearned Landscaping Revenue (236); Common Stock (307); Dividends (319); Landscaping Revenue (403); Wages Expense (601); and Landscaping Expense (696).

a. On May 15, DeShawn Tyler opens a landscaping company called Elegant Lawns by investing $7,000 in cash along with equipment having a $3,000 value in exchange for common stock.

b. On May 21, Elegant Lawns purchases office supplies on credit for $500.

c. On May 25, Elegant Lawns receives $4,000 cash for performing landscaping services.

d. On May 30, Elegant Lawns receives $1,000 cash in advance of providing landscaping services to a customer.

QS 2-9

Preparing journal entries

A1

Prepare general journal entries for the following transactions of Green Energy Company. Use the following partial chart of accounts: Cash; Accounts Receivable; Supplies; Accounts Payable; Consulting Revenue; and Utilities Expense.

May 1 The company provided $2,000 of sustainability consulting services on credit to a customer.

3 The company purchased $300 of energy-efficient supplies on credit.

9 The company collected $500 cash as partial payment of the May 1 consulting revenue.

20 The company paid $300 cash toward the payable for energy-efficient supplies.

31 The company paid $100 cash for May's renewable energy utilities.

QS 2-10

Analyzing transactions using accounting equation

A1

Analyze each transaction in QS 2-9 by showing its effects on the accounting equation—specifically, identify the accounts and amounts (including + or −) for each transaction.

QS 2-11

Preparing compound journal entries **A1**

Prepare compound journal entries for each transaction.

a. The owner invests $6,500 cash and $3,500 of equipment in the company in exchange for common stock.

b. The company acquires $2,000 of supplies by paying $500 cash and putting $1,500 on credit (accounts payable).

QS 2-12

Identifying a posting error

P1

A trial balance has total debits of $20,000 and total credits of $24,500. Which one of the following errors would create this imbalance?

a. A $2,250 debit to Utilities Expense in a journal entry was incorrectly posted to the ledger as a $2,250 credit, leaving the Utilities Expense account with a $3,000 debit balance.

b. A $4,500 debit to Salaries Expense in a journal entry was incorrectly posted to the ledger as a $4,500 credit, leaving the Salaries Expense account with a $750 debit balance.

c. A $2,250 credit to Consulting Revenue in a journal entry was incorrectly posted to the ledger as a $2,250 debit, leaving the Consulting Revenue account with a $6,300 credit balance.

d. A $2,250 debit posting to Accounts Receivable was posted mistakenly to Land.

e. A $4,500 debit posting to Equipment was posted mistakenly to Cash.

f. An entry debiting Cash and crediting Accounts Payable for $4,500 was mistakenly not posted.

QS 2-13

Classifying accounts in financial statements

P1

Indicate the financial statement on which each of the following items appears: income statement, statement of retained earnings, or balance sheet.

a. Services Revenue

b. Interest Payable

c. Accounts Receivable

d. Salaries Expense

e. Equipment

f. Prepaid Insurance

g. Buildings

h. Rental Revenue

i. Unearned Revenue

j. Office Supplies

k. Interest Expense

l. Insurance Expense

QS 2-14

Preparing a trial balance

P1

Lawson Consulting had the following accounts and amounts on December 31. Prepare a December 31 trial balance.

Cash	$5,000	Accounts payable	$ 3,000	Services revenue	$12,000
Accounts receivable	4,500	I. Lawson, Capital	10,500	Rent expense	2,000
Equipment	6,500	I. Lawson, Withdrawals	1,500	Wages expense	6,000

QS 2-15

Preparing an income statement **P1**

Use the information in QS 2-14 to prepare a December income statement for Lawson Consulting. The company began operations on December 1.

QS 2-16

Preparing a statement of retained earnings **P1**

Use the information in QS 2-14 to prepare a December statement of retained earnings for Lawson Consulting. The Retained Earnings account balance at December 1 was $0. *Hint:* Net income for December is $4,000.

QS 2-17

Preparing a balance sheet

P1

Use the information in QS 2-14 to prepare a December 31 balance sheet for Lawson Consulting. *Hint:* The ending Retained Earnings account balance as of December 31 is $2,500.

QS 2-18

Interpreting debt ratio

A2

The debt ratio for Deutsche Auto for each of the last three years follows. Over this three-year period, did the company's risk from financial leverage increase or decrease?

	Current Year	1 Year Ago	2 Years Ago
Debt ratio	61%	45%	37%

QS 2-19

Computing and using the debt ratio **A2**

Home Demo reports the following: Total liabilities = $38,633 million and Total assets = $42,966 million. (a) Compute Home Demo's debt ratio. (b) Assuming Lows Hardware (a competitor) has a debt ratio of 60.0%, which company has higher risk from financial leverage?

EXERCISES

Exercise 2-1

Steps in analyzing and recording transactions **C1**

Order the following steps in the accounting process that focus on analyzing and recording transactions.

a. Prepare and analyze the trial balance.

b. Analyze each transaction from source documents.

c. Record relevant transactions in a journal.

d. Post journal information to ledger accounts.

Exercise 2-2

Identifying source documents from accounting processes

C1

Identify the source document for NDX Company in each of the following accounting processes.

a. A customer purchases merchandise with a credit card. NDX uses the electronic sales receipt to record transaction details in its accounting system.

b. NDX purchases goods and receives a bill from the supplier. Details from the bill are captured and entered in the accounting database, which is stored in the cloud.

c. An NDX employee receives a bank statement each month on her company e-mail. The statement is used to record bank fees incurred for that month.

Exercise 2-3

Identifying and classifying accounts

C1

Identify the item that best completes each of the descriptions below.

1. Asset

2. Equity

3. Account

4. Liability

5. Three

a. Balance sheet accounts are arranged into _____ general categories.

b. The owner's claim on a company's assets is called _____.

c. Accounts Payable and Notes Payable are examples of _____ accounts.

d. Accounts Receivable, Prepaid Accounts, Supplies, and Land are examples of _____ accounts.

e. A(n) _____ is a record of increases and decreases in a specific asset, liability, equity, revenue, or expense item.

Exercise 2-4

Identifying a ledger and chart of accounts

C1

Identify the item that best completes each of the descriptions below.

1. Chart

2. General ledger

3. Journal

4. Account

5. Source document

a. A(n) _____ of accounts is a list of all accounts a company uses, not including account balances.

b. The _____ is a record containing all accounts used by a company, including account balances.

c. A(n) _____ describes transactions entering an accounting system, such as a purchase order.

d. Increases and decreases in a specific asset, liability, equity, revenue, or expense are recorded in a(n) _____.

e. A(n) _____ has a complete record of every transaction recorded.

Exercise 2-5

Identifying type and normal balances of accounts

C2

For each of the following, (1) identify the account as an asset, liability, equity, revenue, or expense; (2) identify the normal balance of the account; and (3) enter *debit* or *credit* to identify the kind of entry that would increase the account balance.

a. Land

e. Accounts Receivable

i. Equipment

b. Cash

f. Tour Service Revenue

j. Notes Payable

c. Legal Expense

g. Unearned Revenue

d. Prepaid Insurance

h. Services Revenue

Exercise 2-6

Analyzing effects of a compound entry

A1

Groro Co. bills a client $62,000 for services provided and agrees to accept the following three items in full payment: (1) $10,000 cash, (2) $80,000 of equipment, and (3) $28,000 note payable owed on the equipment. For this transaction, (*a*) analyze the transaction using the accounting equation, (*b*) record the transaction in journal entry form, and (*c*) post the entry using T-accounts to represent ledger accounts. Use the following partial chart of accounts—account numbers in parentheses: Cash (101); Supplies (124); Equipment (167); Accounts Payable (201); Note Payable (245); Common Stock (307); and Services Revenue (403).

Exercise 2-7

Analyzing account entries and balances

A1

Use the information in each of the following separate cases to calculate the unknown amount.

a. Corentine Co. had $152,000 of accounts payable on September 30 and $132,500 on October 31. Total purchases on credit during October were $281,000. Determine how much cash was paid on accounts payable during October.

b. On September 30, Valerian Co. had a $102,500 balance in Accounts Receivable. During October, the company collected $102,890 from its credit customers. The October 31 balance in Accounts Receivable was $89,000. Determine the amount of sales on credit that occurred in October.

c. During October, Alameda Company had $102,500 of cash receipts and $103,150 of cash disbursements. The October 31 Cash balance was $18,600. Determine how much cash the company had at the close of business on September 30.

Exercise 2-8

Preparing journal entries

A1

Prepare general journal entries for the following transactions of Sustain Company.

June 1 T. James, owner, invested $11,000 cash in Sustain Company in exchange for common stock.

2 The company purchased $4,000 of furniture made from reclaimed wood on credit.

3 The company paid $600 cash for a 12-month prepaid insurance policy on the reclaimed furniture.

4 The company billed a customer $3,000 for sustainability services provided.

12 The company paid $4,000 cash toward the payable from the June 2 furniture purchase.

20 The company collected $3,000 cash for services billed on June 4.

21 T. James invested an additional $10,000 cash in Sustain Company in exchange for common stock.

30 The company received $5,000 cash in advance of providing sustainability services to a customer.

Exercise 2-9

Preparing general journal entries

A1

Prepare general journal entries for the following transactions of a new company called Pose-for-Pics. Use the following partial chart of accounts: Cash; Supplies; Prepaid Insurance; Equipment; Common Stock; Services Revenue; and Utilities Expense.

Aug. 1 M. Harris, the owner, invested $6,500 cash and $33,500 of photography equipment in the company in exchange for common stock.

2 The company paid $2,100 cash for an insurance policy covering the next 24 months.

5 The company purchased supplies for $880 cash.

20 The company received $3,331 cash from taking photos for customers.

31 The company paid $675 cash for August utilities.

Exercise 2-10

Recording transactions in balance column accounts

A1

Open a ledger account for Cash in balance column format. Post general journal entries that impact cash from Exercise 2-9 to the ledger account for Cash, and enter the balance after each posting.

Exercise 2-11

Analyzing transactions using accounting equation **A1**

Analyze each transaction in Exercise 2-9 by showing its effects on the accounting equation—specifically, identify the accounts and amounts (including + or −) for each transaction.

Exercise 2-12

Preparing T-accounts (ledger) and a trial balance

P1

Use the information in Exercise 2-9 to open the following T-accounts: Cash; Supplies; Prepaid Insurance; Equipment; Common Stock; Services Revenue; and Utilities Expense. (1) Post the general journal entries to these T-accounts (which will serve as the ledger). (2) Prepare the August 31 trial balance.

Exercise 2-13

Recording effects of transactions in T-accounts

A1

For the following transactions of Spade Company, (1) prepare general journal entries and (2) post entries to T-accounts and calculate the ending balance of each T-account. Use the following accounts: Cash; Accounts Receivable; Supplies; Equipment; Accounts Payable; Common Stock; Dividends; Services Revenue; and Rent Expense.

a. K. Spade, owner, invested $100,750 cash in the company in exchange for common stock.

b. The company purchased supplies for $1,250 cash.

c. The company purchased $10,050 of equipment on credit.

d. The company received $15,500 cash for services provided to a customer.

e. The company paid $10,050 cash to settle the payable for the equipment purchased in transaction *c*.

f. The company billed a customer $2,700 for services provided.

g. The company paid $1,225 cash for the monthly rent.

h. The company collected $1,125 cash as partial payment for the account receivable created in transaction *f*.

i. The company paid a $10,000 cash dividend to the owner (sole shareholder).

Check Cash ending balance, $94,850

Exercise 2-14

Preparing a trial balance

P1

After recording the transactions of Exercise 2-13 in T-accounts and calculating the balance of each account, prepare a trial balance. Use May 31 as its report date.

Exercise 2-15

Analyzing and journalizing transactions involving cash payments

A1

1. Prepare general journal entries for the following transactions of Valdez Services.

a. The company paid $2,000 cash for payment on a 6-month-old account payable for office supplies.

b. The company paid $1,200 cash for the just-completed two-week salary of the receptionist.

c. The company paid $39,000 cash for equipment purchased.

d. The company paid $800 cash for this month's utilities.

e. The company paid a $4,500 cash dividend to the owner (sole shareholder).

2. Transactions *a, c,* and *e* did not result in an expense. Match each transaction (*a, c,* and *e*) with one of the following reasons for not recording an expense.

_____ This transaction is a distribution of cash to the owner. Even though equity decreased, that decrease did not occur in the process of providing goods or services to customers.

_____ This transaction decreased cash in settlement of a previously existing liability (equity did not change). Supplies expense is recorded when assets are used, not necessarily when cash is paid.

_____ This transaction involves the purchase of an asset. The form of the company's assets changed, but total assets did not (and neither did equity).

Exercise 2-16

Analyzing and journalizing transactions involving receipt of cash

A1

1. Prepare general journal entries for the following transactions of Valdez Services.

a. B. Valdez invested $20,000 cash in the company in exchange for common stock.

b. The company provided services to a client and immediately received $900 cash.

c. The company received $10,000 cash from a client in advance for services to be provided next year.

d. The company received $3,500 cash from a client in partial payment of accounts receivable.

2. Transactions *a, c, and d* did not yield revenue. Match each transaction (*a, c,* and *d*) with one of the following reasons for not recording revenue.

_____ This transaction changed the form of an asset from a receivable to cash. Total assets were not increased (revenue was recognized when the services were originally provided).

_____ This transaction brought in cash, but this is an owner investment.

_____ This transaction brought in cash, but it created a liability to provide services to the client in the next year.

Exercise 2-17

Entering transactions into T-accounts

A1

Fill in each of the following T-accounts for Belle Co.'s seven transactions listed here. The T-accounts represent Belle Co.'s general ledger. Code each entry with transaction numbers *1* through *7* (in order) for reference.

1. D. Belle created a new business and invested $6,000 cash, $7,600 of equipment, and $12,000 in web servers in exchange for common stock.
2. The company paid $4,800 cash in advance for prepaid insurance coverage.
3. The company purchased $900 of supplies on credit.
4. The company paid $800 cash for selling expenses.
5. The company received $4,500 cash for services provided.
6. The company paid $900 cash toward accounts payable.
7. The company paid $3,400 cash for equipment.

Cash	Supplies	Prepaid Insurance
Equipment	Web Servers	Accounts Payable
D. Belle, Capital	Services Revenue	Selling Expenses

Exercise 2-18

Preparing general journal entries **A1**

Use information from Exercise 2-17 to prepare the general journal entries for Belle Co.'s first seven transactions.

Exercise 2-19

Identifying transactions from T-accounts

A1

Chase Company posted transactions (*a* through *f*) in the following T-accounts in December, its first month of operations. Prepare the six journal entries from which the postings were made.

Cash	
a. 6,000	b. 2,000
c. 5,000	e. 3,000
	f. 1,000

Supplies	
b. 2,000	
d. 1,500	

Accounts Payable	
f. 1,000	d. 1,500

Chase, Capital	
	a. 6,000

Services Revenue	
	c. 5,000

Rent Expense	
e. 3,000	

Exercise 2-20

Preparing a trial balance from T-accounts **P1**

Use the T-accounts in Exercise 2-19 from Chase Company's first month of operations to prepare its December 31 trial balance.

Exercise 2-21

Preparing a trial balance from data with a missing value

P1

Prepare a December 31 trial balance for Jindal Co. using the following information and fill in the missing amount for Equipment (assume all data are correct).

Cash	$ 8,000	Equipment	$__?__	Wages expense	$12,000
Accounts payable	4,000	Jindal, Withdrawals	500	Accounts receivable	1,000
Services revenue	20,000	Jindal, Capital	16,500	Unearned revenue	2,000
Rent expense	3,000				

Exercise 2-22

Identifying effects of posting errors on the trial balance

P1

Posting errors are identified in the following table. In column (1), enter the amount of the difference between the two trial balance columns (debit and credit) due to the error. In column (2), identify the trial balance column (debit or credit) with the larger amount if they are not equal. In column (3), identify the account(s) affected by the error. In column (4), indicate the amount by which the account(s) in column (3) is under- or overstated. Item (a) is completed as an example.

	Description of Posting Error	(1) Difference between Debit and Credit Columns	(2) Column with the Larger Total	(3) Identify Account(s) Incorrectly Stated	(4) Amount That Account(s) Is Over- or Understated
a.	$3,600 debit to Rent Expense is posted as a $1,340 debit.	$2,260	Credit	Rent Expense	Rent Expense understated $2,260
b.	$6,500 credit to Cash is posted twice as two credits to Cash.				
c.	$2,050 debit to Prepaid Insurance is posted as a debit to Insurance Expense.				
d.	$38,000 debit to Machinery is posted as a debit to Accounts Payable.				
e.	$5,850 credit to Services Revenue is posted as a $585 credit.				
f.	$1,390 debit to Store Supplies is not posted.				

Exercise 2-23

Analyzing a trial balance error

P1

You are told the column totals in a trial balance are not equal. After careful analysis, you discover only one error. Specifically, a correctly journalized credit purchase of an automobile for $18,950 is posted from the journal to the ledger with an $18,950 debit to Automobiles and another $18,950 debit to Accounts Payable. The Automobiles account has a debit balance of $37,100 on the trial balance. (1)

Answer each of the following questions and (2) compute the dollar amount of any misstatement for parts *a* through *d*.

a. Is the Debit column total of the trial balance overstated, understated, or correctly stated?

b. Is the Credit column total of the trial balance overstated, understated, or correctly stated?

c. Is the Automobiles account balance overstated, understated, or correctly stated in the trial balance?

d. Is the Accounts Payable account balance overstated, understated, or correctly stated in the trial balance?

e. If the Debit column total of the trial balance is $200,000 before correcting the error, what is the total of the Credit column before correction?

Exercise 2-24

Computing net income

P1

	Assets	Liabilities
Beginning of the year	$ 60,000	$20,000
End of the year	105,000	36,000

A company had the following assets and liabilities at the beginning and end of this year.

Determine net income or net loss for the business during the year for each of the following *separate* cases.

a. Owner made no investments in the business, and no dividends were paid during the year.

b. Owner made no investments in the business, and dividends paid were $15,000 during the year.

c. No dividends were paid during the year, but the owner did invest an additional $55,000 cash in exchange for common stock.

d. Dividends paid were $15,000 during the year, and the owner did invest an additional $35,000 cash near year-end in exchange for common stock.

Exercise 2-25

Preparing an income statement

P1

Carmen Camry operates a consulting firm called Help Today, which began operations on December 1. On December 31, the company's records show the following selected accounts and amounts for the month of December. Use this information to prepare a December income statement for the business.

Cash	$25,360	Accounts payable	$ 10,500	Salaries expense	$5,600
Accounts receivable	22,360	C. Camry, Capital	102,000	Telephone expense	860
Office supplies	5,250	C. Camry, Withdrawals	6,000	Miscellaneous expenses	520
Office equipment	20,000	Consulting revenue	27,000		
Land	44,000	Rent expense	9,550		

Check Net income, $10,470

Exercise 2-26

Preparing a statement of owner's equity

P1

Use the information in Exercise 2-25 to prepare a December statement of retained earnings for Help Today. The Retained Earnings account balance at December 1 was $0. *Hint:* Net income for December is $10,470.

Exercise 2-27

Preparing a balance sheet

P1

Use the information in Exercise 2-25 to prepare a December 31 balance sheet for Help Today. *Hint:* The ending Retained Earnings account balance as of December 31 is $4,470.

Exercise 2-28

Analyzing changes in a company's equity

P1

Compute the missing amount for each of the following separate companies in columns B through E.

	A	B	C	D	E
1		CBS	ABC	CNN	NBC
2	Equity, beginning of year	$ 0	$ 0	$ 0	$ 0
3	Owner investments during the year	110,000	?	87,000	210,000
4	Owner withdrawals during the year	?	(47,000)	(10,000)	(55,000)
5	Net income (loss) for the year	22,000	90,000	(4,000)	?
6	Equity, end of year	104,000	85,000	?	110,000

Exercise 2-29

Calculating and interpreting the debt ratio

A2

Company	Expenses	Total Assets	Net Income	Total Liabilities
DreamWorks	$22,000	$ 40,000	$19,000	$ 30,000
Pixar	67,000	150,000	27,000	147,000
Universal	12,000	68,000	5,000	17,000

a. Compute the debt ratio for each of the three companies.

b. Which company has the most financial leverage?

PROBLEM SET A

Problem 2-1A

Preparing and posting journal entries; preparing a trial balance

P1 A1

Karla Tanner opened a web consulting business called Linkworks and completed the following transactions in its first month of operations.

Apr. 1 Tanner invested $80,000 cash along with office equipment valued at $26,000 in the company in exchange for common stock.

2 The company prepaid $9,000 cash for 12 months' rent for office space. *Hint:* Debit Prepaid Rent for $9,000.

3 The company made credit purchases for $8,000 in office equipment and $3,600 in office supplies. Payment is due within 10 days.

6 The company completed services for a client and immediately received $4,000 cash.

9 The company completed a $6,000 project for a client, who must pay within 30 days.

13 The company paid $11,600 cash to settle the account payable created on April 3.

19 The company paid $2,400 cash for the premium on a 12-month prepaid insurance policy. *Hint:* Debit Prepaid Insurance for $2,400.

22 The company received $4,400 cash as partial payment for the work completed on April 9.

25 The company completed work for another client for $2,890 on credit.

28 The company paid a $5,500 cash dividend.

29 The company purchased $600 of additional office supplies on credit.

30 The company paid $435 cash for this month's utility bill.

Required

1. Prepare general journal entries to record these transactions (use account titles listed in part 2).

2. Open the following ledger accounts—their account numbers are in parentheses (use the balance column format): Cash (101); Accounts Receivable (106); Office Supplies (124); Prepaid Insurance (128); Prepaid Rent (131); Office Equipment (163); Accounts Payable (201); Common Stock (307); Dividends (319); Services Revenue (403); and Utilities Expense (690). Post journal entries from part 1 to the ledger accounts and enter the balance after each posting.

3. Prepare a trial balance as of April 30.

Check (2) Ending balances: Cash, $59,465; Accounts Receivable, $4,490; Accounts Payable, $600

(3) Total debits, $119,490

Problem 2-2A

Preparing and posting journal entries; preparing a trial balance

P1 A1

Aracel Engineering completed the following transactions in the month of June.

a. J. Aracel, the owner, invested $100,000 cash, office equipment with a value of $5,000, and $60,000 of drafting equipment to launch the company in exchange for common stock.

b. The company purchased land worth $49,000 for an office by paying $6,300 cash and signing a note payable for $42,700.

c. The company purchased a portable building with $55,000 cash and moved it onto the land acquired in *b*.

d. The company paid $3,000 cash for the premium on an 18-month insurance policy.

e. The company provided services to a client and collected $6,200 cash.

f. The company purchased $20,000 of additional drafting equipment by paying $9,500 cash and signing a note payable for $10,500.

g. The company completed $14,000 of services for a client. This amount is to be received in 30 days.

h. The company purchased $1,150 of additional office equipment on credit.

i. The company completed $22,000 of services for a customer on credit.

j. The company purchased $1,333 of TV advertising on credit.

k. The company collected $7,000 cash in partial payment from the client described in transaction *g*.

l. The company paid $1,200 cash for employee wages.

m. The company paid $1,150 cash to settle the account payable created in transaction *h*.

n. The company paid $925 cash for repairs.

o. The company paid a $9,480 cash dividend.

p. The company paid $1,200 cash for employee wages.

q. The company paid $2,500 cash for advertisements on the web during June.

Required

1. Prepare general journal entries to record these transactions (use the account titles listed in part 2).

2. Open the following ledger accounts—their account numbers are in parentheses (use the balance column format): Cash (101); Accounts Receivable (106); Prepaid Insurance (108); Office Equipment (163); Drafting Equipment (164); Building (170); Land (172); Accounts Payable (201); Notes Payable (250); Common Stock (307); Dividends (319); Services Revenue (403); Wages Expense (601); Advertising Expense (603); and Repairs Expense (604). Post the journal entries from part 1 to the accounts and enter the balance after each posting.

3. Prepare a trial balance as of the end of June.

Check (2) Ending balances: Cash, $22,945; Accounts Receivable, $29,000; Accounts Payable, $1,333

(3) Trial balance totals, $261,733

Problem 2-3A

Preparing and posting journal entries; preparing a trial balance

P1 A1

Denzel Brooks opened a web consulting business called Venture Consultants and completed the following transactions in March.

Mar. 1 Brooks invested $150,000 cash along with $22,000 in office equipment in the company in exchange for common stock.

2 The company prepaid $6,000 cash for six months' rent for an office. *Hint:* Debit Prepaid Rent for $6,000.

3 The company made credit purchases of office equipment for $3,000 and office supplies for $1,200. Payment is due within 10 days.

6 The company completed services for a client and immediately received $4,000 cash.

9 The company completed a $7,500 project on credit for a client, who must pay within 30 days.

12 The company paid $4,200 cash to settle the account payable created on March 3.

19 The company paid $5,000 cash for the premium on a 12-month insurance policy. *Hint:* Debit Prepaid Insurance for $5,000.

22 The company received $3,500 cash as partial payment for the work completed on March 9.

25 The company completed work for another client for $3,820 on credit.

29 The company paid a $5,100 cash dividend.

30 The company purchased $600 of additional office supplies on credit.

31 The company paid $500 cash for this month's utility bill.

Required

1. Prepare general journal entries to record these transactions (use the account titles listed in part 2).
2. Open the following ledger accounts—their account numbers are in parentheses (use the balance column format): Cash (101); Accounts Receivable (106); Office Supplies (124); Prepaid Insurance (128); Prepaid Rent (131); Office Equipment (163); Accounts Payable (201); Common Stock (307); Dividends (319); Services Revenue (403); and Utilities Expense (690). Post the journal entries from part 1 to the ledger accounts and enter the balance after each posting.
3. Prepare a trial balance as of the end of March.

Check (2) Ending balances: Cash, $136,700; Accounts Receivable, $7,820; Accounts Payable, $600

(3) Total debits, $187,920

Problem 2-4A

Recording transactions; posting to ledger; preparing a trial balance

P1 A1

Business transactions completed by Hannah Venedict during the month of September are as follows.

a. Venedict invested $60,000 cash along with office equipment valued at $25,000 in a new business named HV Consulting in exchange for common stock.

b. The company purchased land valued at $40,000 and a building valued at $160,000. The purchase is paid with $30,000 cash and a note payable for $170,000.

c. The company purchased $2,000 of office supplies on credit.

d. Venedict invested an automobile in the company in exchange for more common stock. The automobile has a value of $16,500.

e. The company purchased $5,600 of additional office equipment on credit.

f. The company paid $1,800 cash salary to an assistant.

g. The company provided services to a client and collected $8,000 cash.

h. The company paid $635 cash for this month's utilities.

i. The company paid $2,000 cash to settle the account payable created in transaction *c*.

j. The company purchased $20,300 of new office equipment by paying $20,300 cash.

k. The company completed $6,250 of services on credit for a client, who must pay within 30 days.

l. The company paid $1,800 cash salary to an assistant.

m. The company received $4,000 cash in partial payment on the receivable created in transaction *k*.

n. The company paid a $2,800 cash dividend.

Required

1. Prepare general journal entries to record these transactions (use account titles listed in part 2).

2. Open the following ledger accounts—their account numbers are in parentheses (use the balance column format): Cash (101); Accounts Receivable (106); Office Supplies (108); Office Equipment (163); Automobiles (164); Building (170); Land (172); Accounts Payable (201); Notes Payable (250); Common Stock (307); Dividends (319); Consulting Revenue (403); Salaries Expense (601); and Utilities Expense (602). Post the journal entries from part 1 to the ledger accounts and enter the balance after each posting.

3. Prepare a trial balance as of the end of September.

Check (2) Ending balances: Cash, $12,665; Office Equipment, $50,900

(3) Trial balance totals, $291,350

Problem 2-5A

Computing net income from equity analysis, preparing a balance sheet, and computing the debt ratio

P1 A2

The accounting records of Nettle Distribution show the following assets and liabilities as of December 31 for Year 1 and Year 2.

December 31	Year 1	Year 2	December 31	Year 1	Year 2
Cash	$ 64,300	$ 15,640	Building	$ 0	$80,000
Accounts receivable	26,240	19,100	Land	0	60,000
Office supplies	3,160	1,960	Accounts payable	3,500	33,500
Office equipment	44,000	44,000	Note payable	0	40,000
Trucks	148,000	157,000			

Required

1. Prepare balance sheets for the business as of December 31 for Year 1 and for Year 2. *Hint:* Report only total equity on the balance sheet and remember that total equity equals the difference between assets and liabilities.
2. Compute net income for Year 2 by comparing total equity amounts for these two years and using the following information: During Year 2, the owner invested $35,000 additional cash in the business in exchange for common stock, and the company paid a $19,000 cash dividend.
3. Compute the Year 2 year-end debt ratio.

Check (2) Net income, $6,000

(3) Debt ratio, 19.5%

Problem 2-6A

Analyzing account balances and reconstructing transactions

P1 A1

Yi Min started an engineering firm called Min Engineering. He began operations and completed seven transactions in May, which included his initial investment of $18,000 cash. After those seven transactions, the ledger included the following accounts with normal balances.

Cash	$37,600	Office equipment	$12,900	Y. Min, Withdrawals	$ 3,370
Office supplies	890	Accounts payable	12,900	Services revenue	36,000
Prepaid insurance	4,600	Y. Min, Capital	18,000	Rent expense	7,540

Check (1) Trial balance totals, $66,900

(2) Ending Cash balance, $37,600

Required

1. Prepare a trial balance for this business as of the end of May.
2. The following seven transactions produced the account balances shown above.
   - **a.** Y. Min invested $18,000 cash in the business in exchange for common stock.
   - **b.** Paid $7,540 cash for monthly rent expense for May.
   - **c.** Paid $4,600 cash in advance for the annual insurance premium beginning the next period.
   - **d.** Purchased office supplies for $890 cash.
   - **e.** Purchased $12,900 of office equipment on credit (with accounts payable).
   - **f.** . Received $36,000 cash for services provided in May.
   - **g.** The company paid a $3,370 cash dividend.

   Prepare a Cash T-account, enter the cash effects (if any) of each transaction, and compute the ending Cash balance. Code each entry in the T-account with one of the transaction codes *a* through *g*.

Problem 2-7A

Preparing an income statement, statement of retained earnings, and balance sheet

P1

Angela Lopez owns and manages a consulting firm called Metrix, which began operations on December 1. On December 31, Metrix shows the following selected accounts and amounts for the month of December.

Cash	$8,000	Accounts payable	$ 1,300	Rental revenue	$ 500
Accounts receivable	3,500	Notes payable	2,400	Salaries expense	3,000
Notes receivable	2,500	Unearned revenue	300	Rent expense	2,000
Office supplies	1,500	A. Lopez, Capital	11,600	Advertising expense	400
Prepaid insurance	1,000	A. Lopez, Withdrawals	2,000	Utilities expense	200
Equipment	4,000	Consulting revenue	12,000		

Required

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1. Prepare a December income statement for the business.
2. Prepare a December statement of retained earnings. The Retained Earnings account balance at December 1 was $0.
3. Prepare a December 31 balance sheet. *Hint:* Use the Retained Earnings account balance calculated in part 2.

PROBLEM SET B

Problem 2-1B

Preparing and posting journal entries; preparing a trial balance

P1 A1

Humble Management Services opened for business and completed these transactions in September.

Sep. 1 H. Humble, the owner, invested $38,000 cash along with office equipment valued at $15,000 in the company in exchange for common stock.

2 The company prepaid $9,000 cash for 12 months' rent for office space. *Hint:* Debit Prepaid Rent for $9,000.

4 The company made credit purchases for $8,000 in office equipment and $2,400 in office supplies. Payment is due within 10 days.

8 The company completed work for a client and immediately received $3,280 cash.

12 The company completed a $15,400 project for a client, who must pay within 30 days.

13 The company paid $10,400 cash to settle the payable created on September 4.

19 The company paid $1,900 cash for the premium on an 18-month insurance prepaid policy. *Hint:* Debit Prepaid Insurance for $1,900.

22 The company received $7,700 cash as partial payment for the work completed on September 12.

24 The company completed work for another client for $2,100 on credit.

28 The company paid a $5,300 cash dividend.

29 The company purchased $550 of additional office supplies on credit.

30 The company paid $860 cash for this month's utility bill.

Required

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1. Prepare general journal entries to record these transactions (use account titles listed in part 2).

2. Open the following ledger accounts—their account numbers are in parentheses (use the balance column format): Cash (101); Accounts Receivable (106); Office Supplies (124); Prepaid Insurance (128); Prepaid Rent (131); Office Equipment (163); Accounts Payable (201); Common Stock (307); Dividends (319); Services Revenue (403); and Utilities Expense (690). Post journal

entries from part 1 to the ledger accounts and enter the balance after each posting.

3. Prepare a trial balance as of the end of September.

Check (2) Ending balances: Cash, $21,520; Accounts Receivable, $9,800; Accounts Payable, $550

(3) Total debits, $74,330

Problem 2-2B

Preparing and posting journal entries; preparing a trial balance

P1 A1

At the beginning of April, Bernadette Grechus launched a custom computer solutions company called Softworks. The company had the following transactions during April.

a. B. Grechus invested $65,000 cash, office equipment with a value of $5,750, and $30,000 of computer equipment in the company in exchange for common stock.

b. The company purchased land worth $22,000 for an office by paying $5,000 cash and signing a note payable for $17,000.

c. The company purchased a portable building with $34,500 cash and moved it onto the land acquired in *b*.

d. The company paid $5,000 cash for the premium on a two-year insurance policy.

e. The company provided services to a client and immediately collected $4,600 cash.

f. The company purchased $4,500 of additional computer equipment by paying $800 cash and signing a note payable for $3,700.

g. The company completed $4,250 of services for a client. This amount is to be received within 30 days.

h. The company purchased $950 of additional office equipment on credit.

i. The company completed $10,200 of services for a customer on credit.

j. The company purchased $580 of TV advertising on credit.

k. The company collected $5,100 cash in partial payment from the client described in transaction *i*.

l. The company paid $1,800 cash for employee wages.

m. The company paid $950 cash to settle the payable created in transaction *h*.

n. The company paid $608 cash for repairs.

o. The company paid a $6,230 cash dividend.

p. The company paid $1,800 cash for employee wages.

q. The company paid $750 cash for advertisements on the web during April.

Required

1. Prepare general journal entries to record these transactions (use account titles listed in part 2).

2. Open the following ledger accounts—their account numbers are in parentheses (use the balance column format): Cash (101); Accounts Receivable (106); Prepaid Insurance (108); Office Equipment (163); Computer Equipment (164); Building (170); Land (172); Accounts Payable (201); Notes Payable (250); Common Stock (307); Dividends (319); Services Revenue (403); Wages Expense (601); Advertising Expense (603); and Repairs Expense (604). Post the journal entries from part 1 to the accounts and enter the balance after each posting.

3. Prepare a trial balance as of the end of April.

Check (2) Ending balances: Cash, $17,262; Accounts Receivable, $9,350; Accounts Payable, $580

(3) Trial balance totals, $141,080

Problem 2-3B

Preparing and posting journal entries; preparing a trial balance

P1 A1

Zucker Management Services opened for business and completed these transactions in November.

Nov. 1 M. Zucker, the owner, invested $30,000 cash along with $15,000 of office equipment in the company in exchange for common stock.

2 The company prepaid $4,500 cash for six months' rent for an office. *Hint:* Debit Prepaid Rent for $4,500.

4 The company made credit purchases of office equipment for $2,500 and office supplies for $600. Payment is due within 10 days.

8 The company completed work for a client and immediately received $3,400 cash.

12 The company completed a $10,200 project on credit for a client, who must pay within 30 days.

13 The company paid $3,100 cash to settle the payable created on November 4.

19 The company paid $1,800 cash for the premium on a 24-month insurance policy.

22 The company received $5,200 cash as partial payment for the work completed on November 12.

24 The company completed work for another client for $1,750 on credit.

28 The company paid a $5,300 cash dividend.

29 The company purchased $249 of additional office supplies on credit.

30 The company paid $831 cash for this month's utility bill.

Required

1. Prepare general journal entries to record these transactions (use account titles listed in part 2).

2. Open the following ledger accounts—their account numbers are in parentheses (use the balance column format): Cash (101); Accounts Receivable (106); Office Supplies (124); Prepaid Insurance (128); Prepaid Rent (131); Office Equipment (163); Accounts Payable (201); Common Stock (307); Dividends (319); Services Revenue (403); and Utilities Expense (690). Post the journal entries from part 1 to the ledger accounts and enter the balance after each posting.
3. Prepare a trial balance as of the end of November.

Check (2) Ending balances: Cash, $23,069; Accounts Receivable, $6,750; Accounts Payable, $249

(3) Total debits, $60,599

Problem 2-4B

Recording transactions; posting to ledger; preparing a trial balance

P1 A1

Nuncio Consulting completed the following transactions during June.

a. A. Nuncio, the owner, invested $35,000 cash along with office equipment valued at $11,000 in the new company in exchange for common stock.

b. The company purchased land valued at $7,500 and a building valued at $40,000. The purchase is paid with $15,000 cash and a note payable for $32,500.

c. The company purchased $500 of office supplies on credit.

d. A. Nuncio invested an automobile in the company in exchange for more common stock. The automobile has a value of $8,000.

e. The company purchased $1,200 of additional office equipment on credit.

f. The company paid $1,000 cash salary to an assistant.

g. The company provided services to a client and collected $3,200 cash.

h. The company paid $540 cash for this month's utilities.

i. The company paid $500 cash to settle the payable created in transaction *c*.

j. The company purchased $3,400 of new office equipment by paying $3,400 cash.

k. The company completed $4,200 of services on credit for a client, who must pay within 30 days.

l. The company paid $1,000 cash salary to an assistant.

m. The company received $2,200 cash in partial payment on the receivable created in transaction *k*.

n. The company paid a $1,100 cash dividend.

Required

1. Prepare general journal entries to record these transactions (use account titles listed in part 2).

2. Open the following ledger accounts—their account numbers are in parentheses (use the balance column format): Cash (101); Accounts Receivable (106); Office Supplies (108); Office Equipment (163); Automobiles (164); Building (170); Land (172); Accounts Payable (201); Notes Payable (250); Common Stock (307); Dividends (319); Consulting Revenue (403); Salaries Expense (601); and Utilities Expense (602). Post the journal entries from part 1 to the ledger accounts and enter the balance after each posting.

3. Prepare a trial balance as of the end of June.

Check (2) Ending balances: Cash, $17,860; Office Equipment, $15,600

(3) Trial balance totals, $95,100

Problem 2-5B

Computing net income from equity analysis, preparing a balance sheet, and computing the debt ratio

P1 A2

The accounting records of Tama Co. show the following assets and liabilities as of December 31 for Year 1 and for Year 2.

December 31	Year 1	Year 2	December 31	Year 1	Year 2
Cash	$30,000	$ 5,000	Building	$ 0	$250,000
Accounts receivable	35,000	25,000	Land	0	50,000
Office supplies	8,000	13,500	Accounts payable	4,000	12,000
Office equipment	40,000	40,000	Note payable	0	250,000
Machinery	28,000	28,500			

Required

1. Prepare balance sheets for the business as of December 31 for Year 1 and Year 2. *Hint:* Report only total equity on the balance sheet and remember that total equity equals the difference between assets and liabilities.
2. Compute net income for Year 2 by comparing total equity amounts for these two years and using the following information: During Year 2, the owner invested $5,000 additional cash in the business in exchange for common stock, and the company paid a $3,000 cash dividend.
3. Compute the Year 2 debt ratio.

Check (2) Net income, $11,000

(3) Debt ratio, 63.6%

Problem 2-6B

Analyzing account balances and reconstructing transactions

P1 A1

Roshaun Gould started a web consulting firm called Gould Solutions. He began operations and completed seven transactions in April that resulted in the following accounts, which all have normal balances.

Cash	$20,000	Office equipment	$12,250	R. Gould, Withdrawals	$ 5,200
Office supplies	750	Accounts payable	12,250	Consulting revenue	20,400
Prepaid rent	1,800	R. Gould, Capital	15,000	Miscellaneous expenses	7,650

Required

1. Prepare a trial balance for this business as of the end of April.
2. The following seven transactions produced the account balances shown above.
   - **a.** Gould invested $15,000 cash in the business in exchange for common stock.
   - **b.** Paid $1,800 cash in advance for next month's rent expense.
   - **c.** Paid $7,650 cash for miscellaneous expenses.
   - **d.** Purchased office supplies for $750 cash.
   - **e.** Purchased $12,250 of office equipment on credit (with accounts payable).
   - **f.** Received $20,400 cash for consulting services provided in April.
   - **g.** The company paid a $5,200 cash dividend.

   Prepare a Cash T-account, enter the cash effects (if any) of each transaction, and compute the ending Cash balance. Code each entry in the T-account with one of the transaction codes *a* through *g*.

Check (1) Trial balance totals, $47,650

(2) Ending Cash balance, $20,000

Problem 2-7B

Preparing an income statement, statement of retained earnings, and balance sheet

P1

Victoria Rivera owns and manages a consulting firm called Prisek, which began operations on July 1. On July 31, the company's records

show the following selected accounts and amounts for the month of July.

Cash	$24,000	Accounts payable	$ 3,900	Rental revenue	$1,500
Accounts receivable	10,500	Notes payable	7,200	Salaries expense	9,000
Notes receivable	7,500	Unearned revenue	900	Rent expense	6,000
Office supplies	4,500	V. Rivera, Capital	34,800	Advertising expense	1,200
Prepaid insurance	3,000	V. Rivera, Withdrawals	6,000	Utilities expense	600
Equipment	12,000	Consulting revenue	36,000		

Required

1. Prepare a July income statement for the business.
2. Prepare a July statement of retained earnings. The Retained Earnings account balance at July 1 was $0.
3. Prepare a July 31 balance sheet. *Hint:* Use the Retained Earnings account balance calculated in part 2.

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connect

SERIAL PROBLEM

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Business Solutions

P1 A1

Serial problem started in Chapter 1. If the Chapter 1 segment was not completed, the problem can begin at this point. It is available in Connect with an algorithmic option.

Alexander Image/Shutterstock

SP 2 On October 1, 2021, Santana Rey launched a computer services company called **Business Solutions**, which provides consulting services, computer system installations, and custom program development. The company's initial chart of accounts follows.

Account	No.	Account	No.
Cash	101	S. Rey, Capital	301
Accounts Receivable	106	S. Rey, Withdrawals	302
Computer Supplies	126	Computer Services Revenue	403
Prepaid Insurance	128	Wages Expense	623
Prepaid Rent	131	Advertising Expense	655
Office Equipment	163	Mileage Expense	676
Computer Equipment	167	Miscellaneous Expenses	677
Accounts Payable	201	Repairs Expense—Computer	684

Required

1. Prepare journal entries to record each of the following transactions for Business Solutions.

Oct. 1 S. Rey invested $45,000 cash, a $20,000 computer system, and $8,000 of office equipment in the company in exchange for common stock.

2 The company paid $3,300 cash for four months' rent. *Hint:* Debit Prepaid Rent for $3,300.

3 The company purchased $1,420 of computer supplies on credit from Harris Office Products.

5 The company paid $2,220 cash for one year's premium on a property and liability insurance policy. *Hint:* Debit Prepaid Insurance for $2,220.

6 The company billed Easy Leasing $4,800 for services performed in installing a new web server.

8 The company paid $1,420 cash for the computer supplies purchased from Harris Office Products on October 3.

10 The company hired Lyn Addie as a part-time assistant.

12 The company billed Easy Leasing another $1,400 for services performed.

15 The company received $4,800 cash from Easy Leasing as partial payment on its account.

17 The company paid $805 cash to repair computer equipment that was damaged when moving it.

20 The company paid $1,728 cash for advertisements.

22 The company received $1,400 cash from Easy Leasing on its account.

28 The company billed IFM Company $5,208 for services performed.

31 The company paid a $3,600 cash dividend.

31 S. Rey withdrew $3,600 cash from the company for personal use.

Nov. 1 The company paid $320 cash for mileage expenses.

2 The company received $4,633 cash from Liu Corporation for computer services performed.

5 The company purchased computer supplies for $1,125 cash from Harris Office Products.

8 The company billed Gomez Co. $5,668 for services performed.

13 The company agreed to perform future services for Alex's Engineering Co. No work has yet been performed.

18 The company received $2,208 cash from IFM Company as partial payment of the October 28 bill.

22 The company paid $250 cash for miscellaneous expenses. *Hint:* Debit Miscellaneous Expenses for $250.

24 The company completed work and sent a bill for $3,950 to Alex's Engineering Co.

25 The company sent another bill to IFM Company for the past-due amount of $3,000.

28 The company paid $384 cash for mileage expenses.

30 The company paid $1,750 cash for Lyn Addie's wages for 14 days' work.

30 The company paid a $2,000 cash dividend.

2. Open ledger accounts (in balance column format) and post the journal entries from part 1 to them.

3. Prepare a trial balance as of the end of November.

Check (2) Cash, Nov. 30 bal., $38,264

(3) Trial bal. totals, $98,659

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments (1) do not require instructors to know Tableau, (2) are accessible to introductory students, (3) do not require Tableau software, and (4) run in **Connect**. All are auto-gradable.

Tableau DA 2-1 Quick Study, Identifying normal balance, **C2**—similar to QS 2-4 and 2-5.

Tableau DA 2-2 Exercise, Preparing an income statement, **P1**—similar to QS 2-15.

Tableau DA 2-3 Mini-Case, Preparing an income statement, statement of retained earnings, and balance sheet, **P1**—similar to Exercises 2-25, 2-26, and 2-27.

GENERAL LEDGER

General Ledger (GL) Assignments expose students to general ledger software similar to that in practice. **GL** is part of **Connect**, and **GL** assignments are auto-gradable and have algorithmic options. For

the following **GL** assignments, we prepare journal entries and identify the financial statement impacts of each entry. Financial statements are automatically generated based on the journal entries recorded—this feature can be turned off.

GL 2-1 Based on FastForward

GL 2-2 Based on Exercise 2-13

GL 2-3 Based on Exercise 2-16

GL 2-4 Based on Problem 2-1A

For the following **GL** assignments, we record journal entries, create financial statements, and assess the impact of each transaction on financial statements.

GL 2-5 Based on Problem 2-2A

GL 2-6 Based on Problem 2-3A

GL 2-7 Based on Problem 2-4A

GL 2-8 Based on the Serial Problem SP 2

Accounting Analysis

COMPANY ANALYSIS

A2

AA 2-1 Refer to **Apple**'s financial statements in Appendix A for the following questions.

Required

1. What amount of total liabilities does Apple report for each of the fiscal years ended (*a*) September 28, 2019, and (*b*) September 29, 2018?
2. What amount of total assets does it report for each of the fiscal years ended (*a*) September 28, 2019, and (*b*) September 29, 2018?

3. Compute its debt ratio for each of the fiscal years ended (*a*) September 28, 2019, and (*b*) September 29, 2018. (Report ratio in percent and round it to one decimal.)

4. In which fiscal year did it employ more financial leverage: the year ending September 28, 2019, or September 29, 2018? Explain.

COMPARATIVE ANALYSIS

page 82

A2

AA 2-2 Key comparative figures for **Apple** and **Google** follow.

	Apple		Google	
$ millions	Current Year	Prior Year	Current Year	Prior Year
Total liabilities	$248,028	$258,578	$ 74,467	$ 55,164
Total assets	338,516	365,725	275,909	232,792

1. What is the debt ratio for Apple in the current year and for the prior year?
2. What is the debt ratio for Google in the current year and for the prior year?
3. Which of the two companies has the higher degree of financial leverage in the current year?

EXTENDED ANALYSIS

A2

AA 2-3 Key comparative figures for **Apple**, **Google**, and **Samsung** follow.

	Samsung		Apple	Google
$ millions	Current Year	Prior Year	Current Year	Current Year
Total liabilities	$ 76,952	$ 78,599	$248,028	$ 74,467
Total assets	302,511	291,179	338,516	275,909

Required

1. Compute Samsung's debt ratio for the current year and prior year.
2. Did Samsung's financial leverage increase or decrease in the current year?
3. Looking at the current year debt ratio, is Samsung a more risky or less risky investment than (*a*) Apple and (*b*) Google?

Discussion Questions

1. Provide the names of two (*a*) asset accounts, (*b*) liability accounts, and (*c*) equity accounts.
2. What is the difference between a note payable and an account payable?
3. Discuss the steps in processing business transactions.
4. What kinds of transactions can be recorded in a general journal?
5. Are debits or credits typically listed first in general journal entries? Are the debits or the credits indented?
6. Should a transaction be recorded first in a journal or the ledger? Why?
7. If assets are valuable resources and asset accounts have debit balances, why do expense accounts also have debit balances?
8. Why does the recordkeeper prepare a trial balance?
9. If an incorrect amount is journalized and posted to the accounts, how should the error be corrected?
10. Identify the four financial statements of a business.
11. What information is reported in a balance sheet?
12. What information is reported in an income statement?
13. Why does the user of an income statement need to know the time period that it covers?
14. Define (*a*) *assets,* (*b*) *liabilities,* and (*c*) *equity*.

15. Which financial statement is sometimes called the *statement of financial position?*

Beyond the Numbers

ETHICS CHALLENGE

C1

BTN 2-1 Assume that you are a cashier and your manager requires that you immediately enter each sale when it occurs. Recently, lunch hour traffic has increased and the assistant manager asks you to avoid delays by taking customers' cash and making change without entering sales. The assistant manager says she will add up cash and enter sales after lunch. She says that, in this way, customers will be happy and the register record will always match the cash amount when the manager arrives at three o'clock.

The advantages to the process proposed by the assistant manager include improved customer service, fewer delays, and less work for you. The disadvantage is that the assistant manager could steal cash by simply recording less sales than the cash received and then pocketing the excess cash. You decide to reject her suggestion without the manager's approval and to confront her on the ethics of her suggestion.

Required

Propose and evaluate two other courses of action you might consider, and explain why.

COMMUNICATING IN PRACTICE

P1

BTN 2-2 Lila Corentine is an aspiring entrepreneur and your friend. She is having difficulty understanding the purposes of financial statements and how they fit together across time.

Required

Write a one-page memorandum to Corentine explaining the purposes of the four financial statements and how they are linked across time.

TAKING IT TO THE NET

P1

BTN 2-3 Access EDGAR online (**sec.gov/edgar**) and locate the 2018 10-K report of **Amazon.com** (ticker: AMZN) filed on February 1, 2019. Review its financial statements reported for years ended 2018, 2017, and 2016 to answer the following questions.

Required

1. What are the amounts of Amazon's net income or net loss reported for each of these three years?
2. Do Amazon's operating activities provide cash or use cash for each of these three years? *Hint:* See the statement of cash flows.
3. If Amazon has 2018 net income of $10,073 million and 2018 operating cash flows of $30,723 million, how is it possible that its cash balance at December 31, 2018, increases by only $10,317 million relative to its balance at December 31, 2017?

TEAMWORK IN ACTION

C1 C2 A1

BTN 2-4 The expanded accounting equation consists of page 83 assets, liabilities, common stock, dividends, revenues, and expenses. It can be used to reveal insights into changes in a company's financial position.

Required

1. Form *learning teams* of six (or more) members. Each team member must select one of the six components, and each team must have at least one expert on each component: (*a*) assets,

(*b*) liabilities, (*c*) common stock, (*d*) dividends, (*e*) revenues, and (*f*) expenses.

2. Form *expert teams* of individuals who selected the same component in part 1. Expert teams are to draft a report that each expert will present to his or her learning team addressing the following:
   a. Identify for its component the (i) increase and decrease sides of the account and (ii) normal balance side of the account.
   b. Describe a transaction, with amounts, that increases its component.
   c. Using the transaction and amounts in (*b*), verify the equality of the accounting equation and then explain any effects on the income statement and statement of cash flows.
   d. Describe a transaction, with amounts, that decreases its component.
   e. Using the transaction and amounts in (*d*), verify the equality of the accounting equation and then explain any effects on the income statement and statement of cash flows.
3. Each expert should return to his/her learning team. In rotation, each member presents his/her expert team's report to the learning team. Team discussion is encouraged.

ENTREPRENEURIAL DECISION

P1 A2

BTN 2-5 Assume that Katrina Lake of **titch Fix** plans to expand her business to accommodate more product lines. She is considering financing expansion in one of two ways: (1) contributing more of her own funds to the business or (2) borrowing the funds from a bank.

Required

Identify at least two issues that Katrina should consider when trying to decide on the method for financing the expansion.

ENTREPRENEURIAL DECISION

P1 A2

BTN 2-6 Angel Martin is a young entrepreneur who operates Martin Music Services, offering singing lessons and instruction on musical instruments. Martin wishes to expand but needs a $30,000 loan. The bank requests that Martin prepare a balance sheet and key financial ratios. Martin has not kept formal records but is able to provide the following accounts and their amounts as of December 31.

Cash	$ 3,600	Accounts receivable	$ 9,600	Prepaid insurance	$ 1,500
Prepaid rent	9,400	Store supplies	6,600	Equipment	50,000
Accounts payable	2,200	Unearned lesson fees	15,600	Total equity*	62,900
Annual net income	40,000				

*The total equity amount reflects all owner investments, dividends, revenues, and expenses as of December 31.

Required

1. Prepare a balance sheet as of December 31 for Martin Music Services. (Report only the total equity amount on the balance sheet.)
2. Compute Martin's debt ratio and its return on assets (the latter ratio is defined in Chapter 1). Assume average assets equal its ending balance.
3. Do you believe the prospects of a $30,000 bank loan are good? Why or why not?

3 Adjusting Accounts for Financial Statements

page 84

Chapter Preview

DEFERRAL OF EXPENSE

C1 Timing

Accrual vs. cash

3-Step process

P1 Framework

Examples

NTK 3-1

DEFERRAL OF REVENUE

P2 Framework

Examples

NTK 3-2

ACCRUED EXPENSE

P3 Framework

Examples

NTK 3-3

ACCRUED REVENUE

P4 Framework

Examples

Summary

NTK 3-4

REPORTING

P5 Adjusted trial balance

Reporting

P6 Closing process

C2 Classified balance sheet

A1 Profit margin & current ratio

NTK 3-5, 6, 7

Learning Objectives

CONCEPTUAL

C1 Explain the importance of periodic reporting and the role of accrual accounting.

C2 Explain and prepare a classified balance sheet.

ANALYTICAL

A1 Compute and analyze profit margin and current ratio.

PROCEDURAL

P1 Prepare adjusting entries for deferral of expenses.

P2 Prepare adjusting entries for deferral of revenues.

P3 Prepare adjusting entries for accrued expenses.

P4 Prepare adjusting entries for accrued revenues.

P5 Prepare financial statements from an adjusted trial balance.

P6 Prepare closing entries and a postclosing trial balance.

P7 *Appendix 3A*—Explain the alternatives in accounting for prepaids.

P8 *Appendix 3B*—Prepare a work sheet and explain its usefulness.

P9 *Appendix 3C*—Prepare reversing entries and explain their purpose.

Leading the Way

"Whatever you dream, you can do"

—EMILY NÚÑEZ CAVNESS

DENVER—Emily Núñez Cavness co-founded **Sword & Plough** (**SwordandPlough.com**) while deployed in Afghanistan. "It was not

the usual startup location,'' recalls Emily as she describes a Skype meeting interrupted by mortar fire. Emily and her sister Betsy recycle military surplus materials to create totes, handbags, backpacks, and accessories. The sisters reuse materials that ‘‘would otherwise be burned or buried.''

Emily and Betsy have already recycled 30,000 pounds of materials. They stress their success is in part due to the accounting system. ‘‘We were able to pinpoint some immediate problems to solve,'' explains Emily. They describe how moving from a cash to an accrual system gave more timely information. Emily insists the information ‘‘didn't just stay stored on my iPhone, or scrap piece of paper—we took action!''

Accounting adjustments that increased the value of revenue and expense data were used to better set prices and manage costs. Accounting analytics helped Emily and Betsy with business decisions and overall idea development. ‘‘We took the idea seriously,'' exclaims Emily, ‘‘and today . . . [it is] a powerful reality.''

Bart Young/Invision for Intuit/AP Images

‘‘It has been challenging,'' admits Emily. ‘‘I want Sword & Plough to be a leader in the field of social entrepreneurship.'' Hoo-ah!

Sources: *Sword & Plough website,* January 2021; *ABC News,* August 2014; *Military Times,* September 2015; *NationSwell,* January 2016; *HuffPost,* October 2017; *Facebook,* 2019

TIMING AND REPORTING

The Accounting Period

C1

Explain the importance of periodic reporting and the role of accrual accounting.

The value of information is linked to its timeliness. Useful information must reach decision makers frequently. To provide timely information, accounting systems prepare reports at regular intervals. The **time period assumption** presumes that an organization's activities can be divided into specific time periods such as a month, a three-month quarter, a six-month interval, or a year. Exhibit 3.1 shows various **accounting,** or *reporting,* **periods.** Most organizations use a year as their primary accounting period. Reports covering a one-year period are known as **annual financial statements.** Many organizations also prepare **interim financial statements** covering one, three, or six months of activity.

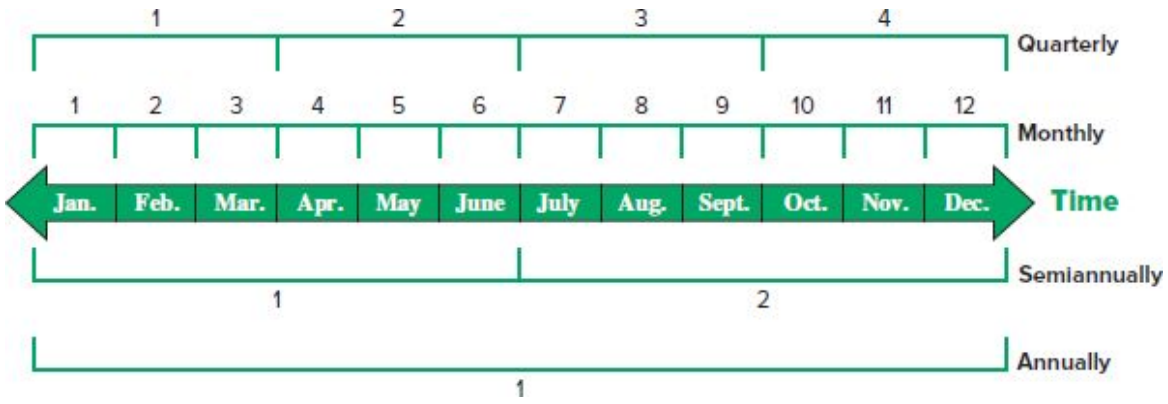


EXHIBIT 3.1

Accounting Periods

The annual reporting period is not always a calendar year ending on December 31. An organization can use a **fiscal year** consisting of any 12 consecutive months or 52 weeks. For example, **Gap**'s fiscal year consistently ends the final week of January or the first week of February each year.

Companies with little seasonal variation in sales often use the calendar year as their fiscal year. **Netflix** uses calendar-year reporting.

Companies that have seasonal variations in sales often use a **natural business year** end, which is when sales are at their lowest level for the year. The natural business year for retailers such as **Target** and **Nordstrom** ends around January 31, after the holidays.

Accrual Basis versus Cash Basis

After external transactions and events are recorded, several accounts require adjustments before their balances appear in financial statements. This is needed because internal transactions and events are not yet recorded.

- **Accrual basis accounting** records revenues when services and products are delivered and records expenses when incurred (matched with revenues).
- **Cash basis accounting** records revenues when cash is received and records expenses when cash is paid. Cash basis income is cash receipts minus cash payments.

Most agree that accrual accounting better reflects business performance than cash basis accounting. Accrual accounting also increases the *comparability* of financial statements from period to period.

Accrual Basis To compare these two systems, let's consider FastForward's Prepaid Insurance account. FastForward paid $2,400 for 24 months of insurance coverage that began on December 1, 2021. Accrual accounting requires that $100 of insurance expense be reported each month, from December 2021 through November 2023. (This means expenses are $100 in 2021, $1,200 in 2022, and $1,100 in 2023.) Exhibit 3.2 shows this allocation of insurance cost across the three years. Any unexpired premium is reported as a Prepaid Insurance asset on the accrual basis balance sheet.

EXHIBIT 3.2

Accrual Accounting

Cash Basis A *cash basis* income statement for December 2021 reports insurance expense of $2,400, as shown in Exhibit 3.3. The cash basis income statements for years 2022 and 2023 report no insurance expense. The cash basis balance sheet never reports a prepaid insurance asset because it is immediately expensed. Also, cash basis income for 2021–2023 does not match the cost of insurance with the insurance benefits received for those years.

EXHIBIT 3.3

Cash Accounting

Recognizing Revenues and Expenses

We divide a company's activities into time periods, but not all activities are complete when financial statements are prepared. Thus, adjustments are required to get proper account balances.

We use two principles in the adjusting process: revenue recognition and expense recognition.

- **Revenue recognition principle** requires that revenue be recorded when goods or services are provided to customers and at an amount expected to be received from customers. Adjustments

ensure revenue is recognized (reported) in the time period when those services and products are provided.

- **Expense recognition** (or **matching**) **principle** requires that expenses be recorded in the same accounting period as the revenues that are recognized as a result of those expenses.

Framework for Adjustments

Four types of adjustments exist for transactions and events that extend over more than one period.

Deferral of expense | Deferral of revenue | Accrued expense | Accrued revenue

Adjustments are made using a 3-step process, as shown in Exhibit 3.4.

Step 1: Determine what the current account balance *equals*.
Step 2: Determine what the current account balance *should equal*.
Step 3: Record an adjusting entry to get from step 1 to step 2.

EXHIBIT 3.4

Three-Step Process for Adjusting Entries

Each **adjusting entry** made at the end of an accounting period reflects a transaction or event that is not yet recorded. An adjusting entry affects one or more income statement accounts *and* one or more balance sheet accounts (but never the Cash account).

DEFERRAL OF EXPENSE

P1

Prepare adjusting entries for deferral of expenses.

Prepaid expenses, or *deferred expenses,* are assets *paid for* in advance of receiving their benefits. When these assets are used,

those advance payments become expenses.

Framework Adjusting entries for prepaid expenses increase expenses and decrease assets, as shown in the T-accounts of Exhibit 3.5. This adjustment shows the using up of prepaid expenses. To demonstrate accounting for prepaid expenses, we look at prepaid insurance, supplies, and depreciation. In each case we decrease an asset (balance sheet) account and increase an expense (income statement) account.

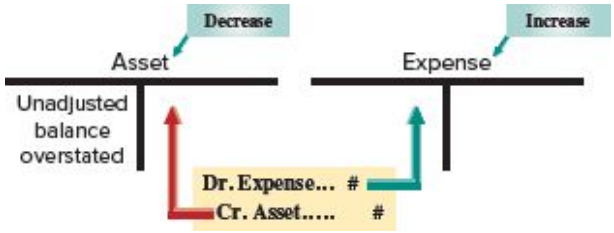


EXHIBIT 3.5

Adjusting for Prepaid Expenses (decrease an asset and increaseexpense)

Prepaid Insurance

Prepaid insurance expires with time. We use our three-step process.

Step 1: We determine that the current balance of FastForward's prepaid insurance is equal to its $2,400 payment for 24 months of insurance benefits that began on December 1, 2021.

Step 2: The benefits of the insurance expire over time and a portion of the Prepaid Insurance asset becomes expense. For FastForward, one month's insurance coverage expires by December 31, 2021. This expense is $100, or 1/24 of $2,400, which leaves $2,300.

Step 3: The adjusting entry to record this expense and reduce the asset, along with T-account postings, follows.

Dec. 31	Adjustment (*a*)	
	Insurance Expense	100
	Prepaid Insurance	100
	Record first month's expired insurance.	

Assets = Liabilities + Equity
−100 −100

Prepaid Insurance			128
Dec. 1	2,400	Dec. 31	100
Balance	2,300		

Insurance Expense		637
Dec. 31	100	

Explanation After adjusting and posting, the $100 balance in page 88 Insurance Expense and the $2,300 balance in Prepaid Insurance are ready for reporting in financial statements. The following highlights the adjustment for prepaid insurance.

Before Adjustment	Adjustment	After Adjustment
Prepaid Insurance = $2,400	**Deduct $100 from Prepaid Insurance** **Add $100 to Insurance Expense**	**Prepaid Insurance = $2,300**
Reports $2,400 policy for 24 months' coverage.	Record current month's $100 insurance expense and $100 reduction in prepaid.	Reports $2,300 in coverage for remaining 23 months.

Supplies

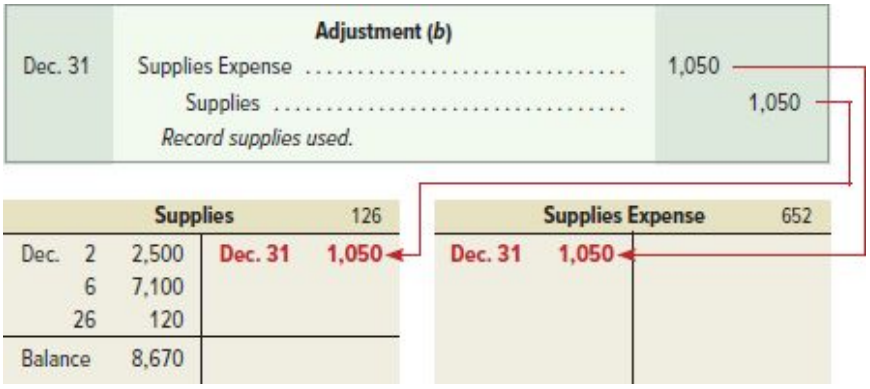
Assets = Liabilities + Equity
−1,050 −1,050

We count supplies at period-end to find the amount used and then make an adjusting entry.

Step 1: FastForward purchased $9,720 of supplies in December, some of which were used during that same month. When financial statements are prepared at December 31, the cost of supplies used during December is expensed.

Step 2: When FastForward computes (physically counts) its remaining unused supplies at December 31, it finds $8,670 of supplies remaining of the $9,720 total supplies. The $1,050 difference between these two amounts is December's supplies expense.

Step 3: The adjusting entry to record this expense and reduce the Supplies asset account, along with T-account postings, follows.



	Adjustment (*b*)	
Dec. 31	Supplies Expense	1,050
	Supplies	1,050
	Record supplies used.	

Supplies 126

Dec.	2	2,500	Dec. 31		1,050
	6	7,100			
	26	120			
Balance		8,670			

Supplies Expense 652

Dec. 31	1,050		

Explanation The balance of the Supplies account is $8,670 after posting—equaling the cost of the remaining supplies. The following highlights the adjustment for supplies.

Before Adjustment	Adjustment	After Adjustment
Supplies = $9,720	**Deduct $1,050 from Supplies** **Add $1,050 to Supplies Expense**	**Supplies = $8,670**
Reports $9,720 in supplies.	Record $1,050 in supplies used and $1,050 as supplies expense.	Reports $8,670 in supplies.

Other Prepaid Expenses

Other prepaid expenses, such as Prepaid Rent and Prepaid Advertising, are accounted for exactly as insurance and supplies are.

Some prepaid expenses are both paid for *and* fully used up within a single period. One example is when a company pays monthly rent on the first day of each month. In this case, we record the cash paid with a debit to Rent Expense instead of an asset account.

Depreciation

A special category of prepaid expenses is **plant assets,** also called Property, Plant, & Equipment (PP&E). Plant assets are long-term tangible assets used to produce and sell products and services. Examples include buildings, machines, vehicles, and equipment. Plant assets provide benefits for more than one period. All plant assets (excluding land) eventually wear out or become less useful.

The costs of plant assets are gradually reported as expenses in the income statement over the assets' useful lives (benefit periods). **Depreciation** is the allocation of the costs of these assets over their expected useful lives, but it does not necessarily measure decline in market value. Depreciation expense is recorded with an adjusting entry similar to that for other prepaid expenses.

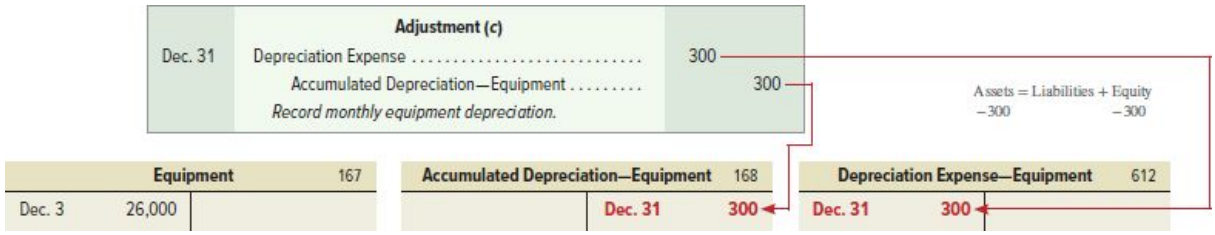
Point: An asset's expected value at the end of its useful life is called salvage value.

page 89

Step 1: FastForward purchased equipment for $26,000 in early December to use in earning revenue. This equipment's cost must be depreciated.

Step 2: The equipment is expected to have a useful life (benefit period) of five years and to be worth about $8,000 at the end of five years. This means the *net* cost of this equipment over its useful life is $18,000 ($26,000 − $8,000). FastForward depreciates it using **straight-line depreciation,** which allocates equal amounts of the asset's net cost to depreciation during its useful life. Dividing the $18,000 net cost by the 60 months (5 years) in the asset's useful life gives a monthly cost of $300 ($18,000⁄60).

Step 3: The adjusting entry to record monthly depreciation expense, along with T-account postings, follows.



Explanation After posting the adjustment, the Equipment account ($26,000) minus its Accumulated Depreciation ($300) account equals the $25,700 net cost. The $300 balance in the Depreciation Expense account is reported in the December income statement. The following highlights the adjustment for depreciation.

Before Adjustment	Adjustment	After Adjustment
Equipment, net = $26,000	**Deduct $300 from Equipment, net** **Add $300 to Depreciation Expense**	**Equipment, net = $25,700**
Reports $26,000 in equipment.	Record $300 in depreciation and $300 as accumulated depreciation.	Reports $25,700 in equipment, net of accumulated depreciation.

Accumulated Depreciation is a separate contra account and has a normal credit balance. A **contra account** is an account linked with another account, it has an opposite normal balance, and it is reported as a subtraction from that other account's balance. FastForward's contra account of Accumulated Depreciation—Equipment is subtracted from the Equipment account in the balance sheet.

The Accumulated Depreciation contra account includes total depreciation expense for all prior periods for which the asset was used. To demonstrate, on February 28, 2022, after three months of adjusting entries, the Equipment and Accumulated Depreciation accounts appear as in Exhibit 3.6. The $900 balance in the Accumulated Depreciation account is subtracted from its related $26,000 asset cost. The difference ($25,100) between these two

balances is called **book value**, or *net amount,* which is the asset's costs minus its accumulated depreciation.

Equipment		167
Dec. 3	26,000	

Accumulated Depreciation—Equipment		168
	Dec. 31	300
	Jan. 31	300
	Feb. 28	300
	Balance	900

EXHIBIT 3.6

Accounts after 3 Months of Depreciation

These account balances are reported in the assets section of the February 28 balance sheet. Exhibit 3.7 shows two ways to report plant assets.

Equipment	$26,000		OR (Book Value)	Equipment, net $25,100
Less accumulated depreciation	900	25,100		

EXHIBIT 3.7

Reporting Equipment and Accumulated Depreciation

Caia Image/Image Source

Decision Maker

Investor A publisher signs an Olympic athlete to write a book. The company pays the athlete $500,000 to sign plus future book royalties. A note to the company's financial statements says, "prepaid expenses include $500,000 in author signing fees to be matched against future expected sales." How does this affect your analysis? ■ *Answer:* Prepaid expenses are assets paid for in advance of receiving their benefits–they are expensed as they are used up. As an investor, you are concerned about the risk of future book sales. The riskier the likelihood of future book sales is, the more likely your analysis is to treat the $500,000, or a portion of it, as an expense, not a prepaid expense (asset).

NEED-TO-KNOW 3-1

Prepaid Expenses

P1

For each separate case below, follow the three-step process page 90 for adjusting the prepaid asset account at December 31. *Assume no other adjusting entries are made during the year.*

1. **Prepaid Insurance.** The Prepaid Insurance account has a $5,000 debit balance to start the year, and no insurance payments were made during the year. A review of insurance policies shows that $1,000 of unexpired insurance remains at its December 31 year-end.
2. **Prepaid Rent.** On October 1 of the current year, the company prepaid $12,000 for one year of rent for facilities being occupied from that day forward. The company debited Prepaid Rent and credited Cash for $12,000. December 31 year-end statements must be prepared.
3. **Supplies.** The Supplies account has a $1,000 debit balance to start the year. Supplies of $2,000 were purchased during the current year and debited to the Supplies account. A December 31 physical count shows $500 of supplies remaining.
4. **Accumulated Depreciation.** The company has only one plant asset (equipment) that it purchased at the start of this year. That asset had cost $38,000, had an estimated life of 10 years, and is expected to be valued at $8,000 at the end of the 10-year life. December 31 year-end statements must be prepared.

Solution

1. Step 1: Prepaid Insurance equals $5,000 (before adjustment)

   Step 2: Prepaid Insurance should equal $1,000 (the unexpired part)

   Step 3: Adjusting entry to get from step 1 to step 2

Dec. 31	Insurance Expense	4,000	
	Prepaid Insurance		4,000
	Record expired insurance coverage ($5,000 – $1,000).		

2. Step 1: Prepaid Rent equals $12,000 (before adjustment)

Step 2: Prepaid Rent should equal $9,000 (the unexpired part)*

Step 3: Adjusting entry to get from step 1 to step 2

Dec. 31	Rent Expense	3,000	
	Prepaid Rent		3,000
	*Record expired prepaid rent. *$12,000 – $3,000 = $9,000, where $3,000 is from: ($12,000/12 months) × 3 months*		

3. Step 1: Supplies equal $3,000 (from $1,000 + $2,000; before adjustment)

Step 2: Supplies should equal $500 (what's left)

Step 3: Adjusting entry to get from step 1 to step 2*

Dec. 31	Supplies Expense	2,500	
	Supplies		2,500
	*Record supplies used. *$1,000 + $2,000 purchased – $500 remaining = **$ 2,500** supplies used*		

4. Step 1: Accumulated Depreciation equals $0 (before adjustment)

Step 2: Accumulated Depreciation should equal $3,000 (after current-period depreciation of $3,000)*

Step 3: Adjusting entry to get from step 1 to step 2

Dec. 31	Depreciation Expense—Equipment	3,000	
	Accumulated Depreciation—Equipment		3,000
	*Record depreciation for period. *($38,000 – $8,000)/ 10 years*		

Do More: QS 3-5, QS 3-6, QS 3-7, QS 3-8, QS 3-9

DEFERRAL OF REVENUE

P2

Prepare adjusting entries for deferral of revenues.

Unearned revenue is cash received in advance of providing products and services. Unearned revenues, or *deferred revenues,* are liabilities. When cash is accepted, an obligation to provide products or services is accepted. We defer, or postpone, reporting amounts received as revenues until the product or service is provided.

Framework As products or services are provided, the liability decreases and the unearned revenues become revenues. Adjusting entries for unearned revenue decrease the unearned revenue (balance sheet) account and increase the revenue (income statement) account, as shown in Exhibit 3.8.

Unearned revenues are common in sporting and concert events. When the **Boston Celtics** receive cash from advance ticket sales, they record it in an unearned revenue account called *Deferred Game Revenues.* The Celtics record revenue as games are played.

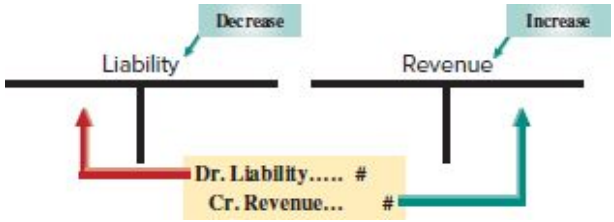


EXHIBIT 3.8

Adjusting for Unearned Revenues (decrease a liability and increase revenue)

Unearned Consulting Revenue

FastForward has unearned revenues. The company agreed on December 26 to provide consulting services to a client for 60 days for a fixed fee of $3,000.

Step 1: On December 26, the client paid the 60-day fee in advance, covering the period December 27 to February 24. The entry to record the cash received in advance is

Dec. 26	Cash	3,000	
	Unearned Consulting Revenue		3,000
	Received advance payment for services over the next 60 days.		

Assets = Liabilities + Equity
+3,000 +3,000

This advance payment increases cash and creates a liability to do consulting work over the next 60 days (5 days this year and 55 days next year).

Step 2: As time passes, FastForward earns this payment through consulting. By December 31, it has provided five days' service and earned 5⁄60 of the $3,000 unearned revenue. This amounts to $250 ($3,000 × 5⁄60). The *revenue recognition principle* requires that $250 of unearned revenue be reported as revenue on the December income statement.

Step 3: The adjusting entry to reduce the liability account and recognize revenue, along with T-account postings, follows.

Assets = Liabilities + Equity
+3,000 +3,000

Assets = Liabilities + Equity
−250 +250

Adjustment (*d*)

Dec. 31	Unearned Consulting Revenue	250	
	Consulting Revenue		250
	Record earned revenue that was received in advance ($3,000 × 5/60).		

Unearned Consulting Revenue 236

Dec. 31	250	Dec. 26	3,000
		Balance	2,750

Consulting Revenue 403

		Dec. 5	4,200
		12	1,600
		31	250
		Balance	6,050

Explanation The adjusting entry transfers $250 from unearned revenue (a liability account) to a revenue account. The following highlights the adjustment for unearned revenue.

Before Adjustment	Adjustment	After Adjustment
Unearned Consulting Revenue = $3,000	**Deduct $250 from Unearned Consulting Revenue** **Add $250 to Consulting Revenue**	**Unearned Consulting Revenue = $2,750**
Reports $3,000 in unearned revenue for consulting services promised for 60 days ($50 per day).	Record 5 days of earned consulting revenue, which is 5/60 of unearned amount.	Reports $2,750 in unearned revenue for consulting services owed over next 55 days (55 days × $50 = $2,750).

LifeJourneys/iStock/Getty Images

Ethical Risk

Clawbacks from Accounting Fraud Former executives at **Saba Software**, a cloud-based talent management system, were charged with accounting fraud by the SEC for falsifying revenue to boost income. This alleged overstatement of income led to a payback of millions of dollars to the company by the former CEO and former CFO. See SEC release 2015–28. ■

NEED-TO-KNOW 3-2

Unearned Revenues

P2

For each separate case below, follow the three-step process page 92 for adjusting the unearned revenue liability account at December 31. *Assume no other adjusting entries are made during the year.*

a. Unearned Rent Revenue. The company collected $24,000 rent in advance on September 1, debiting Cash and crediting Unearned Rent Revenue. The tenant was paying 12 months' rent in advance and moved in on September 1.

b. Unearned Services Revenue. The company charges $100 per month to spray a house for insects. A customer paid $600 on November 1 in advance for six treatments, which was recorded with a debit to Cash and a credit to Unearned Services Revenue. At year-end, the company has applied two treatments for the customer.

Solution

a. Step 1: Unearned Rent Revenue equals $24,000 (before adjustment)

Step 2: Unearned Rent Revenue should equal $16,000 (current-period earned revenue is $8,000*)

Step 3: Adjusting entry to get from step 1 to step 2

b. Step 1: Unearned Services Revenue equals $600 (before adjustment)

Step 2: Unearned Services Revenue should equal $400 (current- period earned revenue is $200*)

Step 3: Adjusting entry to get from step 1 to step 2

Dec. 31	Unearned Rent Revenue	8,000	
	Rent Revenue		8,000
	*Record earned portion of rent received in advance. *($24,000/12 months) × 4 months' rental usage*		

Dec. 31	Unearned Services Revenue	200	
	Services Revenue		200
	*Record earned portion of revenue received in advance. *$100 × 2 treatments = Services revenue*		

Do More: QS 3-10, QS 3-11, QS 3-12

ACCRUED EXPENSE

P3

Prepare adjusting entries for accrued expenses

Accrued expenses, *or accrued liabilities,* are costs that are incurred in a period that are both unpaid and unrecorded. Accrued expenses are reported on the income statement for the period when incurred.

Framework Adjusting entries for recording accrued expenses increase the expense (income statement) account and increase a liability (balance sheet) account, as shown in Exhibit 3.9. This adjustment recognizes expenses incurred in a period but not yet paid. Common examples of accrued expenses are salaries, interest, rent, and taxes. We use salaries and interest to show how to adjust accounts for accrued expenses.

EXHIBIT 3.9

Adjusting for Accrued Expenses (increase a liability and increase expense)

Accrued Salaries Expense

FastForward's employee earns $70 per day, or $350 for a five-day workweek beginning on Monday and ending on Friday.

Step 1: Its employee is paid every two weeks on Friday. On page 93 December 12 and 26, the wages are paid, recorded in the journal, and posted to the ledger.

Step 2: The calendar in Exhibit 3.10 shows three working days after the December 26 payday (29, 30, and 31). This means the employee has earned three days' salary by the close of business on Wednesday,

December 31, but this salary cost has not been paid or recorded. FastForward must report the added expense and liability for unpaid salary from December 29, 30, and 31.

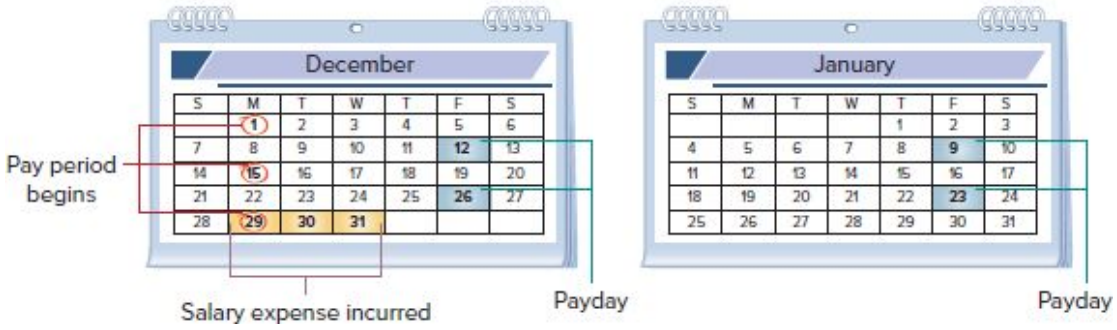


EXHIBIT 3.10

Salary Accrual and Paydays

Step 3: The adjusting entry for accrued salaries, along with T-account postings, follows.

Adjustment (e)

Dec. 31	Salaries Expense	210	
	Salaries Payable		210
	Record three days' accrued salary (3 × $70).		

Assets = Liabilities + Equity
+210 +210

Salaries Expense		622
Dec. 12	700	
26	700	
31	210	
Balance	1,610	

Salaries Payable		209
	Dec. 31	210

Explanation Salaries expense of $1,610 is reported on the December income statement, and $210 of salaries payable (liability) is reported in the balance sheet. The following highlights the adjustment for salaries incurred.

Before Adjustment	Adjustment	After Adjustment
Salaries Payable = $0	**Add $210 to Salaries Payable** **Add $210 to Salaries Expense**	**Salaries Payable = $210**
Reports $0 from employee salaries incurred but not yet paid in cash.	Record 3 days' salaries owed, but not yet paid, at $70 per day.	Reports $210 salaries payable to employee but not yet paid.

Accrued Interest Expense

Companies accrue interest expense on notes payable (loans) and other long-term liabilities at the end of a period. Interest expense is incurred as time passes. Unless interest is paid on the last day of an accounting period, we need to adjust for interest expense incurred but not yet paid. This means we must accrue interest cost from the most recent payment date up to the end of the period. The formula for computing accrued interest is

Ghing/Shutterstock

Principal amount owed × Annual interest rate × Fraction of year since last payment

If a company has a $6,000 loan from a bank at 5% annual interest, then 30 days' accrued interest expense is $25—computed as $6,000 × 0.05 × 30⁄360. The adjusting entry debits Interest Expense for $25 and credits Interest Payable for $25.

Point: Interest computations use a 360-day year, called the *bankers' rule.*

Future Cash Payment of Accrued Expenses

Accrued expenses at the end of one accounting period result page 94 in *cash payment* in a *future period*(*s*). Recall that FastForward recorded accrued salaries of $210. On January 9, the first payday of the next period, the following entry settles the accrued liability (salaries payable) and records salaries expense for seven days of work in January.

Assets = Liabilities + Equity
−700 −210 −490

Jan. 9	Salaries Payable (3 days at $70 per day)	210	
	Salaries Expense (7 days at $70 per day)	490	
	Cash		700
	Paid two weeks' salary including three days accrued.		

The $210 debit is the payment of the liability for the three days' salary accrued on December 31. The $490 debit records the salary for January's first seven working days (including the New Year's Day holiday) as an expense of the new accounting period. The $700 credit records the total amount of cash paid to the employee.

NEED-TO-KNOW 3-3

Accrued Expenses

P3

For each separate case below, follow the three-step process for adjusting the accrued expense account at December 31. *Assume no other adjusting entries are made during the year.*

a. Salaries Payable. At year-end, salaries expense of $5,000 has been incurred by the company but is not yet paid to employees.

b. Interest Payable. At its December 31 year-end, the company holds a mortgage payable that has incurred $1,000 in annual interest that is neither recorded nor paid. The company will pay the interest on January 3 of the next year.

Solution

a. Step 1: Salaries Payable equals $0 (before adjustment)

Step 2: Salaries Payable should equal $5,000 (not yet recorded)

Step 3: Adjusting entry to get from step 1 to step 2

b. Step 1: Interest Payable equals $0 (before adjustment)

Step 2: Interest Payable should equal $1,000 (not yet recorded)

Step 3: Adjusting entry to get from step 1 to step 2

Dec. 31	Salaries Expense	5,000	
	Salaries Payable		5,000
	Record accrued salaries expense.		

Dec. 31	Interest Expense	1,000	
	Interest Payable		1,000
	Record interest incurred but not yet paid.		

Do More: QS 3-13, QS 3-14, E 3-6, E 3-7, E 3-8

ACCRUED REVENUE

P4

Prepare adjusting entries for accrued revenues.

Accrued revenues are revenues earned in a period that are both unrecorded and not yet received in cash (or other assets). An example is a technician who bills customers after the job is done. If one-third of a job is complete by the end of a period, then the technician must record one-third of the expected billing as revenue in that period—even though there is no billing or collection. Accrued revenues are also called ***accrued assets.***

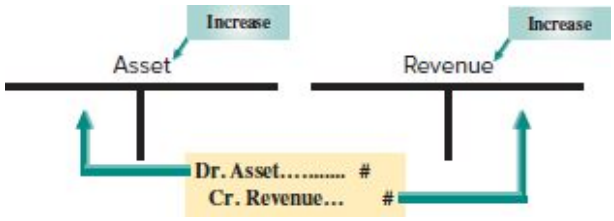


EXHIBIT 3.11

Adjusting for Accrued Revenues (increase asset and increase revenue)

Framework The adjusting entries for accrued revenues increase a revenue (income statement) account and increase an asset (balance sheet) account, as shown in Exhibit 3.11. Accrued revenues usually come from services, products, interest, and rent. We use services and interest to show how to adjust for accrued revenues.

Accrued Services Revenue

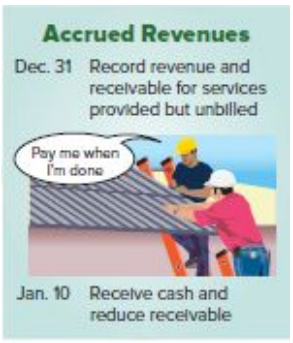
Accrued revenues are recorded when adjusting entries are made at the end of the accounting period. These accrued revenues

are earned but unrecorded because either the buyer has not yet paid or the seller has not yet billed the buyer. FastForward provides an example.

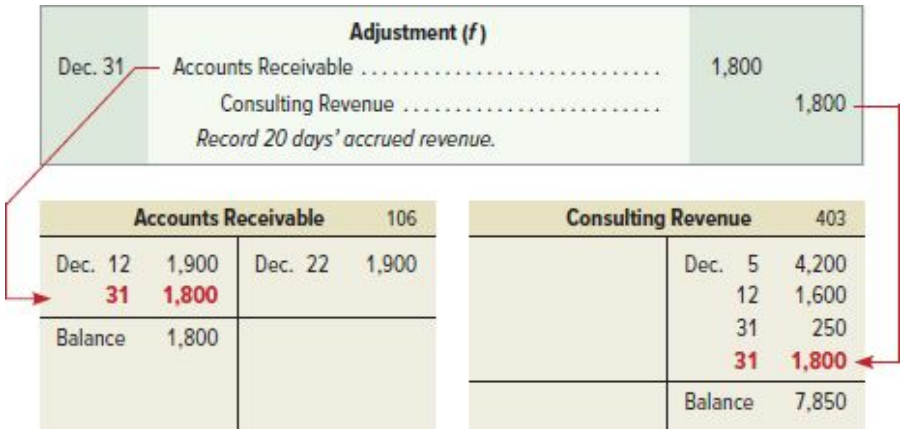
Step 1: In the second week of December, FastForward agreed to provide 30 days of consulting services to a fitness club for a fixed fee of $2,700 (or $90 per day). FastForward will provide services from December 12 through January 10, or 30 days of service. The club agrees to pay FastForward $2,700 on January 10 when the service is complete.

Step 2: At December 31, 20 days of services have already been provided. Because the contracted services have not yet been entirely provided, FastForward has neither billed the club nor recorded the services already provided. Still, FastForward has earned two-thirds of the 30-day fee, or $1,800 ($2,700 × 20⁄30). The *revenue recognition principle* requires FastForward to report the $1,800 on the December income statement. The balance sheet reports that the club owes FastForward $1,800.

Step 3: The adjusting entry for accrued services, along with T-account postings, follows.



Assets	= Liabilities	+ Equity
+1,800		+1,800



Adjustment (*f*)

Dec. 31	Accounts Receivable	1,800	
	Consulting Revenue		1,800
	Record 20 days' accrued revenue.		

Accounts Receivable 106

Dec. 12	1,900	Dec. 22	1,900
31	1,800		
Balance	1,800		

Consulting Revenue 403

		Dec. 5	4,200
		12	1,600
		31	250
		31	1,800
		Balance	7,850

Explanation Accounts receivable are reported on the balance sheet at $1,800, and the $7,850 total of consulting revenue is reported on the income statement. The following highlights the adjustment for accrued revenue.

Before Adjustment	Adjustment	After Adjustment
Accounts Receivable = $0	**Add $1,800 to Accounts Receivable** **Add $1,800 to Consulting Revenue**	**Accounts Receivable = $1,800**
Reports $0 from revenue earned but not yet received in cash.	Record 20 days of earned revenue, which is 20/30 of total contract.	Reports $1,800 in accounts receivable from services provided.

Accrued Interest Revenue

If a company is holding notes receivable that produce interest revenue, we must adjust the accounts to record any earned and yet uncollected interest revenue. The adjusting entry is similar to the one for accruing services revenue. Specifically, debit Interest Receivable (asset) and credit Interest Revenue.

Future Cash Receipt of Accrued Revenues

Accrued revenues at the end of one accounting period result in *cash receipts* in a *future period*(*s*). Recall that FastForward made an adjusting entry for $1,800 to record 20 days' accrued revenue earned from its consulting contract. When FastForward receives $2,700 cash on January 10 for the entire contract amount, it makes the following entry to remove the accrued asset (accounts receivable) and record revenue earned in January. The $2,700 debit is the cash received. The

$1,800 credit is the removal of the receivable, and the $900 credit is revenue earned in January.

Assets	=	Liabilities	+	Equity
+2,700				+900
−1,800				

Jan. 10	Cash	2,700	
	Accounts Receivable (20 days at $90 per day)		1,800
	Consulting Revenue (10 days at $90 per day)		900
	Received cash for accrued asset and recorded earned consulting revenue for January.		

Wit Olszewski/Shutterstock

Analytics Insight

We Accept Bitcoin **Microsoft**, **Subway**, **Expedia**, and others accept Bitcoin as a form of payment. Bitcoin is a digital currency that can be bought and sold. In recent years, one Bitcoin has been worth between $500 and $20,000. Companies accepting Bitcoin must ensure their accounting system properly accounts for rapid changes in Bitcoin value when setting a sales price. ■

NEED-TO-KNOW 3-4

Accrued Revenues

P4

For each separate case below, follow the three-step process page 96 for adjusting the accrued revenue account at December 31. *Assume no other adjusting entries are made during the year.*

a. **Accounts Receivable.** At year-end, the company has completed services of $1,000 for a client, but the client has not yet been billed for those services.

b. **Interest Receivable.** At year-end, the company has earned, but not yet recorded, $500 of interest earned from its investments in government bonds.

Solution

a. Step 1: Accounts Receivable equals $0 (before adjustment)

Step 2: Accounts Receivable should equal $1,000 (not yet recorded)

Step 3: Adjusting entry to get from step 1 to step 2

b. Step 1: Interest Receivable equals $0 (before adjustment)

Step 2: Interest Receivable should equal $500 (not yet recorded)

Step 3: Adjusting entry to get from step 1 to step 2

Dec. 31	Accounts Receivable	1,000	
	Services Revenue		1,000
	Record accrued revenue.		

Dec. 31	Interest Receivable	500	
	Interest Revenue		500
	Record accrued interest.		

Do More: QS 3-3, QS 3-15, QS 3-16, E 3-9 through E 3-13

Links to Financial Statements

Exhibit 3.12 summarizes the four adjustments. Each adjusting entry affects one or more income statement (revenue or expense) accounts *and* one or more balance sheet (asset or liability) accounts, but never the Cash account.

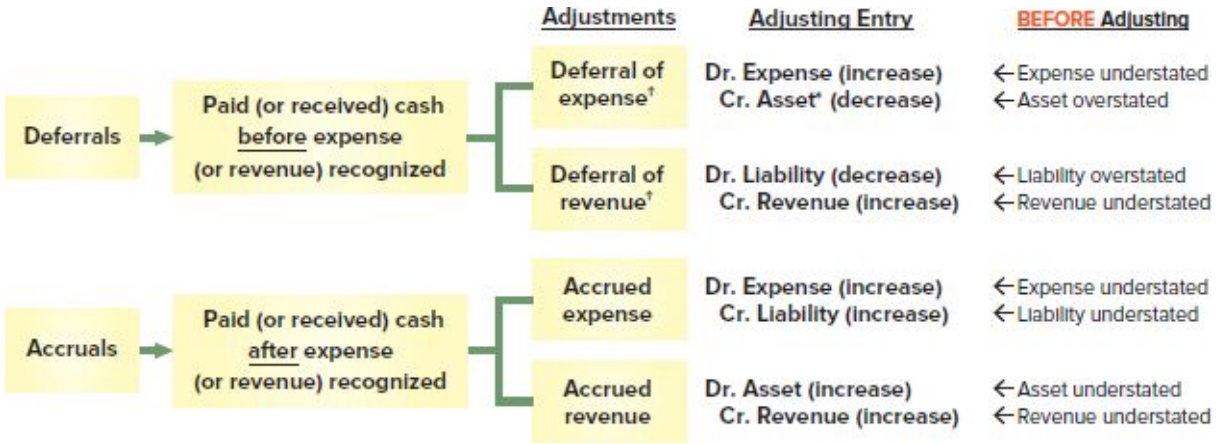


EXHIBIT 3.12

Summary of Adjustments

*For depreciation, the credit is to Accumulated Depreciation (contra asset).
†Exhibit assumes that deferred expenses are initially recorded as assets and that deferred revenues are initially recorded as liabilities.

Decision Ethics

Financial Officer At year-end, the president instructs you, the financial officer, not to record accrued expenses until next year because they will not be paid until then. The president also directs you to record in current year sales a recent purchase order from a customer that requires merchandise to be delivered two weeks after the year-end. Your company would report a net income instead of a net loss if you follow these instructions. What do you do? ■ *Answer:* Omitting accrued expenses and recognizing revenue early mislead financial statement users. One action is to explain to the president what is required. If the president persists, you might talk to lawyers and any auditors involved.

TRIAL BALANCE AND FINANCIAL STATEMENTS

P5

Prepare financial statements from an adjusted trial balance.

Adjusted Trial Balance

An **unadjusted trial balance** is a list of accounts and balances *before* adjustments are recorded. An **adjusted trial balance** is a list of accounts and balances *after* adjusting entries have been recorded and posted to the ledger.

Exhibit 3.13 shows both the unadjusted and the adjusted page 97 trial balances for FastForward at December 31, 2021. The order of accounts in the trial balance usually matches the order in the chart of accounts. Several new accounts usually arise from adjusting entries.

FASTFORWARD
Trial Balances
December 31, 2021

Acct. No.	Account Title	Unadjusted Trial Balance Dr.	Unadjusted Trial Balance Cr.	Adjustments Dr.	Adjustments Cr.	Adjusted Trial Balance Dr.	Adjusted Trial Balance Cr.
101	Cash	$ 4,275				$ 4,275	
106	Accounts receivable	0		(f) $1,800		1,800	
126	Supplies	9,720			(b) $1,050	8,670	
128	Prepaid insurance	2,400			(a) 100	2,300	
167	Equipment	26,000				26,000	
168	Accumulated depreciation—Equip.		$ 0		(c) 300		$ 300
201	Accounts payable		6,200				6,200
209	Salaries payable		0		(e) 210		210
236	Unearned consulting revenue		3,000	(d) 250			2,750
307	Common stock		30,000				30,000
318	Retained earnings		0				0
319	Dividends	200				200	
403	Consulting revenue		5,800		(d) 250		7,850
					(f) 1,800		
406	Rental revenue		300				300
612	Depreciation expense—Equip.	0		(c) 300		300	
622	Salaries expense	1,400		(e) 210		1,610	
637	Insurance expense	0		(a) 100		100	
640	Rent expense	1,000				1,000	
652	Supplies expense	0		(b) 1,050		1,050	
690	Utilities expense	305				305	
	Totals	$45,300	$45,300	$3,710	$3,710	$47,610	$47,610

EXHIBIT 3.13

Unadjusted and Adjusted Trial Balances

Each adjustment (see middle columns) has a letter that links it to an adjusting entry explained earlier. Each amount in the Adjusted Trial Balance columns is computed by taking that account's amount from the Unadjusted Trial Balance columns and adding or subtracting any adjustment(s). To demonstrate, Supplies has a $9,720 Dr. balance in the unadjusted columns. Subtracting the $1,050 Cr. amount shown in the Adjustments columns equals an adjusted $8,670 Dr. balance for Supplies. An account can have more than one adjustment, such as for Consulting Revenue. Also, some accounts might not require adjustment for this period, such as Accounts Payable.

Preparing Financial Statements

We can prepare financial statements directly from information page 98 in the *adjusted* trial balance. Exhibit 3.14 shows how revenue and expense balances are transferred from the adjusted trial balance to the

income statement (red lines). The net income and dividends amounts are then used to prepare the statement of retained earnings (green lines). Asset and liability balances are then transferred to the balance sheet (blue lines). The ending retained earnings is computed in the statement of retained earnings and transferred to the balance sheet (pink line).

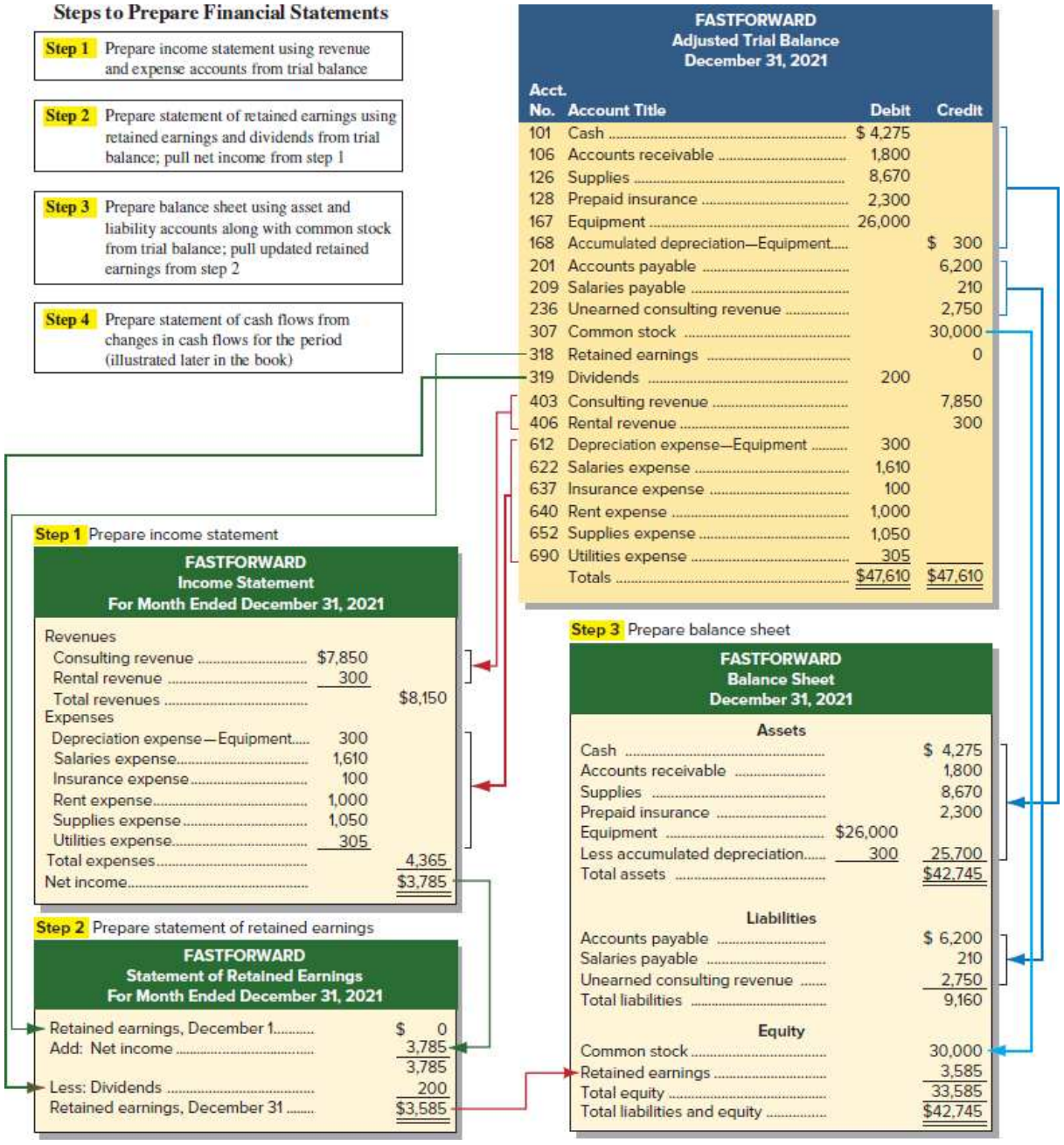


EXHIBIT 3.14

We prepare financial statements in the following order: (1) income statement, (2) statement of retained earnings, and (3) balance sheet. This order makes sense because the balance sheet uses information from the statement of retained earnings, which in turn uses information from the income statement. The statement of cash flows is usually the final statement prepared. page 99

Point: Each trial balance amount is used in only one financial statement.

NEED-TO-KNOW 3-5

Preparing Financial Statements from a Trial Balance

P5

Use the following adjusted trial balance of Magic Company to prepare its December 31 year-end (1) income statement, (2) statement of retained earnings, and (3) balance sheet (unclassified). The Retained Earnings account balance was $45,000 on December 31 of the *prior year*.

MAGIC COMPANY
Adjusted Trial Balance
December 31

Account Title	Debit	Credit
Cash	$ 13,000	
Accounts receivable	17,000	
Land	85,000	
Accounts payable		$ 12,000
Long-term notes payable		33,000
Common stock		30,000
Retained earnings		45,000
Dividends	20,000	
Services revenue		79,000
Salaries expense	56,000	
Supplies expense	8,000	
Totals	$199,000	$199,000

Solution

Step 1

MAGIC COMPANY
Income Statement
For Year Ended December 31

Revenues		
Services revenue		$79,000
Expenses		
Salaries expense	$56,000	
Supplies expense	8,000	
Total expenses		64,000
Net income		$15,000

Step 2

MAGIC COMPANY
Statement of Retained Earnings
For Year Ended December 31

Retained earnings, December 31, prior year-end	$45,000
Add: Net income	15,000
	60,000
Less: Dividends	20,000
Retained earnings, December 31, current year-end	$40,000

Step 3

MAGIC COMPANY
Balance Sheet
December 31

Assets	
Cash	$ 13,000
Accounts receivable	17,000
Land	85,000
Total assets	$115,000
Liabilities	
Accounts payable	$ 12,000
Long-term notes payable	33,000
Total liabilities	45,000
Equity	
Common stock	30,000
Retained earnings	40,000
Total equity	70,000
Total liabilities and equity	$115,000

Do More: QS 3-18, QS 3-19, E 3-15, E 3-16, E 3-17, P 3-4

CLOSING PROCESS

P6

Prepare closing entires and a post-closing trial balance

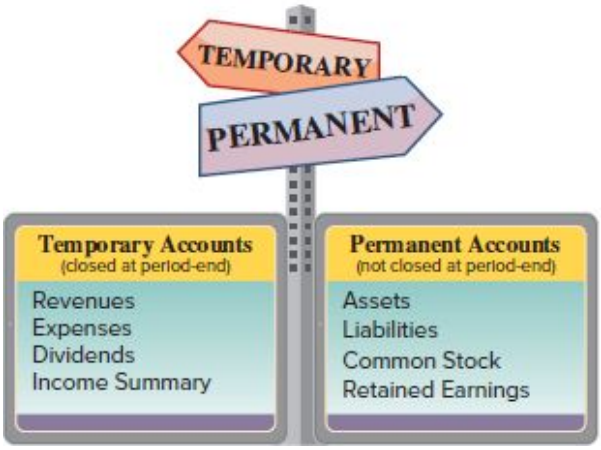
The **closing process** occurs at the end of an accounting period *after* financial statements are completed. In the closing process we (1) identify accounts for closing, (2) record and post the closing entries, and (3) prepare a post-closing trial balance. The closing process has two purposes. First, it resets revenue, expense, and dividends account balances to zero at the end of each period. This is done so that these accounts can properly measure income and dividends for the next period. Second, it updates the balance of the Retained Earnings account, which matches that reported in the balance sheet and the statement of retained earnings.

page 101

Temporary and Permanent Accounts

Temporary accounts relate to one accounting period. They include all income statement accounts, the dividends account, and the **Income Summary** account. They are temporary because such accounts are used for a period and then closed at period-end. **The closing process applies only to temporary accounts.**

Permanent accounts report on activities related to one or more-future accounting periods. They include asset, liability, and equity accounts (all balance sheet accounts). **Permanent accounts are not closed each period and carry their ending balance into future periods**.



Recording Closing Entries

Closing entries transfer the end-of-period balances in revenue, expense, and dividends accounts to the permanent Retained Earnings account. Closing entries are necessary at the end of each period after financial statements are prepared because

Point: If Apple did not make closing entries, prior year revenue from iPhone sales would be included with current year revenue.

- Revenue, expense, and dividends accounts must begin each period with zero balances.
- Retained Earnings must reflect prior periods' revenues, expenses, and dividends.

An income statement reports revenues and expenses for an *accounting period*. Dividends are also reported for an accounting period. Because revenue, expense, and dividends accounts record information separately for each period, they must start each period with zero balances.

Exhibit 3.15 uses the adjusted account balances of FastForward (from the Adjusted Trial Balance columns of Exhibit 3.14 or from the left side of Exhibit 3.16) to show the four steps to close its temporary accounts.

1 2 To close revenue and expense accounts, we transfer their balances to Income Summary. **Income Summary is a temporary account only used for the closing process** that contains a credit for total revenues (and gains) and a debit for total expenses (and losses).

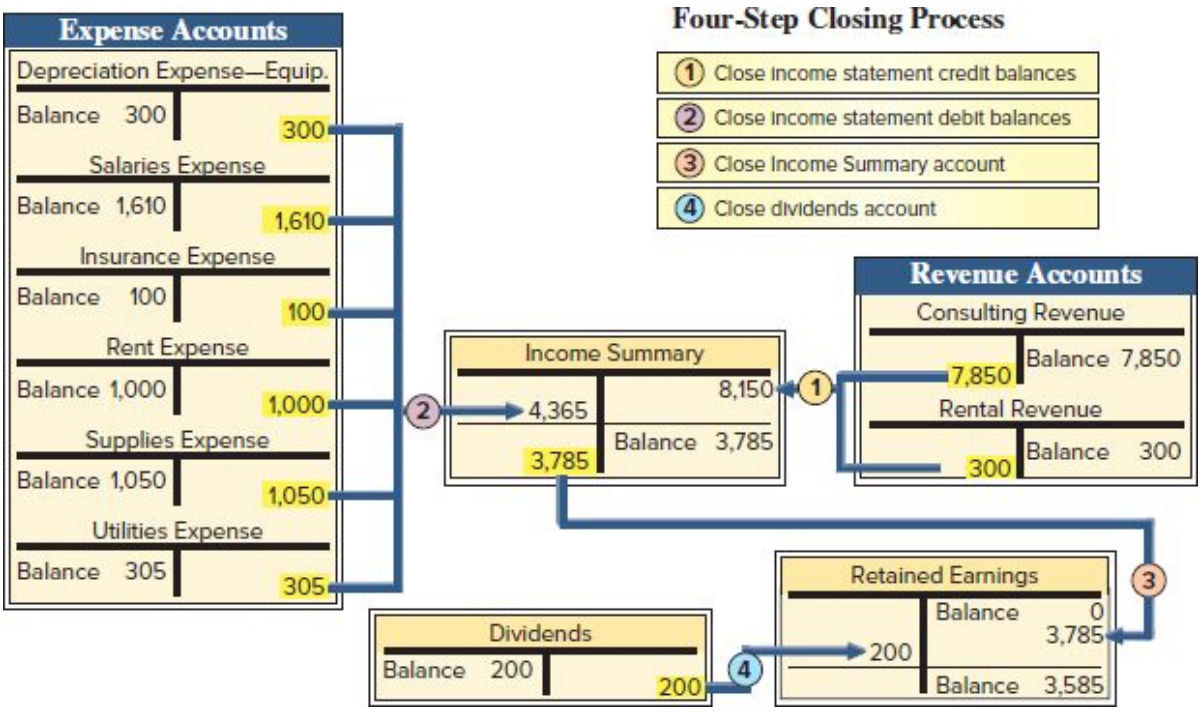


EXHIBIT 3.15

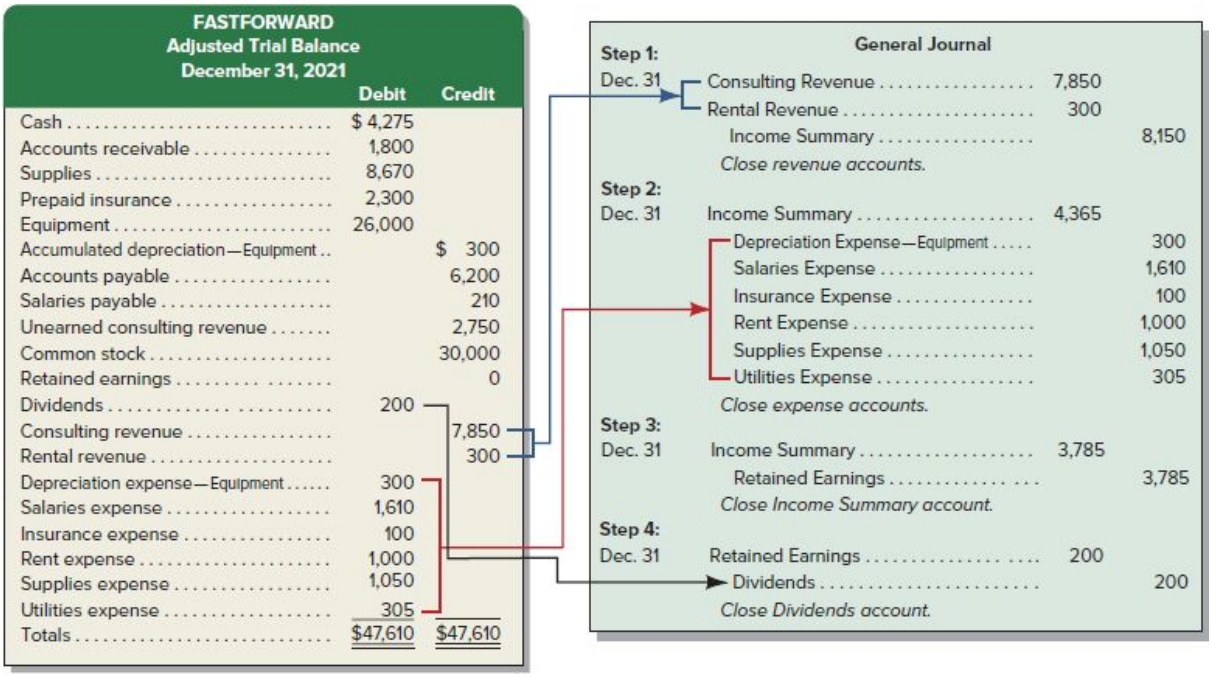
Four-Step Closing

Point: Retained Earnings is the only permanent account in Exhibit 3.15—meaning it is not closed, but it does have Income Summary closed to it.

3 The Income Summary balance, which equals net income page 102 or net loss, is transferred to the Retained Earnings account.

4 The Dividends account balance is transferred to the Retained Earnings account. After closing entries are posted, the revenue, expense, dividends, and Income Summary accounts have zero-balances and are said to be *closed* or *cleared*.

Exhibit 3.16 shows the four closing journal entries to apply the closing process of Exhibit 3.15.



FASTFORWARD
Adjusted Trial Balance
December 31, 2021

	Debit	Credit
Cash	$ 4,275	
Accounts receivable	1,800	
Supplies	8,670	
Prepaid insurance	2,300	
Equipment	26,000	
Accumulated depreciation—Equipment		$ 300
Accounts payable		6,200
Salaries payable		210
Unearned consulting revenue		2,750
Common stock		30,000
Retained earnings		0
Dividends	200	
Consulting revenue		7,850
Rental revenue		300
Depreciation expense—Equipment	300	
Salaries expense	1,610	
Insurance expense	100	
Rent expense	1,000	
Supplies expense	1,050	
Utilities expense	305	
Totals	$47,610	$47,610

General Journal

Step 1:			
Dec. 31	Consulting Revenue	7,850	
	Rental Revenue	300	
	Income Summary		8,150
	Close revenue accounts.		
Step 2:			
Dec. 31	Income Summary	4,365	
	Depreciation Expense—Equipment		300
	Salaries Expense		1,610
	Insurance Expense		100
	Rent Expense		1,000
	Supplies Expense		1,050
	Utilities Expense		305
	Close expense accounts.		
Step 3:			
Dec. 31	Income Summary	3,785	
	Retained Earnings		3,785
	Close Income Summary account.		
Step 4:			
Dec. 31	Retained Earnings	200	
	Dividends		200
	Close Dividends account.		

EXHIBIT 3.16

Preparing Closing Entries

Step 1: Close Credit Balances in Revenue Accounts to Income Summary First, we close revenues to Income Summary. We bring accounts with credit balances to zero by debiting them. For FastForward, this is step 1 in Exhibit 3.16. The $8,150 credit entry to Income Summary equals total revenues for the period. This leaves revenue accounts with zero balances, and they are now ready to record revenues for next period.

Step 2: Close Debit Balances in Expense Accounts to Income Summary Second, we close expenses to Income Summary. We bring expense accounts' debit balances to zero by crediting them. With a balance of zero, these accounts are ready to record expenses for next period. This second closing entry for FastForward is step 2 in Exhibit 3.16.

Step 3: Close Income Summary to Retained Earnings After steps 1 and 2, the balance of Income Summary equals December net income of $3,785 ($8,150 credit less $4,365 debit). The third closing entry transfers the balance of the Income Summary account to the Retained

Earnings account. This entry closes the Income Summary account—see step 3 in Exhibit 3.16.

Step 4: Dividends Account to Retained Earnings Close Dividends Account to Retained Earnings The fourth closing entry transfers any debit balance in the Dividends account to the Retained Earnings account—see step 4 in Exhibit 3.16. This entry gives the Dividends account a zero balance, and the account is now ready to record next period's dividends.

Exhibit 3.17 shows the entire ledger of FastForward as of December 31 *after* adjusting and closing entries are posted. The temporary accounts (revenues, expenses, and dividends) have ending balances equal to zero.

Asset Accounts

Cash — Acct. No. 101

Date	Explan.	PR	Debit	Credit	Balance
Dec. 1	(1)	G1	30,000		30,000
2	(2)	G1		2,500	27,500
3	(3)	G1		26,000	1,500
5	(5)	G1	4,200		5,700
6	(13)	G1		2,400	3,300
12	(6)	G1		1,000	2,300
12	(7)	G1		700	1,600
22	(9)	G1	1,900		3,500
24	(10)	G1		900	2,600
24	(11)	G1		200	2,400
26	(12)	G1	3,000		5,400
26	(14)	G1		120	5,280
26	(15)	G1		305	4,975
26	(16)	G1		700	**4,275**

Accounts Receivable — Acct. No. 106

Date	Explan.	PR	Debit	Credit	Balance
Dec. 12	(8)	G1	1,900		1,900
22	(9)	G1		1,900	0
31	**Adj.(f)**	**G1**	**1,800**		**1,800**

Supplies — Acct. No. 126

Date	Explan.	PR	Debit	Credit	Balance
Dec. 2	(2)	G1	2,500		2,500
6	(4)	G1	7,100		9,600
26	(14)	G1	120		9,720
31	**Adj.(b)**	**G1**		**1,050**	**8,670**

Prepaid Insurance — Acct. No. 128

Date	Explan.	PR	Debit	Credit	Balance
Dec. 6	(13)	G1	2,400		2,400
31	**Adj.(a)**	**G1**		**100**	**2,300**

Equipment — Acct. No. 167

Date	Explan.	PR	Debit	Credit	Balance
Dec. 3	(3)	G1	26,000		**26,000**

Accumulated Depreciation—Equipment — Acct. No. 168

Date	Explan.	PR	Debit	Credit	Balance
Dec. 31	**Adj.(c)**	**G1**		**300**	**300**

Liability and Equity Accounts

Accounts Payable — Acct. No. 201

Date	Explan.	PR	Debit	Credit	Balance
Dec. 6	(4)	G1		7,100	7,100
24	(10)	G1	900		**6,200**

Salaries Payable — Acct. No. 209

Date	Explan.	PR	Debit	Credit	Balance
Dec. 31	**Adj.(e)**	**G1**		**210**	**210**

Unearned Consulting Revenue — Acct. No. 236

Date	Explan.	PR	Debit	Credit	Balance
Dec. 26	(12)	G1		3,000	3,000
31	**Adj.(d)**	**G1**	**250**		**2,750**

Common Stock — Acct. No. 307

Date	Explan.	PR	Debit	Credit	Balance
Dec. 1	(1)	G1		30,000	30,000

Retained Earnings — Acct. No. 318

Date	Explan.	PR	Debit	Credit	Balance
Dec. 31	**Clos.(3)**	**G1**		**3,785**	**3,785**
31	**Clos.(4)**	**G1**	**200**		**3,585**

Dividends — Acct. No. 319

Date	Explan.	PR	Debit	Credit	Balance
Dec. 24	(11)	G1	200		200
31	**Clos.(4)**	**G1**		**200**	**0**

Revenue and Expense Accounts (Including Income Summary)

Consulting Revenue — Acct. No. 403

Date	Explan.	PR	Debit	Credit	Balance
Dec. 5	(5)	G1		4,200	4,200
12	(8)	G1		1,600	5,800
31	**Adj.(d)**	**G1**		**250**	**6,050**
31	**Adj.(f)**	**G1**		**1,800**	**7,850**
31	**Clos.(1)**	**G1**	**7,850**		**0**

Rental Revenue — Acct. No. 406

Date	Explan.	PR	Debit	Credit	Balance
Dec. 12	(8)	G1		300	**300**
31	**Clos.(1)**	**G1**	**300**		**0**

Depreciation Expense—Equipment — Acct. No. 612

Date	Explan.	PR	Debit	Credit	Balance
Dec. 31	**Adj.(c)**	**G1**	**300**		**300**
31	**Clos.(2)**	**G1**		**300**	**0**

Salaries Expense — Acct. No. 622

Date	Explan.	PR	Debit	Credit	Balance
Dec. 12	(7)	G1	700		700
26	(16)	G1	700		1,400
31	**Adj.(e)**	**G1**	**210**		**1,610**
31	**Clos.(2)**	**G1**		**1,610**	**0**

Insurance Expense — Acct. No. 637

Date	Explan.	PR	Debit	Credit	Balance
Dec. 31	**Adj.(a)**	**G1**	**100**		**100**
31	**Clos.(2)**	**G1**		**100**	**0**

Rent Expense — Acct. No. 640

Date	Explan.	PR	Debit	Credit	Balance
Dec. 12	(6)	G1	1,000		**1,000**
31	**Clos.(2)**	**G1**		**1,000**	**0**

Supplies Expense — Acct. No. 652

Date	Explan.	PR	Debit	Credit	Balance
Dec. 31	**Adj.(b)**	**G1**	**1,050**		**1,050**
31	**Clos.(2)**	**G1**		**1,050**	**0**

Utilities Expense — Acct. No. 690

Date	Explan.	PR	Debit	Credit	Balance
Dec. 26	(15)	G1	305		**305**
31	**Clos.(2)**	**G1**		**305**	**0**

Income Summary — Acct. No. 901

Date	Explan.	PR	Debit	Credit	Balance
Dec. 31	**Clos.(1)**	**G1**		**8,150**	**8,150**
31	**Clos.(2)**	**G1**	**4,365**		**3,785**
31	**Clos.(3)**	**G1**	**3,785**		**0**

EXHIBIT 3.17

General Ledger after the Closing Process for FastForward

Post-Closing Trial Balance

A **post-closing trial balance** is a list of permanent accounts and their balances after all closing entries. Only balance sheet (permanent) accounts are on a post-closing trial balance. A post-closing trial balance verifies that (1) total debits equal total credits for permanent accounts and (2) all temporary accounts have zero balances. FastForward's post-closing trial balance is in Exhibit 3.18 and often is the last step in the accounting process.

FASTFORWARD
Post-Closing Trial Balance
December 31, 2021

	Debit	Credit
Cash	$ 4,275	
Accounts receivable	1,800	
Supplies	8,670	
Prepaid insurance	2,300	
Equipment	26,000	
Accumulated depreciation—Equipment		$ 300
Accounts payable		6,200
Salaries payable		210
Unearned consulting revenue		2,750
Common stock		30,000
Retained earnings		3,585
Totals	$43,045	$43,045

EXHIBIT 3.18

Post-Closing Trial Balance

Decision Maker

Staff Accountant A friend shows you the post-closing trial balance she is working on. You review the statement and see a line item for rent expense. How do you know that an error exists? ■ *Answer:* This error is apparent in a post-closing trial balance because Rent Expense is a temporary account. Post-closing trial balances only contain permanent accounts.

nd3000/Shutterstock

NEED-TO-KNOW 3-6

Closing Entries

P6

Use the following adjusted trial balance for Magic Company to prepare its closing entries.

Account Title	Debit	Credit
Cash	$13,000	
Accounts receivable	17,000	
Land	85,000	
Accounts payable		$12,000
Long-term notes payable		33,000
Common stock		30,000
Retained earnings		45,000
Dividends	20,000	
Services revenue		79,000
Salaries expense	56,000	
Supplies expense	8,000	
Totals	$199,000	$199,000

Do More: QS 3-20, QS 3-21, QS 3-22, QS 3-23, E 3-19, E 3-20

Solution

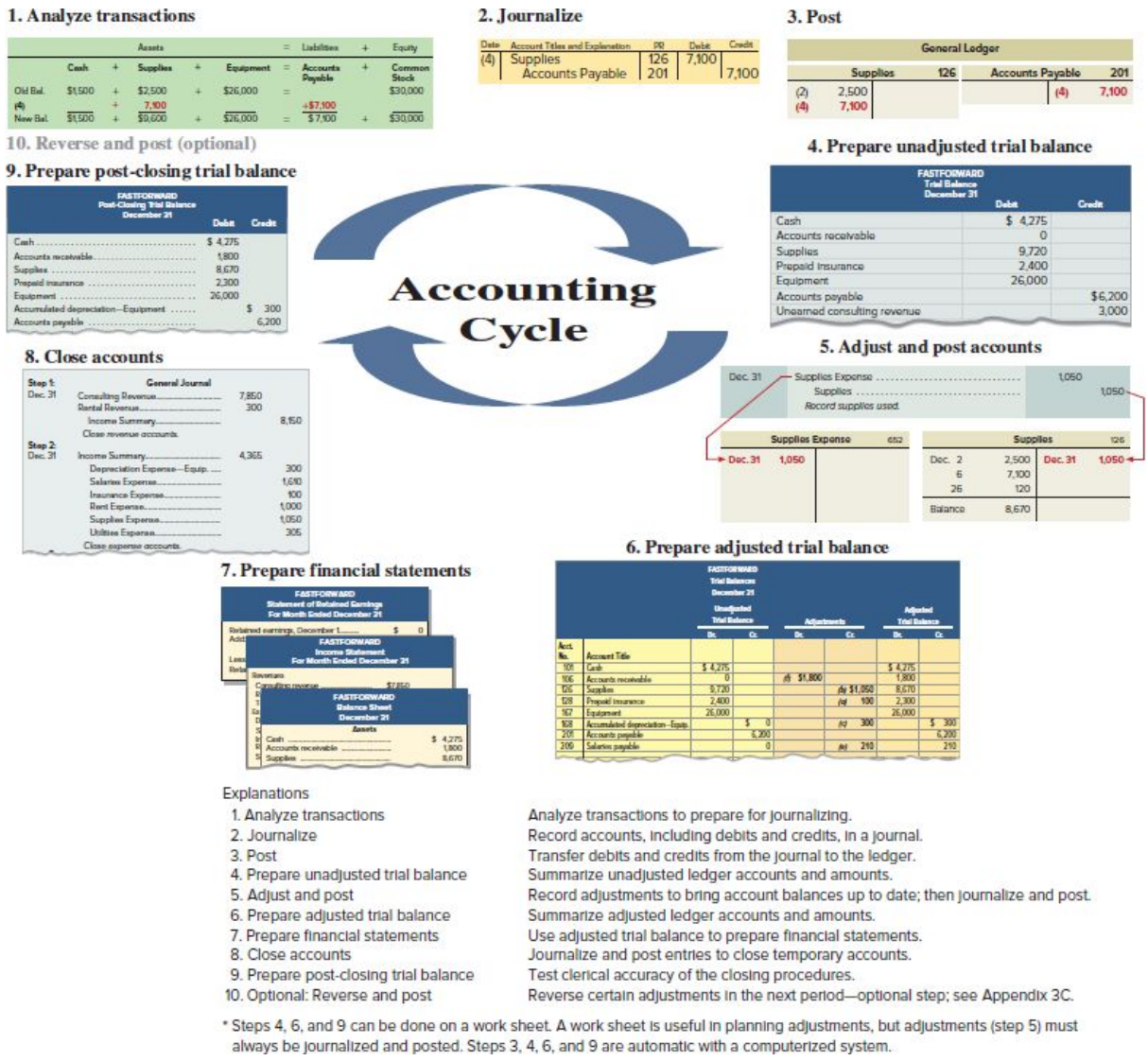
Dec. 31	Services Revenue	79,000	
	Income Summary		79,000
	Close revenue account.		
Dec. 31	Income Summary	64,000	
	Salaries Expense		56,000
	Supplies Expense		8,000
	Close expense accounts.		

Dec. 31	Income Summary	15,000	
	Retained Earnings		15,000
	Close Income Summary.		
Dec. 31	Retained Earnings	20,000	
	Dividends		20,000
	Close Dividends account.		

ACCOUNTING CYCLE

The **accounting cycle** is the steps in preparing financial statements. It is called a *cycle* because the steps are repeated each reporting period. Exhibit 3.19 shows the 10 steps in the cycle. Steps 1 through 3 occur regularly as a company enters into transactions. Steps 4 through 9 are

done at the end of a period. *Reversing entries* in step 10 are optional and are explained in Appendix 3C.



Explanations

1. Analyze transactions	Analyze transactions to prepare for journalizing.
2. Journalize	Record accounts, including debits and credits, in a journal.
3. Post	Transfer debits and credits from the journal to the ledger.
4. Prepare unadjusted trial balance	Summarize unadjusted ledger accounts and amounts.
5. Adjust and post	Record adjustments to bring account balances up to date; then journalize and post.
6. Prepare adjusted trial balance	Summarize adjusted ledger accounts and amounts.
7. Prepare financial statements	Use adjusted trial balance to prepare financial statements.
8. Close accounts	Journalize and post entries to close temporary accounts.
9. Prepare post-closing trial balance	Test clerical accuracy of the closing procedures.
10. Optional: Reverse and post	Reverse certain adjustments in the next period—optional step; see Appendix 3C.

* Steps 4, 6, and 9 can be done on a work sheet. A work sheet is useful in planning adjustments, but adjustments (step 5) must always be journalized and posted. Steps 3, 4, 6, and 9 are automatic with a computerized system.

EXHIBIT 3.19

Steps in the Accounting Cycle*

CLASSIFIED BALANCE SHEET

C2

Explain and prepare a classified balance sheet.

This section describes a classified balance sheet. An **unclassified balance sheet** broadly groups accounts into assets, liabilities, and equity. One example is FastForward's balance sheet in Exhibit 3.14. A **classified balance sheet** organizes assets and liabilities into subgroups.

Classification Structure

A classified balance sheet typically contains the categories in Exhibit 3.20 (there is no required layout). An important classification is the separation between current (short-term) and noncurrent (long-term) for both assets and liabilities. Current items are expected to come due (either collected or owed) within one year or the company's operating cycle, whichever is longer. The **operating cycle** is the time span from when *cash is used* to acquire goods and services until *cash is received* from the sale of goods and services. Most operating cycles are less than one year, which means most companies use a one-year period to classify current and noncurrent items. To make it easy, **assume an operating cycle of one year,** unless we say otherwise.

A balance sheet lists current assets before noncurrent assets and current liabilities before noncurrent liabilities. Current assets and current liabilities are listed in order of how quickly they will be converted to, or paid in, cash.

EXHIBIT 3.20

Typical Categories in a Classified Balance Sheet

Classification Categories

The balance sheet for Snowboarding Components in Exhibit 3.21 shows the typical categories. Its assets are classified as either current or noncurrent. Its noncurrent assets include three main categories:

long-term investments, plant assets, and intangible assets. Its liabilities are classified as either current or long-term. Not all companies use the same categories. **Jarden**, a producer of snowboards, reported a balance sheet with five asset classes: current assets; property, plant, and equipment; goodwill; intangibles; and other assets.

Current Assets

Current assets are cash and other resources that are expected to be sold, collected, or used within one year or the company's operating cycle, whichever is longer. Examples are cash, short-term investments, accounts receivable, short-term notes receivable, merchandise inventory (goods for sale), and prepaid expenses.

Long-Term Investments

Long-term (or *noncurrent*) **investments** include notes receivable and investments in stocks and bonds when they are expected to be held for more than the longer of one year or the operating cycle.

SNOWBOARDING COMPONENTS
Balance Sheet
December 31

Assets			Liabilities		
Current assets			**Current liabilities**		
Cash	$ 6,500		Accounts payable	$ 15,300	
Accounts receivable	6,500		Wages payable	3,200	
Merchandise inventory	27,500		Unearned revenue	10,500	
Prepaid insurance	2,400		Total current liabilities		$ 29,000
Total current assets		$ 42,900			
Long-term investments			**Long-term liabilities**		
Notes receivable (due in three years)	1,500		Notes payable (due in ten years)	150,000	
Investments in stocks and bonds	66,000		Total long-term liabilities		150,000
Total long-term investments		67,500	Total liabilities		179,000
Plant assets					
Equipment	203,200		**Equity**		
Less accumulated depreciation	53,000	150,200	Common stock		50,000
Land		73,200	Retained earnings		114,800
Total plant assets		223,400	Total equity		164,800
Intangible assets		10,000			
Total assets		$343,800	Total liabilities and equity		$343,800

EXHIBIT 3.21

Classified Balance Sheet

Plant Assets Plant assets are tangible assets that are both page 107 *long-lived* and *used to produce or sell products and services*. Examples are equipment, machinery, buildings, and land that are used to produce or sell products and services. Plant assets are also called *property, plant and equipment (PP&E)* or *fixed assets*.

Intangible Assets **Intangible assets** are long-term assets that benefit business operations but lack physical form. Examples are patents, trademarks, copyrights, franchises, and goodwill. Their value comes from the privileges or rights granted to or held by the owner.

Current Liabilities **Current liabilities** are liabilities due to be paid or settled within one year or the operating cycle, whichever is longer. They usually are settled by paying out cash. Current liabilities include accounts payable, wages payable, taxes payable, interest payable, and unearned revenues. Also, any portion of a long-term liability due to be paid within one year or the operating cycle, whichever is longer, is a current liability.

Long-Term Liabilities **Long-term liabilities** are liabilities *not* due within one year or the operating cycle, whichever is longer. Notes payable, mortgages payable, bonds payable, and lease obligations are common long-term liabilities.

Equity Equity is the owner's claim on assets. For a corporation, this claim is reported in the equity section as common stock and retained earnings. Equity is not separated into current and noncurrent categories.

Purestock/SuperStock

NEED-TO-KNOW 3-7

Classified Balance Sheet

C2

Use the following account balances from Magic Company's post-closing trial balance to prepare its classified balance sheet as of December 31.

Cash	$13,000	Long-term notes payable	$33,000
Accounts receivable	17,000	Common stock	30,000
Land	85,000	Retained earnings	40,000
Accounts payable	12,000		

Solution

MAGIC COMPANY
Balance Sheet
December 31

Assets		**Liabilities**	
Current assets		Current liabilities	
Cash	$ 13,000	Accounts payable	$ 12,000
Accounts receivable	17,000	Total current liabilities	12,000
Total current assets	30,000	Long-term notes payable	33,000
Plant assets		Total liabilities	45,000
Land	85,000	**Equity**	
Total plant assets	85,000	Common stock	30,000
		Retained earnings	40,000
		Total equity	70,000
Total assets	$115,000	Total liabilities and equity	$115,000

Do More: QS 3-26, QS 3-29, QS 3-31, E 3-22, E 3-24, P 3-6

Decision Analysis — Profit Margin and Current Ratio

A1

Compute and analyze profit margin and current ratio. page 108

Profit Margin

A useful measure of a company's operating results is the ratio of its net income to net sales. This ratio is called **profit margin**, or *return on sales,* and is computed as in Exhibit 3.22. This ratio shows the percent of profit in each dollar of sales.

$$\text{Profit margin} = \frac{\text{Net income}}{\text{Net sales}}$$

EXHIBIT 3.22

Profit Margin

Visa's profit margins are shown in Exhibit 3.23. Visa's profit margin is better than **Mastercard**'s in each of the last three years. For Mastercard to improve its profit margin, it must either reduce expenses or increase revenues at a relatively greater amount than expenses.

Company	$ millions	Current Year	1 Year Ago	2 Years Ago
Visa	Net income	$12,080	$10,301	$ 6,699
	Net sales	$22,977	$20,609	$18,358
	Profit margin	53%	50%	36%
Mastercard	Profit margin	48%	39%	31%

EXHIBIT 3.23

Computation and Analysis Using Profit Margin.

Decision Maker

CFO Your health care equipment company consistently reports a 9% profit margin, which is similar to that of competitors. The treasurer argues that profit margin can be increased to 20% if the company cuts marketing expenses. Do you cut those expenses? ■ *Answer:* Cutting those expenses increases profit margin in the short run. However, over the long run, cutting such expenses can hurt current and future sales. You must explain that the

company can cut the "fat" (expenses that do not create sales) but should be careful if cutting those that create sales.

Current Ratio

Financial statements help assess a company's ability to pay its debts. Such analysis affects decisions by suppliers when allowing a company to buy on credit. It also affects decisions by creditors when lending money to a company, including loan terms such as interest rate and due date. The **current ratio** is one measure of a company's ability to pay its short-term obligations. It is defined in Exhibit 3.24.

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

EXHIBIT 3.24

Computation and Analysis Using Profit Margin.

Costco's current ratio for each of the last three years is in Exhibit 3.25. A current ratio of over 1.0 means that current obligations can be covered with current assets. For the most recent three years, Costco's current ratio has been slightly above or slightly below 1.0. This means Costco can cover its current liabilities, but with no extra buffer. We also see that Costco has a better ratio than **Walmart** in each of the last three years.

Company	$ millions	Current Year	1 Year Ago	2 Years Ago
Costco	Current assets.....	$23,485	$20,289	$17,317
	Current liabilities.....	$23,237	$19,926	$17,495
	Current ratio	1.01	1.02	0.99
Walmart	Current ratio	0.80	0.76	0.86

EXHIBIT 3.25

Computation and Analysis Using Current Ratio

Decision Maker

Analyst You are analyzing a dirt bike company's ability to meet upcoming loan payments. You compute its current ratio as 1.2. You

find that a major portion of accounts receivable is due from one client who has not made any payments in the past 12 months. Removing this receivable from current assets lowers the current ratio to 0.7. What do you conclude? ■ *Answer:* A current ratio of 1.2 suggests that current assets are sufficient to cover current liabilities. Removing the past-due receivable reduces the current ratio to 0.7. You conclude that the company will have difficulty meeting its loan payments.

Ingram Publishing

NEED-TO-KNOW 3-8

COMPREHENSIVE 1

Preparing Year-End Accounting Adjustments

The following information relates to Fanning's Electronics on December 31.

a. The company's weekly payroll is $8,750, paid each Friday for a five-day workweek. Assume December 31 falls on a Monday, but the employees will not be paid their wages until Friday, January 4 of next year.

b. At the beginning of the current year, the company purchased equipment that cost $20,000. Its useful life is predicted to be five years, at which time the equipment is expected to be worthless (zero salvage value).

c. On October 1, the company agreed to work on a new housing development. The company is paid $120,000 on October 1 in advance of future installation of similar alarm systems in 24 new

homes. That amount was credited to the Unearned Revenue account. Between October 1 and December 31, work on 20 homes was completed.

d. On September 1, the company purchased a 12-month insurance policy for $1,800. The transaction was recorded with an $1,800 debit to Prepaid Insurance.

e. On December 29, the company completed $7,000 in services that have not been billed or recorded as of December 31.

Required

1. Prepare any necessary adjusting entries on December 31 of the current year related to transactions and events *a* through *e*.

2. Prepare T-accounts for the accounts affected by adjusting entries, and post the adjusting entries. Determine the adjusted balances for the Prepaid Insurance, Unearned Revenue, and Services Revenue accounts.

3. Complete the following table and determine the page 109 amounts and effects of each adjusting entry on the current year income statement and the year-end balance sheet. Use up (down) arrows to indicate an increase (decrease) in the four "Effect on" columns.

Entry	Amount in the Entry	Effect on Net Income	Effect on Total Assets	Effect on Total Liabilities	Effect on Total Equity

SOLUTION

1. Adjusting journal entries.

(*a*) Dec. 31	Wages Expense	1,750	
	Wages Payable		1,750
	Accrue wages ($8,750 × 1/5).		
(*b*) Dec. 31	Depreciation Expense—Equipment	4,000	
	Accumulated Depreciation—Equipment		4,000
	Record depreciation ($20,000/5 *years* = $4,000 *per year*).		
(*c*) Dec. 31	Unearned Revenue	100,000	
	Services Revenue		100,000
	Record revenue earned ($120,000 × 20/24).		
(*d*) Dec. 31	Insurance Expense	600	
	Prepaid Insurance		600
	Adjust for expired insurance ($1,800 × 4/12).		
(*e*) Dec. 31	Accounts Receivable	7,000	
	Services Revenue		7,000
	Record accrued revenue.		

2. T-accounts for adjusting journal entries *a* through *e*.

Accounts Receivable		Wages Payable		Wages Expense	
(*e*) 7,000			(*a*) 1,750	(*a*) 1,750	

Prepaid Insurance		Unearned Revenue		Insurance Expense	
Unadj. Bal. 1,800	(*d*) 600		Unadj. Bal. 120,000	(*d*) 600	
Adj. Bal. 1,200		(*c*) 100,000	Adj. Bal. 20,000		

Accumulated Depreciation—Equipment		Services Revenue		Depreciation Expense—Equipment	
	(*b*) 4,000		(*c*) 100,000 (*e*) 7,000	(*b*) 4,000	
			Adj. Bal. 107,000		

3. Financial statement effects of adjusting journal entries.

Entry	Amount in the Entry	Effect on Net Income	Effect on Total Assets	Effect on Total Liabilities	Effect on Total Equity
a	$ 1,750	$ 1,750 ↓	No effect	$ 1,750 ↑	$ 1,750 ↓
b	4,000	4,000 ↓	$4,000 ↓	No effect	4,000 ↓
c	100,000	100,000 ↑	No effect	$100,000 ↓	100,000 ↑
d	600	600 ↓	$ 600 ↓	No effect	600 ↓
e	7,000	7,000 ↑	$7,000 ↑	No effect	7,000 ↑

NEED-TO-KNOW 3-9

COMPREHENSIVE 2

Preparing Financial Statements from Adjusted Account Balances

CHOI COMPANY Adjusted Trial Balance December 31	Debit	Credit
Cash	$ 3,050	
Accounts receivable	400	
Prepaid insurance	910	
Equipment	217,200	
Accumulated depreciation—Equipment		$ 29,100
Interest payable		4,480
Unearned revenue		460
Long-term notes payable		150,000
Common stock		10,000
Retained earnings		30,340
Dividends	21,000	
Services revenue		57,500
Wages expense	25,000	
Utilities expense	1,900	
Insurance expense	3,450	
Depreciation expense—Equipment	5,970	
Interest expense	3,000	
Totals	$281,880	$281,880

Use the following year-end adjusted trial balance to answer questions 1–3.

CHOI COMPANY Adjusted Trial Balance December 31	Debit	Credit
Cash	$ 3,050	
Accounts receivable	400	
Prepaid insurance	910	
Equipment	217,200	
Accumulated depreciation—Equipment		$ 29,100
Interest payable		4,480
Unearned revenue		460
Long-term notes payable		150,000
M. Choi, Capital		40,340
M. Choi, Withdrawals	21,000	
Services revenue		57,500
Wages expense	25,000	
Utilities expense	1,900	
Insurance expense	3,450	
Depreciation expense—Equipment	5,970	
Interest expense	3,000	
Totals	$281,880	$281,880

1. Prepare the annual income statement from the adjusted trial-balance of Choi Company. *Answer follows:*

CHOI COMPANY Income Statement For Year Ended December 31		
Revenues		
Services revenue		$57,500
Expenses		
Wages expense	$25,000	
Utilities expense	1,900	
Insurance expense	3,450	
Depreciation expense—Equipment	5,970	
Interest expense	3,000	
Total expenses		39,320
Net income		$18,180

2. Prepare a statement of owner's equity from the adjusted trial balance of Choi Company. The beginning-year capital balance was $30,340, and the owner invested $10,000 in the company in the current year. *Answer follows:*

CHOI COMPANY Statement of Retained Earnings For Year Ended December 31	
Retained earnings, December 31, prior year-end	$30,340
Add: Net income	18,180
	48,520
Less: Dividends	21,000
Retained earnings, December 31, current year-end	$27,520

3. Prepare a balance sheet (unclassified) from the adjusted trial balance of Choi Company. *Answer follows:*

CHOI COMPANY Balance Sheet December 31		
Assets		
Cash		$ 3,050
Accounts receivable		400
Prepaid insurance		910
Equipment	$217,200	
Less accumulated depreciation	29,100	188,100
Total assets		$192,460
Liabilities		
Interest payable		$ 4,480
Unearned revenue		460
Long-term notes payable		150,000
Total liabilities		154,940
Equity		
Common stock		10,000
Retained earnings		27,520
Total equity		37,520
Total liabilities and equity		$192,460

APPENDIX 3A

P7

Explain the alternatives in accounting for prepaids.

Alternative Accounting for Prepayments

This appendix explains alternative accounting for deferred expenses and deferred revenues.

RECORDING PREPAYMENT OF EXPENSES IN EXPENSE ACCOUNTS

An alternative method is to record *all* prepaid expenses with debits to expense accounts. If any prepaids remain unused or unexpired at the end of an accounting period, then adjusting entries transfer the cost of the unused portions from expense accounts to prepaid expense (asset) accounts. The financial statements are identical under either method, but the adjusting entries are different. To demonstrate the differences between these two methods, let's look at FastForward's cash payment on December 1 for 24 months of insurance coverage beginning on December 1. FastForward recorded that payment with a debit to an asset account, but it could have recorded a debit to an expense account. These alternatives are shown in Exhibit 3A.1.

Payment Recorded as Asset			
Dec. 1	Prepaid Insurance	2,400	
	Cash.....		2,400

Payment Recorded as Expense			
Dec. 1	Insurance Expense	2,400	
	Cash		2,400

EXHIBIT 3A.1

Alternative Initial Entries for Prepaid Expenses

At the end of its accounting period on December 31, insurance protection for one month has expired. This means $100 ($2,400⁄24) of insurance coverage expired and is an expense for December. The adjusting entry depends on how the original payment was recorded. This is shown in Exhibit 3A.2.

Payment Recorded as Asset			
Dec. 31	Insurance Expense	100	
	Prepaid Insurance		100

Payment Recorded as Expense			
Dec. 31	Prepaid Insurance	2,300	
	Insurance Expense ..		2,300

EXHIBIT 3A.2

Adjusting Entry for Prepaid Expenses for the Two Alternatives

When the entries are posted, we see in Exhibit 3A.3 that the two methods give identical ending balances.

Payment Recorded as Asset			
Prepaid Insurance			128
Dec. 1	2,400	Dec. 31	100
Balance	2,300		
Insurance Expense			637
Dec. 31	100		

Payment Recorded as Expense			
Prepaid Insurance			128
Dec. 31	2,300		
Insurance Expense			637
Dec. 1	2,400	Dec. 31	2,300
Balance	100		

EXHIBIT 3A.3

Account Balances under Two Alternatives for Recording Prepaid Expenses

RECORDING PREPAYMENT OF REVENUES IN REVENUE ACCOUNTS

An alternative method is to record *all* unearned revenues with credits to revenue accounts. If any revenues are unearned at the end of an accounting period, then adjusting entries transfer the unearned portions from revenue accounts to unearned revenue (liability) accounts. The adjusting entries are different for these two alternatives, but the financial statements are identical. To demonstrate the differences between these two methods, let's look at FastForward's December 26 receipt of $3,000 for consulting services covering the period December 27 to February 24. FastForward recorded this transaction with a credit to a liability account. The alternative is to record it with a credit to a revenue account, as shown in Exhibit 3A.4.

Receipt Recorded as Liability			
Dec. 26	Cash	3,000	
	Unearned Consulting Revenue		3,000

Receipt Recorded as Revenue			
Dec. 26	Cash	3,000	
	Consulting Revenue		3,000

EXHIBIT 3A.4

Alternative Initial Entries for Unearned Revenues

By the end of its accounting period on December 31, page 112 FastForward has earned $250 of this revenue. This means $250 of the liability has been satisfied. Depending on how the initial receipt is recorded, the adjusting entry is as shown in Exhibit 3A.5.

Receipt Recorded as Liability			Receipt Recorded as Revenue		
Dec. 31	Unearned Consulting Revenue ..	250	Dec. 31	Consulting Revenue	2,750
	Consulting Revenue	250		Unearned Consulting Revenue ..	2,750

EXHIBIT 3A.5

Adjusting Entry for Unearned Revenues for the Two Alternatives

After entries are posted, the two alternatives give identical ending balances, as shown in Exhibit 3A.6.

Receipt Recorded as Liability			
Unearned Consulting Revenue			236
Dec. 31	250	Dec. 26	3,000
		Balance	2,750

Consulting Revenue			
		Dec. 31	250

Receipt Recorded as Revenue			
Unearned Consulting Revenue			236
		Dec. 31	2,750

Consulting Revenue			
Dec. 31	2,750	Dec. 26	3,000
		Balance	250

EXHIBIT 3A.6

Account Balances under Two Alternatives for Recording Unearned Revenues

APPENDIX 3B

P8

Explain the alternatives in accounting for prepaids.

Work Sheet as a Tool

Benefits of a Work Sheet (Spreadsheet)

A **work sheet** is a document that is used internally by companies to help with adjusting and closing accounts and with preparing financial statements. It is an internal accounting aid and is not a substitute for journals, ledgers, or financial statements. A work sheet:

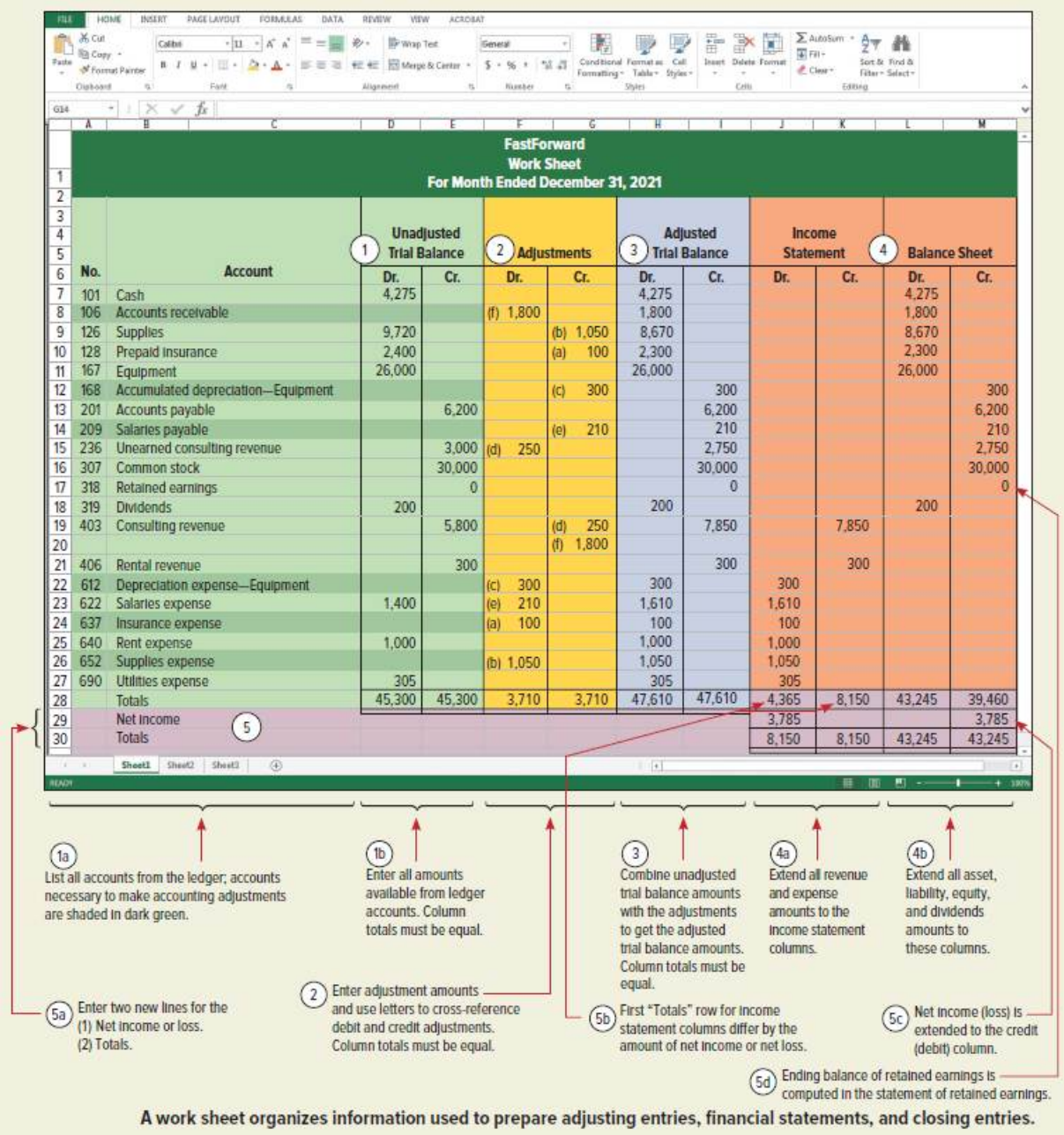
- Helps in preparing financial statements.
- Reduces the risk of errors when working with many accounts and adjustments.
- Links accounts and adjustments to financial statements.
- Shows the effects of proposed or “what-if” transactions.

Use of a Work Sheet

When a work sheet is used to prepare financial statements, it is constructed at the end of a period before the adjusting process. The complete work sheet includes a list of the accounts, their balances and adjustments, and their sorting into financial statement columns. To describe and interpret the work sheet, we use the information from FastForward. Preparing the work sheet has five steps.

1 Step 1. Enter Unadjusted Trial Balance

Refer to Exhibit 3B.1—green section. The first step in page 114 preparing a work sheet is to list the title of each account and its account number. This includes all accounts in the ledger plus any expected ones from adjusting entries. The unadjusted balance for each account is then entered in the correct Debit or Credit column of the unadjusted trial balance columns. The totals of these two columns must be equal. The light green section of Exhibit 3B.1 shows FastForward’s work sheet after completing this first step (dark green rows show accounts expected to arise from adjustments). Sometimes an account can require more than one adjustment, such as for Consulting Revenue. We add a blank line in this case.



A work sheet organizes information used to prepare adjusting entries, financial statements, and closing entries.

EXHIBIT 3B.1

Work Sheet

2 Step 2. Enter Adjustments

page 115

Exhibit 3B.1—yellow section. The second step is to enter adjustments in the Adjustments columns. The adjustments shown are the same ones as shown in Exhibit 3.13. An identifying letter links the debit and credit of each adjustment. This is called *keying* the adjustments. After

preparing a work sheet, **adjustments must still be entered in a journal and posted to the ledger.** The Adjustments columns provide the information for adjusting entries in the journal.

3 Step 3. Prepare Adjusted Trial Balance

Exhibit 3B.1—blue section. The adjusted trial balance is prepared by combining the adjustments with the unadjusted balances for each account. As an example, the Prepaid Insurance account has a $2,400 debit balance in the Unadjusted Trial Balance columns. This $2,400 debit is combined with the $100 credit in the Adjustments columns to give Prepaid Insurance a $2,300 debit in the Adjusted Trial Balance columns. The totals of the Adjusted Trial Balance columns confirm debits and credits are equal.

4 Step 4. Sort Adjusted Trial Balance Amounts to Financial Statements

Exhibit 3B.1—orange section. This step involves sorting account balances from the adjusted trial balance to their proper financial statement columns. Expenses go to the Income Statement Debit column, and revenues to the Income Statement Credit column. Assets and dividends go to the Balance Sheet Debit column. Liabilities, retained earnings, and common stock go to the Balance Sheet Credit column.

5 Step 5. Total Statement Columns, Compute Income or Loss, and Balance Columns

Exhibit 3B.1—purple section. Each financial statement column (from step 4) is totaled. The difference between the Debit and Credit column totals of the Income Statement columns is net income or net loss. This occurs because revenues are entered in the Credit column and expenses in the Debit column. If the Credit total exceeds the Debit total, there is net income. If the Debit total exceeds the Credit total, there is a net loss. For FastForward, the Credit total exceeds the Debit total, giving a $3,785 net income.

The net income from the Income Statement columns is then entered in the Balance Sheet Credit column. Adding net income to the last Credit column means that it is to be added to retained earnings. If a loss occurs, it is added to the Debit column. This means that it is to be subtracted from retained earnings. **The ending balance of retained**

earnings does not appear in the last two columns as a single amount, but it is computed in the statement of retained earnings using these account balances. When net income or net loss is added to the Balance Sheet column, the totals of the last two columns must balance. If they do not, one or more errors have occurred.

APPENDIX

3C

P9

Prepare reversing entries and explain their purpose.

Reversing Entries

Reversing entries are optional. They are dated the first day of the next accounting period, and they reverse the debits and credits of adjusting entries using the same accounts and amounts. Reversing-entries are used for adjusting entries involving accrued revenues and accrued expenses. The purpose of reversing entries is to simplify recordkeeping. Exhibit 3C.1 shows an example of FastForward's reversing entries. The top of the exhibit shows the adjusting entry FastForward recorded on December 31 for its employee's earned but unpaid salary. The entry recorded three days' salary of $210, which increased December's total salary expense to $1,610. The entry also recognized a liability of $210. The expense is reported on December's income statement. The expense account is then closed. The ledger on January 1, 2022, shows a $210 liability and a zero balance in the Salaries Expense account. At this point, the choice is made between using or not using reversing entries.

Accounting *without* Reversing Entries The path down the left side of Exhibit 3C.1 is described in the chapter. To summarize, when the next payday occurs on January 9, we record payment with a compound entry that debits both the expense and liability accounts and credits Cash. Posting that entry creates a $490 balance in the

expense account and reduces the liability account balance to zero because the payable has been settled.

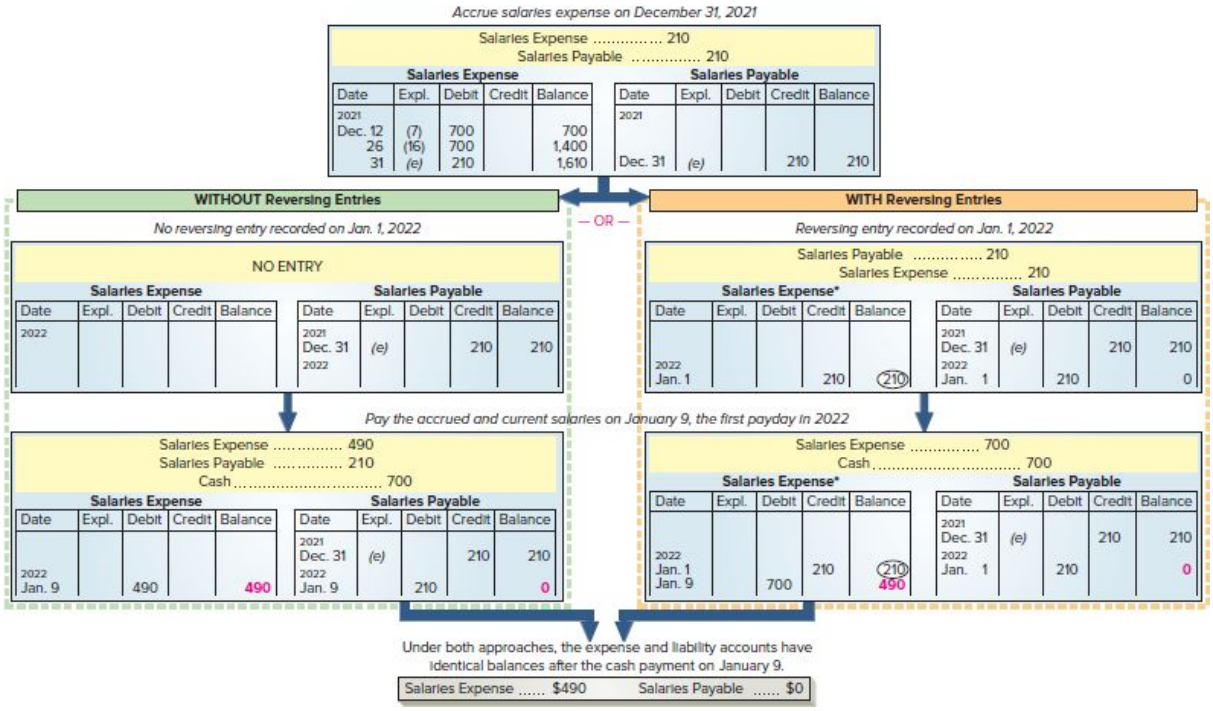


EXHIBIT 3C.1

Reversing Entries for an Accrued Expense

Accounting *with* Reversing Entries The right side of Exhibit 3C.1 shows reversing entries. A reversing entry is the exact opposite of an adjusting entry. For FastForward, the Salaries Payable liability account is debited for $210, meaning that this account now has a zero balance after the entry is posted on January 1. The Salaries Payable account temporarily understates the liability, but this is not a problem because financial statements are not prepared before the liability is settled on January 9. The credit to the Salaries Expense account is unusual because it gives the account an *abnormal credit balance.* We highlight an abnormal balance by circling it. Because of the reversing entry, the January 9 entry to record payment debits the Salaries Expense account and credits Cash for the full $700 paid. It is the same as all other entries made to record 10 days' salary for the employee. We see that after the payment entry is posted, the Salaries Expense account has a $490 balance that reflects seven days' salary of $70 per

day (see the lower right side of Exhibit). The zero balance in the Salaries Payable account is now correct. The lower section this Exhibit shows that the expense and liability accounts have exactly the same balances whether reversing entries are used or not.

Point: If a company chooses to prepare reversing entries, all accruals are reversed. Deferrals are not reversed.

Summary: Cheat Sheet

DEFERRAL OF EXPENSE

Prepaid expenses: Assets paid for in advance of receiving their benefits. When these assets are used, the advance payments become expenses.

Prepaid insurance expires:

Insurance Expense	100	
Prepaid Insurance		100

Supplies are used up:

Supplies Expense	1,050	
Supplies		1,050

Accumulated depreciation: A separate contra account. A **contra account** is an account linked with another account. It has an opposite normal balance and is a subtraction from that other account's balance.

Depreciation of assets:

Depreciation Expense	300	
Accumulated Depreciation—Equipment		300

DEFERRAL OF REVENUE

Unearned revenue: Cash received in advance of providing products and services. When cash is accepted, the company has a liability to provide products or services.

Record unearned revenue (cash received in advance):

Cash	3,000	
Unearned Consulting Revenue		3,000

Reduce unearned revenue (products or services are provided):

Unearned Consulting Revenue	250	
Consulting Revenue		250

ACCRUED EXPENSE

Accrued expenses: Costs incurred in a period that are both unpaid and unrecorded. They are reported on the income statement for the period when incurred.

Salaries expense owed but not yet paid:

Salaries Expense	210	
Salaries Payable		210

Accrued interest formula:

Principal amount owed × Annual interest rate × Fraction of year since last payment

Payment of accrued expenses:

Salaries Payable (3 days at $70 per day)	210	
Salaries Expense (7 days at $70 per day)	490	
Cash		700

ACCRUED REVENUE

Accrued revenues: Revenues earned in a period that are both unrecorded and not yet received in cash.

Revenue earned but not received in cash:

Accounts Receivable	1,800	
Consulting Revenue		1,800

Receipt of accrued revenue:

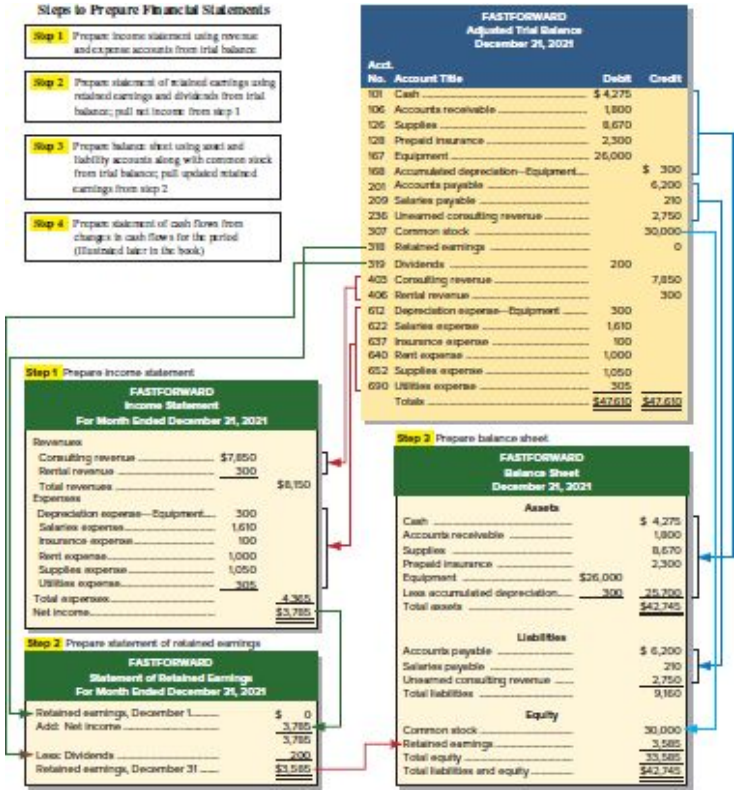
Cash	2,700	
Accounts Receivable (20 days at $90 per day)		1,800
Consulting Revenue (10 days at $90 per day)		900

REPORTING AND ANALYSIS

Unadjusted trial balance: A list of ledger accounts and balances *before* adjustments are recorded.

Adjusted trial balance: A list of accounts and balances *after* adjusting entries have been recorded and posted to the ledger.

Preparing financial statements from adjusted trial balance:



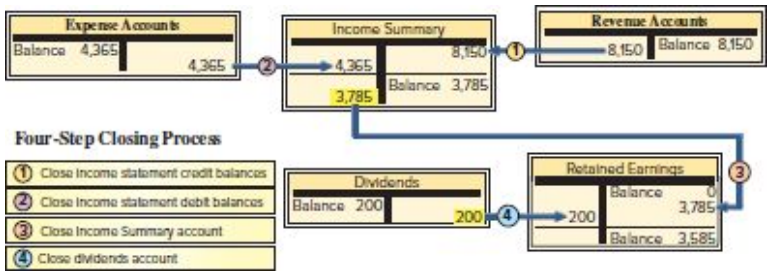
CLOSING PROCESS

Closing process: Occurs at period-end after financial statements have been prepared. Resets revenue, expense, and dividends balances to zero.

Temporary accounts: Closed at period-end. They consist of revenue, expense, dividends, and Income Summary.

Permanent accounts: *Not* closed at period-end. They consist of asset, liability, common stock, and retained earnings (all balance sheet accounts).

Income Summary: A temporary account only used for the closing process that has a credit for total revenues and a debit for total expenses.



Closing Process Journal Entries by Step

1	Consulting Revenue	7,850	3	Income Summary	3,785
	Rental Revenue	300		Retained Earnings	3,785
	Income Summary	8,150	4	Retained Earnings	200
2	Income Summary	4,365		Dividends	200
	Depreciation Expense—Equipment	300			
	Salaries Expense	1,610			
	Insurance Expense	100			
	Rent Expense	1,000			
	Supplies Expense	1,050			
	Utilities Expense	305			

Post-closing trial balance: A list of permanent accounts (assets, liabilities, equity) and their balances after all closing entries.

CLASSIFIED BALANCE SHEET

Classified balance sheet: Organizes assets and liabilities into meaningful subgroups.

Current vs. long-term classification: Current items are to be collected or owed within one year. Long-term items are expected after

one year.

Current assets: Assets to be sold, collected, or used within one year. Examples are cash, short-term investments, accounts receivable, merchandise inventory, and prepaid expenses.

Long-term investments: Assets to be held for more than one year.- Examples are notes receivable and long-term investments in stock and bonds.

Plant assets: Tangible assets used to produce or sell products and services. Examples are equipment, machinery, buildings, and land used in operations.

Intangible assets: Long-term assets that lack physical form. Examples are patents, trademarks, copyrights, franchises, and goodwill.

Current liabilities: Liabilities to be paid or settled within one year.- Examples are accounts payable, wages payable, taxes payable, interest payable, unearned revenues, and current portions of notes or long-term debt.

Long-term liabilities: Liabilities not due within one year. Examples are notes payable, mortgages payable, bonds payable, and lease obligations.

Equity: The owner's claim on assets. For a corporation, this is- common stock and retained earnings.

Common Layout of Classified Balance Sheet

Assets	Liabilities and Equity
Current assets	Current liabilities
Noncurrent assets	Noncurrent liabilities
Long-term investments	
Plant assets	Equity
Intangible assets	

Key Terms

Accounting cycle(103)

Permanent accounts(100)

Plant assets (88)

Post-closing trial balance(103)

Prepaid expenses (87)

Profit margin (107)

Revenue recognition principle (86)

Reversing entries(113)

Straight-line depreciation (89)

Temporary accounts(100)

Time period assumption (85)

Unadjusted trial balance (97)

Unclassified balance sheet(104)

Unearned revenue (91)

Work sheet(111)

Multiple Choice Quiz

1. A company forgot to record accrued and unpaid employee wages of $350,000 at period-end. This oversight would

   a. Understate net income by $350,000.

   b. Overstate net income by $350,000.

   c. Have no effect on net income.

   d. Overstate assets by $350,000.

   e. Understate assets by $350,000.

2. Prior to recording adjusting entries, the Supplies account has a $450 debit balance. A physical count of supplies shows $125 of unused supplies still available. The required adjusting entry is

   a. Debit Supplies $125; credit Supplies Expense $125.

   b. Debit Supplies $325; credit Supplies Expense $325.

c. Debit Supplies Expense $325; credit Supplies $325.

d. Debit Supplies Expense $325; credit Supplies $125.

e. Debit Supplies Expense $125; credit Supplies $125.

3. On May 1 of the current year, a two-year insurance policy was purchased for $24,000 with coverage to begin immediately. What is the amount of insurance expense that appears on the company's income statement for the current year ended December 31?

a. $4,000

c. $12,000

e. $24,000

b. $8,000

d. $20,000

4. On November 1, Stockton Co. receives $3,600 cash from Hans Co. for consulting services to be provided evenly over the period November 1 to April 30—at which time Stockton credits $3,600 to Unearned Revenue. The adjusting entry on December 31 (Stockton's year-end) would include a

a. Debit to Unearned Revenue for $1,200.

b. Debit to Unearned Revenue for $2,400.

c. Credit to Consulting Revenue for $2,400.

d. Debit to Consulting Revenue for $1,200.

e. Credit to Cash for $3,600.

5. If a company paid $900 in cash dividends this period, the entry to close the Dividends account is:

a. Dividends. 900

Retained Earnings 900

b. Retained Earnings 900

Dividends 900

c. No entry required.

ANSWERS TO MULTIPLE CHOICE QUIZ

1. b; the forgotten adjusting entry is: *dr*. Wages Expense, *cr*. Wages Payable.

2. c; Supplies used = $450 − $125 = $325

3. b; Insurance expense = $24,000 × (8/24) = $8,000; Adjusting entry is: *dr*. Insurance Expense for $8,000, *cr*. Prepaid Insurance for $8,000.

4. a; Consulting Revenue earned = $3,600 × (2/6) = $1,200; Adjusting entry is: *dr*. Unearned Revenue for $1,200, *cr*. Consulting Revenue for $1,200.

5. b; Dividends reduce Retained Earnings.

Superscript letter A, B, or C denotes assignments based on Appendix 3A, 3B, or 3C.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

connect

QUICK STUDY

QS 3-1

Periodic reporting

C1

Choose from the following list of terms and phrases to best complete the statements below.

a. Fiscal year accounting

b. Timeliness assumption

c. Accrual basis accounting

d. Annual financial statements

e. Cash basis

f. Time period

1. _____ presumes that an organization's activities can be divided into specific time periods.
2. Financial reports covering a one-year period are known as _____.
3. A(n) _____ consists of any 12 consecutive months.
4. _____ records revenues when services are provided and records expenses when incurred.
5. The value of information is often linked to its _____.

QS 3-2

Computing accrual and cash income

C1

In its first year of operations, Roma Company reports the following. Compute Roma's first-year net income under the cash basis *and* the accrual basis of accounting.

- Earned revenues of $45,000 ($37,000 cash received from customers).
- Incurred expenses of $25,500 ($20,250 cash paid toward them).
- Prepaid $6,750 cash for costs that will not be expensed until next year.

QS 3-3

Identifying accounting adjustments

P1 P2 P3 P4

Classify the following adjusting entries as involving prepaid expenses, unearned revenues, accrued expenses, or accrued revenues.

a. To record revenue earned that was previously received as cash in advance.

b. To record wages expense incurred but not yet paid or recorded.

c. To record revenue earned but not yet billed or recorded.

d. To record expiration of prepaid insurance.

e. To record annual depreciation expense.

QS 3-4

Concepts of adjusting entries

P1 P2 P3 P4

At the end of its annual accounting period, the company must make three adjusting entries. For each of these adjusting entries, indicate the account to be debited and the account to be credited.

a. Accrue salaries expense.

b. Adjust the Unearned Revenue account to recognize earned services revenue.

c. Record services revenue earned for which cash will be received the following period.

QS 3-5

Prepaid (deferred) expenses adjustments

P1

For each separate case below, follow the three-step process for adjusting the prepaid asset account at December 31. Step 1: Determine what the current account balance equals. Step 2: Determine what the current account balance should equal. Step 3: Record the December 31 adjusting entry to get from step 1 to step 2. *Assume no other adjusting entries are made during the year.*

a. **Prepaid Insurance.** The Prepaid Insurance account has a $4,700 debit balance to start the year. A review of insurance policies shows that $900 of unexpired insurance remains at year-end.

b. **Prepaid Insurance.** The Prepaid Insurance account has a $5,890 debit balance at the start of the year. A review of insurance policies shows $1,040 of insurance has expired by year-end.

c. **Prepaid Rent.** On September 1 of the current year, the company prepaid $24,000 for two years of rent for facilities being occupied

that day. The company debited Prepaid Rent and credited Cash for $24,000.

QS 3-6

Prepaid (deferred) expenses adjustments

P1

For each separate case below, follow the three-step process for adjusting the Supplies asset account at December 31. Step 1: Determine what the current account balance equals. Step 2: Determine what the current account balance should equal. Step 3: Record the December 31 adjusting entry to get from step 1 to step 2. *Assume no other adjusting entries are made during the year.*

a. **Supplies.** The Supplies account has a $300 debit balance to start the year. No supplies were purchased during the current year. A December 31 physical count shows $110 of supplies remaining.

b. **Supplies.** The Supplies account has an $800 debit balance to start the year. Supplies of $2,100 were purchased during the current year and debited to the Supplies account. A December 31 physical count shows $650 of supplies remaining.

c. **Supplies.** The Supplies account has a $4,000 debit balance to start the year. During the current year, supplies of $9,400 were purchased and debited to the Supplies account. The inventory of supplies available at December 31 totaled $2,660.

QS 3-7

Adjusting prepaid (deferred) expenses

P1

For each separate case, record the necessary adjusting entry.

a. On July 1, Lopez Company paid $1,200 for six months of insurance coverage. No adjustments have been made to the Prepaid Insurance account, and it is now December 31. Prepare the year-

end adjusting entry to reflect expiration of the insurance as of December 31.

b. Zim Company has a Supplies account balance of $5,000 at the beginning of the year. During the year, it purchases $2,000 of supplies. As of December 31, a physical count of supplies shows $800 of supplies available. Prepare the adjusting journal entry to correctly report the balance of the Supplies account and the Supplies Expense account as of December 31.

QS 3-8

Accumulated depreciation calculations and adjustments

P1

For each separate case below, follow the three-step process for adjusting the Accumulated Depreciation account at December 31. Step 1: Determine what the current account balance equals. Step 2: Determine what the current account balance should equal. Step 3: Record the December 31 adjusting entry to get from step 1 to step 2. *Assume no other adjusting entries are made during the year.*

a. **Accumulated Depreciation.** The Krug Company's Accumulated Depreciation account has a $13,500 balance to start the year. A review of depreciation schedules reveals that $14,600 of depreciation expense must be recorded for the year.

b. **Accumulated Depreciation.** The company has only one plant asset (truck) that it purchased at the start of this year. That asset had cost $44,000, had an estimated life of five years, and is expected to have zero value at the end of the five years.

c. **Accumulated Depreciation.** The company has only one plant asset (equipment) that it purchased at the start of this year. That asset had cost $32,000, had an estimated life of seven years, and is expected to be valued at $4,000 at the end of the seven years.

QS 3-9

Adjusting for depreciation

P1

For each separate case, record an adjusting entry (if necessary).

a. Barga Company purchases $20,000 of equipment on January 1. The equipment is expected to last five years and be worth $2,000 at the end of that time. Prepare the entry to record one year's depreciation expense of $3,600 for the equipment as of December 31.

b. Welch Company purchases $10,000 of land on January 1. The land is expected to last forever. What depreciation adjustment, if any, should be made with respect to the Land account as of-December 31?

QS 3-10

Unearned (deferred) revenues adjustments

P2

For each separate case below, follow the three-step process for adjusting the unearned revenue liability account at December 31. Step 1: Determine what the current account balance equals. Step 2: Determine what the current account balance should equal. Step 3: Record the December 31 adjusting entry to get from step 1 to step 2. *Assume no other adjusting entries are made during the year.*

a. **Unearned Rent Revenue.** The Krug Company collected $6,000 rent in advance on November 1, debiting Cash and crediting Unearned Rent Revenue. The tenant was paying 12 months' rent in advance and occupancy began on November 1.

b. **Unearned Services Revenue.** The company charges $75 per insect treatment. A customer paid $300 on October 1 in advance for four treatments, which was recorded with a debit to Cash and a credit to Unearned Services Revenue. At year-end, the company has applied three treatments for the customer.

c. **Unearned Rent Revenue.** On September 1, a client paid the company $24,000 cash for six months of rent in advance and took

occupancy immediately. The company recorded the cash as Unearned Rent Revenue.

QS 3-11

Adjusting for unearned (deferred) revenues

P2

For each separate case, record the necessary adjusting entry.

a. Tao Co. receives $10,000 cash in advance for four months of evenly planned legal services beginning on October 1. Tao records it by debiting Cash and crediting Unearned Revenue both for $10,000. It is now December 31, and Tao has provided legal services as planned. What adjusting entry should Tao make to account for the work performed from October 1 through December 31?

b. Caden started a new publication called *Contest News*. Its subscribers pay $24 to receive 12 monthly issues. With every new subscriber, Caden debits Cash and credits Unearned Subscription Revenue for the amounts received. The company has 100 new subscribers as of July 1. It sends *Contest News* to each of these subscribers every month from July through December. Assuming no changes in subscribers, prepare the year-end journal entry that Caden must make as of December 31 to adjust the Subscription Revenue account and the Unearned Subscription Revenue account.

QS 3-12

Adjusting for unearned (deferred) revenues

P2

For each separate case, record an adjusting entry (if necessary).

a. Lonzo Co. receives $3,000 cash in advance for six months of recycling services on September 1 and records it by debiting Cash and crediting Unearned Revenue for $3,000. Lonzo provides recycling services monthly as promised. Prepare the December 31

year-end adjusting entry that Lonzo records for the work performed from September 1 through December 31.

b. On October 20, **Milwaukee Bucks** sold a 10-game ticket package for $200 and recorded Unearned Revenue. By December 31, 4 of the 10 games had been played. Record the December 31 year-end adjusting entry that the Bucks record for the 40% of revenue earned on the $200 ticket package.

QS 3-13

Accrued expenses adjustments

P3

For each separate case below, follow the three-step process for adjusting the accrued expense account at December 31. Step 1: Determine what the current account balance equals. Step 2: Determine what the current account balance should equal. Step 3: Record the December 31 adjusting entry to get from step 1 to step 2. *Assume no other adjusting entries are made during the year.*

a. **Salaries Payable.** At year-end, salaries expense of $15,500 has been incurred by the company but is not yet paid to employees.

b. **Interest Payable.** At its December 31 year-end, the company owes $250 of interest on a loan. That interest will not be paid until sometime in January of the next year.

c. **Interest Payable.** At its December 31 year-end, the company holds a mortgage payable that has incurred $875 in annual interest that is neither recorded nor paid. The company intends to pay the-interest on January 7 of the next year.

QS 3-14

Accruing salaries

P3

Molly Mocha employs one college student every summer in her coffee shop. The student works the five weekdays and is paid on the following Monday. (For example, a student who works Monday through

Friday, June 1 through June 5, is paid for that work on Monday, June 8.) The coffee shop makes an adjusting entry each month to show salaries earned but unpaid at month-end.

The student works the last week of July, which is Monday, July 28, through Friday, August 1. If the student earns $100 per day, what adjusting entry must the coffee shop make on July 31 to correctly record accrued salaries expense for July?

QS 3-15

Accrued revenues adjustments

P4

For each separate case below, follow the three-step process for adjusting the accrued revenue account at December 31. Step 1: Determine what the current account balance equals. Step 2: Determine what the current account balance should equal. Step 3: Record the December 31 adjusting entry to get from step 1 to step 2. *Assume no other adjusting entries are made during the year.*

a. **Accounts Receivable.** At year-end, the L. Cole Company has completed services of $19,000 for a client, but the client has not yet been billed for those services.

b. **Interest Receivable.** At year-end, the company has earned, but not yet recorded, $390 of interest earned from its investments in government bonds.

c. **Accounts Receivable.** A painting company bills customers when jobs are complete. The work for one job is now complete. The customer has not yet been billed for the $1,300 of work.

QS 3-16

Recording and analyzing adjusting entries

P1 P2 P3 P4

For the entries below, identify the account to be debited and the account to be credited. Indicate which of the accounts is the income statement account and which is the balance sheet account.

a. Entry to record services revenue earned that was previously received as cash in advance.

b. Entry to record wage expenses incurred but not yet paid or recorded.

c. Entry to record services revenue earned but not yet billed or recorded.

d. Entry to record expiration of prepaid insurance.

e. Entry to record annual depreciation expense.

QS 3-17

Determining effects of adjusting entries

P1 P3

In making adjusting entries at the end of its accounting period, Chao Consulting mistakenly forgot to record:

1. $3,200 of insurance coverage that had expired (this $3,200 cost had been initially debited to the Prepaid Insurance account).

2. $2,000 of accrued salaries expense.

As a result of these two oversights, the financial statements for the reporting period will [choose one]:

a. Understate assets by $3,200.

b. Understate expenses by $5,200.

c. Understate net income by $2,000.

d. Overstate liabilities by $2,000.

QS 3-18

Preparing an adjusted trial balance

P5

Following are unadjusted balances along with year-end adjustments for Quinlan Company. Complete the adjusted trial balance by entering

the adjusted balance for each of the following accounts.

		Unadjusted Trial Balance		Adjustments		Adjusted Trial Balance	
No.	Account Title	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.
101	Cash	$8,000					
106	Accounts receivable	2,000		$4,000			
126	Supplies	4,500			$2,500		
209	Salaries payable		$ 0		400		
307	Common stock		3,000				
318	Retained earnings		6,000				
403	Consulting revenue		11,000		4,000		
622	Salaries expense	5,500		400			
652	Supplies expense	0		2,500			

QS 3-19

Preparing financial statements

P5

The adjusted trial balance for Happ Company follows. Use the adjusted trial balance to prepare the December 31 year-end (*a*) income statement, (*b*) statement of retained earnings, and (*c*) balance sheet. The Retained Earnings account balance was $24,600 on December 31 of the *prior year*.

Adjusted Trial Balance December 31		
Account Title	Dr.	Cr.
Cash	$ 7,000	
Accounts receivable	27,200	
Trucks	42,000	
Accumulated depreciation—Trucks		$ 17,500
Land	32,000	
Accounts payable		15,000
Salaries payable		4,200
Unearned revenue		3,600
Common stock		40,900
Retained earnings		24,600
Dividends	15,400	
Plumbing revenue		84,000
Depreciation expense—Trucks	6,500	
Salaries expense	46,700	
Rent expense	13,000	
Totals	$189,800	$189,800

Check Net income, $17,800

QS 3-20

Preparing closing entries

P2

The ledger of Mai Company includes the following accounts with normal balances as of December 31: Retained Earnings $9,000; Dividends $800; Services Revenue $13,000; Wages Expense $8,400; and Rent Expense $1,600. Prepare its December 31 closing entries.

QS 3-21

Preparing closing entries in T-accounts

P6

Set up T-accounts for the following accounts and amounts with normal balances as of December 31: Retained Earnings $18,000; Dividends $2,000; Services Revenue $33,000; Salaries Expense $25,000; Rent Expense $3,000; and Income Summary $0. (1) Post closing entries to each account's T-account. (2) Compute the ending balance of each T-account.

QS 3-22

Preparing closing entries

P6

Using Sierra Company's adjusted trial balance from QS 3-30, prepare its December 31 closing entries.

QS 3-23

Analyzing closing entries on owner's capital **P6**

Ace Company reports revenues of $40,000 and expenses of $31,000. The company paid $5,000 cash in dividends this period. After closing entries are recorded, determine the amount of the increase or decrease in the Retained Earnings account.

QS 3-24

Identifying post-closing accounts **P6**

For each account, identify whether it is included or excluded from a post-closing trial balance.

a. Accounts Receivable

b. Salaries Expense

c. Cash

d. Land

e. Income Tax Expense

f. Salaries Payable

QS 3-25

Identifying the accounting cycle **P6**

List the following steps of the accounting cycle in their proper order.

a. Posting the journal entries.

b. Journalizing and posting adjusting entries.

c. Preparing the adjusted trial balance.

d. Journalizing and posting closing entries.

e. Analyzing transactions and events.

f. Preparing the financial statements.

g. Preparing the unadjusted trial balance.

h. Journalizing transactions and events.

i. Preparing the post-closing trial balance.

QS 3-26

Classifying balance sheet items

C2

Common categories of a classified balance sheet include Current Assets, Long-Term Investments, Plant Assets, Intangible Assets,

Current Liabilities, and Long-Term Liabilities. For each of the following items, identify the balance sheet category where the item would most likely appear.

1. Land
2. Notes payable (due in five years)
3. Accounts receivable
4. Trademarks
5. Accounts payable
6. Equipment
7. Wages payable
8. Cash

QS 3-27

Preparing an income statement

C2

Use the following selected accounts and amounts with normal balances from Buildex Co.'s adjusted trial balance to prepare its income statement for the year ended December 31. *Hint:* Not all accounts need to be used.

Cash	$ 9,000	Depreciation expense	$ 4,000
Building	98,000	Wages expense	45,000
Accounts payable	8,000	Insurance expense	3,000
Services revenue	60,000	Supplies expense	2,000
Interest revenue	5,000	Utilities expense	1,000

QS 3-28

Preparing a statement of owner's equity **C1**

J. Clancy owns Clancy Consulting. On December 31 of the *prior year,* the Retained Earnings account balance was $20,000. During the current year, the company paid $11,000 in cash dividends. Clancy Consulting reports net income of $47,000 for the current year. Prepare

a statement of retained earnings for Clancy Consulting for the *current year* ended December 31.

QS 3-29

Preparing a classified balance sheet

C2

Use the following selected accounts and amounts with normal balances from Juan Co. to prepare its classified balance sheet at December 31.

Wages payable	$ 1,000	Accounts receivable	$ 7,000
Building	100,000	Accumulated depreciation—Building	30,000
Cash	18,000	Notes payable (due in 5 years)	51,000
Interest payable	2,000	Notes receivable (due in 14 years)	20,000
Common stock	10,000	Accounts payable	11,000
Retained earnings	40,000		

QS 3-30

Preparing an income statement & statement of retained earnings

C2

Use the following adjusted trial balance of Sierra Company to prepare its (1) income statement and (2) statement of retained earnings for the year ended December 31. The Retained Earnings account balance was $4,500 on December 31 of the *prior year*.

Adjusted Trial Balance	Debit	Credit
Cash	$ 5,000	
Prepaid insurance	500	
Notes receivable (due in 5 years)	4,000	
Buildings	20,000	
Accumulated depreciation—Buildings		$12,000
Accounts payable		2,500
Notes payable (due in 3 years)		3,000
Common stock		6,000
Retained earnings		4,500
Dividends	1,000	
Consulting revenue		9,500
Wages expense	3,500	
Depreciation expense—Buildings	2,000	
Insurance expense	1,500	
Totals	$37,500	$37,500

QS 3-31

Preparing a classified balance sheet **C2**

Use the information in the adjusted trial balance reported in QS 3-30 to prepare Sierra Company's *classified* balance sheet as of December 31. Assume the ending Retained Earnings balance at December 31 of the current year is $6,000.

QS 3-32

Computing and analyzing profit margin **A1**

Gomez Company reported net income of $48,025 and net sales of $425,000 for the current year. (*a*) Compute Gomez's profit margin. (*b*) Assuming Cruz (a competitor) has a profit margin of 15%, which company is generating more profit on each dollar of sales?

QS 3-33

Computing the current ratio

A1

Compute Chavez Company's current ratio using the following information.

Accounts receivable	$18,000	Long-term notes payable	$21,000
Accounts payable	11,000	Office supplies	2,600
Buildings	45,000	Prepaid insurance	3,200
Cash	7,000	Unearned services revenue	3,000

QS 3-34[A]

Preparing adjusting entries

P7

Garcia Company had the following selected transactions during the year.

Jan. 1 The company paid $6,000 cash for 12 months of insurance coverage beginning immediately.

Aug. 1 The company received $2,400 cash in advance for 6 months of contracted services beginning on August 1 and ending on January 31.

Dec. 31 The company prepared any necessary year-end adjusting entries related to insurance coverage and services performed.

a. Record journal entries for these transactions assuming Garcia follows the usual practice of recording a prepayment of an expense in an asset account *and* recording a prepayment of revenue received in a liability account.

b. Record journal entries for these transactions assuming Garcia follows the alternative practice of recording a prepayment of an expense in an expense account *and* recording a prepayment of revenue received in a revenue account.

QS 3-35[A]

Preparing adjusting entries

P7

Cal Consulting follows the practice that prepayments are debited to expense when paid, and unearned revenues are credited to revenue when cash is received. Given this company's accounting practices, which one of the following applies to the preparation of adjusting entries at the end of its first accounting period?

a. Unearned revenue (on which cash was received in advance earlier in the period) is recorded with a debit to Consulting Revenue of $500 and a credit to Unearned Revenue of $500.

b. Unpaid salaries of $400 are recorded with a debit to Prepaid Salaries of $400 and a credit to Salaries Expense of $400.

c. Office supplies purchased for the period were $1,000. The cost of unused office supplies of $650 is recorded with a debit to Supplies Expense of $650 and a credit to Office Supplies of $650.

d. Earned but unbilled (and unrecorded) consulting revenue for the period was $1,200, which is recorded with a debit to Unearned Revenue of $1,200 and a credit to Consulting Revenue of $1,200.

QS 3-36[B]

Preparing a work sheet

P8

Determine the financial statement column (Income Statement column or the Balance Sheet column) where a normal account balance is extended.

a. Equipment

b. Common Stock

c. Prepaid Rent

d. Depreciation Expense

e. Accounts Receivable

f. Insurance Expense

g. Supplies

h. Rent Expense

i. Cash

QS 3-37[B]

Computing capital balance using work sheet **P8**

The following selected information is taken from the work sheet for Warton Company at its December 31 year-end. Determine the amount for Retained Earnings that should be reported on its current December 31 year-end balance sheet. *Note:* The Retained Earnings balance was $72,000 on December 31 of the *prior year*.

	Income Statement		Balance Sheet	
	Dr.	Cr.	Dr.	Cr.
Retained Earnings				72,000
Dividends			40,000	
Totals	120,000	180,000		

QS 3-38[B]

Preparing a partial work sheet

P8

The ledger of Claudell Company includes the following unadjusted normal balances: Prepaid Rent $1,000, Services Revenue $55,600, and Wages Expense $5,000. Adjustments are required for (*a*) prepaid rent expired $200; (*b*) accrued services revenue $900; and (*c*) accrued wages expense $700.

Prepare a 10-column worksheet with six rows for the following accounts: Prepaid Rent, Services Revenue, Wages Expense, Accounts Receivable, Wages Payable, and Rent Expense. Enter the unadjusted balances and the necessary adjustments on the work sheet and complete the work sheet for these accounts.

QS 3-39[C]

Preparing reversing entries

P9

Geralt Company made an adjusting entry at its December 31 year-end for $800 of wages earned by employees but not yet paid. Geralt uses reversing entries. Prepare the reversing entry Geralt must record on January 1.

QS 3-40[C]

Preparing reversing entries

P9

On December 31, Yates Co. prepared an adjusting entry for $12,000 of earned but unrecorded consulting revenue. On January 16, Yates received $26,700 cash as payment in full for consulting work it provided that began on December 18 and ended on January 16. The company uses reversing entries.

a. Prepare the December 31 adjusting entry.

b. Prepare the January 1 reversing entry.

c. Prepare the January 16 cash receipt entry.

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connect

EXERCISES

Exercise 3-1

Determining assets and expenses for accrual and cash accounting

C1

On March 1, Year 1, a company paid an $18,000 premium on a 36-month insurance policy for coverage beginning on that date. Refer to that policy and fill in the blanks in the following table.

Balance Sheet: Prepaid Insurance			Income Statement: Insurance Expense		
	Accrual Basis	Cash Basis		Accrual Basis	Cash Basis
Dec. 31, Year 1	$_____	$_____	Year 1	$_____	$_____
Dec. 31, Year 2	_____	_____	Year 2	_____	_____
Dec. 31, Year 3	_____	_____	Year 3	_____	_____
Dec. 31, Year 4	_____	_____	Year 4	_____	_____
			Total	$_____	$_____

Exercise 3-2

Determining when to recognize revenue C1

For each of the following separate situations, determine how much revenue is recognized in December (using accrual basis accounting).

a. On December 7, **Oklahoma City Thunder** sold a $90 ticket to a basketball game to be played in March.

b. **Tesla** sold and delivered a $58,000 car on December 25. The customer will not pay until February.

c. **Deloitte** signs a contract on December 1 to provide 40 days of advisory services with receipt of $10,000 due at the end of the contract. On December 31, 75% of the services have been completed.

Exercise 3-3

Determining when to recognize expenses

C1

For each of the following separate situations, determine the amount of expense each company should recognize in December (using accrual basis accounting).

a. **Chipotle** has monthly wages expense of $3,200 that has been incurred but not paid as of December 31.

b. **United Airlines** purchases a 24-month insurance policy for $48,000 on December 1 for immediate coverage.

c. On December 15, **Pfizer** prepays $20,000 for hotel rooms for its January sales meeting.

Exercise 3-4

Classifying adjusting entries

P1 P2 P3 P4

For journal entries 1 through *6,* identify the explanation that most closely describes it.

A. To record this period's depreciation expense.

B. To record accrued salaries expense.

C. To record this period's use of a prepaid expense.

D. To record accrued interest revenue.

E. To record accrued interest expense.

F. To record the earning of previously unearned income.

____ 1.	Interest Expense	2,208	
	Interest Payable		2,208
____ 2.	Insurance Expense	3,180	
	Prepaid Insurance		3,180
____ 3.	Unearned Revenue	19,250	
	Services Revenue		19,250

____ 4.	Interest Receivable	3,300	
	Interest Revenue		3,300
____ 5.	Depreciation Expense	38,217	
	Accumulated Depreciation		38,217
____ 6.	Salaries Expense	13,280	
	Salaries Payable		13,280

Exercise 3-5

Determining cost flows through accounts

P1

Determine the missing amounts in each of these four separate situations *a* through *d*.

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	a	b	c	d
Supplies available—prior year-end	$ 400	$1,200	$1,260	?
Supplies purchased during current year	2,800	6,500	?	$3,000
Supplies available—current year-end	650	?	1,350	700
Supplies expense for current year	?	1,200	8,400	4,588

Exercise 3-6

Preparing adjusting entries

P1 P2 P3

Prepare adjusting journal entries for the year ended December 31 for each separate situation. Entries can draw from the following partial chart of accounts: Cash; Accounts Receivable; Supplies; Prepaid-Insurance; Prepaid Rent; Equipment; Accumulated Depreciation—Equipment; Wages Payable; Unearned Revenue; Services Revenue; Wages Expense; Supplies Expense; Insurance Expense; Rent Expense; and Depreciation Expense—Equipment.

a. Depreciation on the company's equipment for the year is computed to be $18,000.

b. The Prepaid Insurance account had a $6,000 debit balance at December 31 before adjusting for the costs of any expired coverage. An analysis of the company's insurance policies showed that $1,100 of unexpired insurance coverage remains.

c. The Supplies account had a $700 debit balance at the beginning of the year, and $3,480 of supplies were purchased during the year. The December 31 physical count showed $300 of supplies available.

d. Two-thirds of the work related to $15,000 of cash received in advance was performed this period.

e. The Prepaid Rent account had a $6,800 debit balance at December 31 before adjusting for the costs of expired prepaid rent. An analysis of the rental agreement showed that $5,800 of prepaid rent had expired.

Check (c) Dr. Supplies Expense, $3,880

(e) Dr. Rent Expense, $5,800

f. Wage expenses of $3,200 have been incurred but are not paid as of December 31.

Exercise 3-7

Adjusting and paying accrued wages

P3

Pablo Management has five employees, each of whom earns $250 per day. They are paid on Fridays for work completed Monday through Friday of the same week. Near year-end, the five employees worked Monday, December 31, and Wednesday, Thursday, and Friday, January 2, 3, and 4. New Year's Day (January 1) was an unpaid holiday.

a. Prepare the December 31 year-end adjusting entry for wages expense.

b. Prepare the journal entry to record payment of the employees' wages on Friday, January 4.

Exercise 3-8

Adjusting and paying accrued expenses

P3

The following three *separate* situations require adjusting journal entries to prepare financial statements as of April 30. For each situation, present both:

- The April 30 adjusting entry.
- The subsequent entry during May to record payment of the accrued expenses.

Entries can draw from the following partial chart of accounts: Cash; Accounts Receivable; Salaries Payable; Interest Payable; Legal Services Payable; Unearned Revenue; Services Revenue; Salaries Expense; Interest Expense; Legal Services Expense; and Depreciation Expense.

a. On April 1, the company hired an attorney for April for a flat fee of $3,500. Payment for April legal services was made by the company on May 12.

b. As of April 30, $3,000 of interest expense has accrued on a note payable. The full interest payment of $9,000 on the note is due on May 20.

c. Total weekly salaries expense for all employees is $10,000. This amount is paid at the end of the day on Friday of each five-day workweek. April 30 falls on a Tuesday, which means that the employees had worked two days since the last payday. The next payday is May 3.

Check (*b*) May 20, Dr.Interest Expense, $6,000

Exercise 3-9

Preparing adjusting entries

P1 P3 P4

For each of the following separate cases, prepare adjusting entries required of financial statements for the year ended December 31. Entries can draw from the following partial chart of accounts: Cash; Interest Receivable; Supplies; Prepaid Insurance; Equipment; Accumulated Depreciation—Equipment; Wages Payable; Interest Payable; Unearned Revenue; Interest Revenue; Wages Expense; Supplies Expense; Insurance Expense; Interest Expense; and Depreciation Expense—Equipment.

a. Wages of $8,000 are earned by workers but not paid as of December 31.

b. Depreciation on the company's equipment for the year is $18,000.

c. The Supplies account had a $240 debit balance at the beginning of the year. During the year, $5,200 of supplies are purchased. A physical count of supplies at December 31 shows $440 of supplies available.

d. The Prepaid Insurance account had a $4,000 balance at the beginning of the year. An analysis of insurance policies shows that $1,200 of unexpired insurance benefits remain at December 31.

e. The company has earned (but not recorded) $1,050 of interest revenue for the year ended December 31. The interest payment will be received 10 days after the year-end on January 10.

f. The company has a bank loan and has incurred (but not recorded) interest expense of $2,500 for the year ended December 31. The company will pay the interest five days after the year-end on January 5.

Check (*d*) Dr. Insurance Expense, $2,800

(e) Cr. Interest Revenue, $1,050

Exercise 3-10

Analyzing adjusting entries using accounting equation

P1 P3 P4

Analyze each adjusting entry in Exercise 3-9 by showing its effects on the accounting equation—specifically, identify the accounts and amounts (including + or —) for each transaction or event.

Exercise 3-11

Preparing adjusting entries—accrued revenues and expenses

P3 P4

Prepare year-end adjusting journal entries for M&R Company as of December 31 for each of the following separate cases. Entries can draw from the following partial chart of accounts: Cash; Accounts Receivable; Interest Receivable; Equipment; Wages Payable; Salary Payable; Interest Payable; Lawn Services Payable; Unearned Revenue; Services Revenue; Interest Revenue; Wages Expense; Salary Expense; Supplies Expense; Lawn Services Expense; and Interest Expense.

a. M&R Company provided $2,000 in services to customers in December, which are not yet recorded. Those customers are expected to pay the company in January following the company's year-end.

b. Wage expenses of $1,000 have been incurred but are not paid as of December 31.

c. M&R Company has a $5,000 bank loan and has incurred (but not recorded) 8% interest expense of $400 for the year ended December 31. The company will pay the $400 interest in cash on January 2 following the company's year-end.

d. M&R Company hired a firm that provided lawn services during December for $500. M&R will pay for December lawn services on January 15 following the company's year-end.

e. M&R Company has earned $200 in interest revenue from investments for the year ended December 31. The interest revenue will be received on January 15 following the company's year-end.

f. Salary expenses of $900 have been earned by supervisors but not paid as of December 31.

Exercise 3-12

Analyzing adjusting entries using accounting equation

P3 P4

Analyze each adjusting entry in Exercise 3-11 by showing its effects on the accounting equation—specifically, identify the accounts and amounts (including + or −) for each transaction or event.

Exercise 3-13

Preparing adjusting entries

P1 P2 P3 P4

For each of the following separate cases, prepare the required December 31 year-end adjusting entries.

a. Depreciation on the company's wind turbine equipment for the year is $5,000.

b. The Prepaid Insurance account for the solar panels had a $2,000 debit balance at December 31 before adjusting for the costs of any expired coverage. Analysis of prepaid insurance shows that $600 of unexpired insurance coverage remains at year-end.

c. The company received $3,000 cash in advance for sustainability consulting work. As of December 31, one-third of the sustainability consulting work had been performed.

d. As of December 31, $1,200 in wages expense for the organic produce workers has been incurred but not yet paid.

e. As of December 31, the company has earned, but not yet recorded, $400 of interest revenue from investments in socially responsible bonds. The interest revenue is expected to be received on January 12.

Exercise 3-14

Analyzing effects of adjusting entries on financial statements

P5

For each of the separate cases in Exercise 3-13, determine the financial statement impact of each required year-end adjusting entry. Fill in the table below by indicating the amount and direction (+ or −) of the effect.

Adjusting Entry	Net Income	Total Assets	Total Liabilities	Total Equity
a.				
b.				
c.				
d.				
e.				

Exercise 3-15

Analyzing and preparing adjusting entries

P5

Following are two income statements for Alexis Co. for the year ended December 31. The left number column is prepared before adjusting entries are recorded, and the right column is prepared after adjusting entries. Analyze the statements and prepare the seven adjusting entries *a* through *g* that likely were recorded. *Hint:* The entry for *a* refers to revenue that has been earned but not yet billed. No adjusting entry involves cash.

Income Statements For Year Ended December 31	Unadjusted	Adjustments	Adjusted
Revenues			
Services revenue	$18,000	a.	$25,000
Commissions revenue	36,500		36,500
Total revenues	54,500		61,500
Expenses			
Depreciation expense—Computers	0	b.	1,600
Depreciation expense—Office furniture	0	c.	1,850
Salaries expense	13,500	d.	15,750
Insurance expense	0	e.	1,400
Rent expense	3,800		3,800
Office supplies expense	0	f.	580
Advertising expense	2,500		2,500
Utilities expense	1,245	g.	1,335
Total expenses	21,045		28,815
Net income	$33,455		$32,685

Exercise 3-16

Preparing an adjusted trial balance

P5

Stark Company has the following adjusted accounts with normal balances at its December 31 year-end.

Prepare an adjusted trial balance for Stark Company at December 31.

Notes payable	$11,000	Accumulated depreciation—Buildings	$15,000
Prepaid insurance	2,500	Accounts receivable	4,000
Interest expense	500	Utilities expense	1,300
Accounts payable	1,500	Interest payable	100
Wages payable	400	Unearned revenue	800
Cash	10,000	Supplies expense	200
Wages expense	7,500	Buildings	40,000
Insurance expense	1,800	Dividends	3,000
Common stock	10,000	Depreciation expense—Buildings	2,000
Services revenue	20,000	Supplies	800
		Retained earnings	14,800

Exercise 3-17

Preparing financial statements

P5

Use the adjusted accounts for Stark Company from Exercise 3-16 to prepare the (1) income statement and (2) statement of retained earnings for the year ended December 31 and (3) balance sheet at December 31. The Retained Earnings account balance was $14,800 on December 31 of the *prior year*.

Exercise 3-18

Computing Income Summary and ending capital balance from closing entries

P6

Capri Company began the current period with a $20,000 credit balance in the Retained Earnings account. At the end of the period, the company's adjusted account balances include the following temporary accounts with normal balances.

Services revenue	$70,000	Interest revenue	$ 7,000
Salaries expense	38,000	Dividends	12,000
Depreciation expense	8,000	Utilities expense	4,600

1. After closing the revenue and expense accounts, what is the balance of the Income Summary account?
2. After all closing entries are journalized and posted, what is the balance of the Retained Earnings account?

Exercise 3-19

Preparing and posting closing entries

P6

Use the May 31 fiscal year-end information from the following ledger accounts (assume that all accounts have normal balances) to (*a*) prepare closing journal entries and (*b*) post those entries to ledger accounts.

General Ledger

Retained Earnings — Acct. No. 318

Date	PR	Debit	Credit	Balance
May 31	G2			40,000

Dividends — Acct. No. 319

Date	PR	Debit	Credit	Balance
May 31	G2			22,000

Services Revenue — Acct. No. 403

Date	PR	Debit	Credit	Balance
May 31	G2			76,000

Depreciation Expense — Acct. No. 603

Date	PR	Debit	Credit	Balance
May 31	G2			15,000

Salaries Expense — Acct. No. 622

Date	PR	Debit	Credit	Balance
May 31	G2			20,000

Insurance Expense — Acct. No. 637

Date	PR	Debit	Credit	Balance
May 31	G2			4,400

Rent Expense — Acct. No. 640

Date	PR	Debit	Credit	Balance
May 31	G2			8,400

Income Summary — Acct. No. 901

Date	PR	Debit	Credit	Balance

Check M. Muncel, Capital (ending balance), $46,200

Exercise 3-20

Preparing closing entries and a post-closing trial balance **P6**

Following are accounts and year-end adjusted balances of page 130
Cruz Company as of December 31.

1. Prepare the December 31 closing entries. The account number for Income Summary is 901.
2. Prepare the December 31 post-closing trial balance. *Note:* The Retained Earnings account balance was $37,600 on December 31 of the *prior year*.

No.	Account Title	Debit	Credit
101	Cash	$19,000	
126	Supplies	13,000	
128	Prepaid insurance	3,000	
167	Equipment	24,000	
168	Accumulated depreciation—Equipment		$ 7,500
307	Common stock		10,000
318	Retained earnings		37,600
319	Dividends	7,000	
403	Services revenue		44,000
612	Depreciation expense—Equipment	3,000	
622	Salaries expense	22,000	
637	Insurance expense	2,500	
640	Rent expense	3,400	
652	Supplies expense	2,200	
	Totals	$99,100	$99,100

Exercise 3-21

Preparing an income statement & statement of retained earnings **C2**

Use the following adjusted trial balance at December 31 of Wilson Trucking Company to prepare the (1) income statement and (2) statement of retained earnings, for the year ended December 31. The Retained Earnings account balance was $140,000 at December 31 of the *prior year*.

Account Title	Debit	Credit
Cash	$ 8,000	
Accounts receivable	17,500	
Office supplies	3,000	
Trucks	172,000	
Accumulated depreciation—Trucks		$ 36,000
Land	85,000	
Accounts payable		12,000
Interest payable		4,000
Long-term notes payable		58,000
Common stock		30,000
Retained earnings		140,000
Dividends	20,000	
Trucking revenue		130,000
Depreciation expense—Trucks	23,500	
Salaries expense	61,000	
Office supplies expense	8,000	
Interest expense	12,000	
Totals	$410,000	$410,000

Exercise 3-22

Preparing a classified balance sheet **C2**

Use the information in the adjusted trial balance reported in Exercise 3-21 to prepare Wilson Trucking Company's *classified* balance sheet as of December 31.

Exercise 3-23

Preparing closing entries **P6**

Using Wilson Trucking Company's adjusted trial balance from Exercise 3-21, prepare its December 31 closing entries.

Exercise 3-24

Preparing a classified balance sheet

C2

Use the following selected accounts and amounts with normal balances from Andrea Co. to prepare its classified balance sheet at

December 31.

Accounts payable	$ 8,000	Accounts receivable	$ 4,000
Land	30,000	Accumulated depreciation—Machinery	16,000
Cash	13,000	Notes payable (due in 7 years)	29,000
Salaries payable	1,000	Long-term investments in bonds	7,000
Retained earnings	22,000	Notes receivable (due in 4 years)	15,000
Machinery	20,000	Merchandise inventory	5,000
Prepaid insurance	2,000	Common stock	20,000

Exercise 3-25

Computing and interpreting profit margin

A1

Use the following information to compute profit margin for each separate company *a* through *e*. Which of the five companies is the most profitable according to the profit margin ratio? Interpret the profit margin ratio for company *c*.

	Net Income	Net Sales		Net Income	Net Sales
a.	$ 4,361	$ 44,500	d.	$65,646	$1,458,800
b.	97,706	398,800	e.	80,132	435,500
c.	111,281	257,000			

Exercise 3-26

Computing the current ratio

A1

(*a*) Use the information in the adjusted trial balance reported in Exercise 3-21 to compute the current ratio for Wilson Trucking. (*b*) Assuming Spalding (a competitor) has a current ratio of 1.5, which company is better able to pay its short-term obligations?

Exercise 3-27

Computing and analyzing the current ratio

A1

(*a*) Calculate the current ratio for each of the following competing companies. (*b*) Which competitor is in the best position to pay its short-term obligations?

	Edison	MAXT	Chatter	TRU	Gleeson
Current assets	$79,040	104,880	45,080	85,680	61,000
Current liabilities	$32,000	76,000	49,000	81,600	100,000

Exercise 3-28[A]

Adjusting for prepaids recorded as expenses and unearned revenues recorded as revenues

P7

Ricardo Construction began operations on December 1. In setting up its accounting procedures, the company decided to debit expense accounts when it prepays its expenses and to credit revenue accounts when customers pay for services in advance. Prepare journal entries for items *a* through *d* and the adjusting entries as of its December 31 period-end for items *e* through *g*. Entries can draw from the following partial chart of accounts: Cash; Accounts Receivable; Interest Receivable; Supplies; Prepaid Insurance; Unearned Remodeling Revenue; Remodeling Revenue; Supplies Expense; Insurance-Expense; and Interest Expense.

a. Supplies are purchased on December 1 for $2,000 cash.

b. The company prepaid its insurance premiums for $1,540 cash on December 2.

c. On December 15, the company receives an advance payment of $13,000 cash from a customer for remodeling work.

d. On December 28, the company receives $3,700 cash from another customer for remodeling work to be performed in January.

e. A physical count on December 31 indicates that the company has $1,840 of supplies available.

f. An analysis of insurance policies in effect on December 31 shows that $340 of insurance coverage had expired.

g. As of December 31, only one remodeling project has been worked on and completed. The $5,570 price for this project had been received in advance and recorded as Remodeling Revenue.

Check (*f*) Cr. Insurance Expense, $1,200

(*g*) Dr. Remodeling Revenue, $11,130

Exercise 3-29[A]

Recording and reporting revenues received in advance

P7

Costanza Company experienced the following events and transactions in July. The company has the following partial chart of accounts: Cash; Accounts Receivable; Unearned Revenue; and Services Revenue.

July 1 Received $3,000 cash in advance of performing work for Vivian Solana.

6 Received $7,500 cash in advance of performing work for Iris Haru.

12 Completed the job for Solana.

18 Received $8,500 cash in advance of performing work for Amina Jordan.

31 (a) Completed the job for Haru. (b) None of the work for Jordan has been performed.

a. Prepare journal entries (including any adjusting entries as of the July 31 month-end) to record these events using the procedure of initially crediting the Unearned Revenue account when payment is received from a customer in advance of performing services.

b. Prepare journal entries (including any adjusting entries as of the July 31 month-end) to record these events using the alternative procedure of initially crediting the Services Revenue account when

payment is received from a customer in advance of performing services.

c. Under each method, determine the amount of Services Revenue reported on the income statement for July and the amount of Unearned Revenue reported on the balance sheet as of July 31.

Exercise 3-30[B]

Assigning account balances on a work sheet **P8**

These 16 accounts are from the Adjusted Trial Balance columns of a company's work sheet. Determine the letter of the financial statement column (A, B, C, or D) where a normal account balance is extended.

A. Debit column for the Income Statement columns.

B. Credit column for the Income Statement columns.

C. Debit column for the Balance Sheet columns.

D. Credit column for the Balance Sheet columns.

1. Interest Revenue

2. Machinery

3. Dividends

4. Depreciation Expense

5. Accounts Payable

6. Services Revenue

7. Common Stock

8. Interest Expense

9. Accounts Receivable

10. Accumulated Depreciation

11. Office Supplies

12. Insurance Expense

13. Interest Receivable

14. Cash

15. Rent Expense

16. Wages Payable

Exercise 3-31[B]

Extending accounts to financial statement columns **P8**

The Adjusted Trial Balance columns of a work sheet for Planta Company follow. Complete the work sheet by extending the account balances into the appropriate financial statement columns and by entering the amount of net income for the reporting period.

		Adjusted Trial Balance		Income Statement		Balance Sheet	
No.	Account Title	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.
101	Cash	$ 7,000					
106	Accounts receivable	27,200					
153	Trucks	42,000					
154	Accumulated depreciation—Trucks		$ 17,500				
183	Land	32,000					
201	Accounts payable		15,000				
209	Salaries payable		4,200				
236	Unearned revenue		3,600				
307	Common stock		10,000				
318	Retained earnings		55,500				
319	Dividends	15,400					
403	Plumbing revenue		84,000				
611	Depreciation expense—Trucks	6,500					
622	Salaries expense	38,000					
640	Rent expense	13,000					
677	Miscellaneous expenses	8,700					
	Totals	$189,800	$189,800				
	Net income						
	Totals						

Check Net income, $17,800

Exercise 3-32[B]

Preparing adjusting entries from a work sheet **P8**

Use the following information from the Adjustments columns of a work sheet to prepare the necessary adjusting journal entries (*a*) through (*e*).

		Unadjusted Trial Balance		Adjustments		Adjusted Trial Balance	
No.	Account Title	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.
109	Interest receivable			(d) $ 880			
124	Office supplies				(b) $ 1,750		
128	Prepaid insurance				(a) 900		
164	Accumulated depreciation—Office equipment				(c) 2,200		
209	Salaries payable				(e) 560		
409	Interest revenue				(d) 880		
612	Depreciation expense—Office equipment			(c) 2,200			
620	Office salaries expense			(e) 560			
637	Insurance expense			(a) 900			
650	Office supplies expense			(b) 1,750			
	Totals			$6,290	$6,290		

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Exercise 3-33[B]

Completing worksheet adjustments

P8

The following data are taken from the unadjusted trial balance of the Westcott Company at December 31.

1. Use the following information to complete the Adjustments columns of the work sheet.
   - **a.** Depreciation on equipment, $3
   - **b.** Accrued salaries, $6
   - **c.** The $12 of unearned revenue has been earned
   - **d.** Supplies available at December 31, $15
   - **e.** Expired insurance, $15
2. Extend the balances in the Adjusted Trial Balance columns of the work sheet to the proper financial statement columns. Compute totals for those columns, including net income.

	Unadjusted Trial Balance		Adjustments		Adjusted Trial Balance		Income Statement		Balance Sheet	
Account	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.
Cash	21									
Accounts receivable	12									
Supplies	24									
Prepaid insurance	18									
Equipment	39									
Accumulated depreciation—Equipment		15								
Accounts payable		6								
Salaries payable										
Unearned revenue		12								
Common stock		10								
Retained earnings		32								
Dividends	6									
Services revenue		75								
Depreciation expense—Equipment										
Salaries expense	18									
Insurance expense										
Supplies expense										
Utilities expense	12									
Totals	150	150								
Net income										
Totals										

Exercise 3-34[B]

Completing the Income Statement columns and preparing closing entries

P6 P8

Following are Income Statement columns from a 10-column work sheet for a company.

1. Determine the amount that should be entered on the net income line of the work sheet.
2. Prepare the company's closing entries. The company did not pay any dividends this period.

Account Title	Debit	Credit
Rental revenue		$120,000
Salaries expense	$ 46,300	
Insurance expense	7,400	
Supplies expense	16,000	
Bike repair expense	4,200	
Depreciation expense—Bikes	20,500	
Totals		
Net income		
Totals		

Exercise 3-35[B]

Preparing a work sheet and recording closing entries

P6 P8

The following unadjusted trial balance contains the accounts and balances of Dylan Delivery Company as of December 31. page 133

1. Use the following information about the company's adjustments to complete a 10-column work sheet.
   - **a.** Unrecorded depreciation on the trucks at the end of the year is $40,000.
   - **b.** Total amount of accrued interest expense and interest payable at year-end should be $6,000.
   - **c.** Cost of unused supplies still available at year-end is $2,000.
2. (*a*) Prepare the year-end closing entries for this company. (*b*) Determine the retained earnings to be reported on its year-end balance sheet. *Note:* The Retained Earnings account balance was $257,000 on December 31 of the *prior year*.

Unadjusted Trial Balance		
Account Title	**Debit**	**Credit**
Cash	$ 16,000	
Accounts receivable	34,000	
Supplies	5,000	
Trucks	350,000	
Accumulated depreciation—Trucks		$ 80,000
Land	160,000	
Accounts payable		24,000
Interest payable		5,000
Long-term notes payable		100,000
Common stock		50,000
Retained earnings		257,000
Dividends	34,000	
Delivery revenue		263,000
Depreciation expense—Trucks	40,000	
Salaries expense	110,000	
Supplies expense	15,000	
Interest expense	5,000	
Repairs expense	10,000	
Totals	$779,000	$779,000

Check Adj. trial balance totals, $820,000; Net income, $39,000

Exercise 3-36[C]

Preparing reversing entries

P9

Hawk Company used the following information to prepare adjusting entries at its December 31 year-end. Prepare any necessary reversing entries for accounting adjustments *a* through *e* assuming that the company uses reversing entries.

a. The company earned $6,000 in service revenues that were not yet recorded at year-end.

b. The expired portion of prepaid insurance was $3,700.

c. The company earned $2,900 of its Unearned Revenue account balance.

d. Depreciation expense for office equipment was $3,300.

e. Employees earned, but have not been paid, salaries of $3,400.

Exercise 3-37[C]

Preparing reversing entries

P9

Trey Co. entered into the following two transactions. Trey prepares financial statements annually at December 31.

a. Trey rents a building for $2,800 per month beginning December 1. By agreement, Trey paid cash for both December and January rent on **January 2**.

b. Trey rents space in a building it owns to a tenant for $850 per month. Trey agreed to allow the tenant to delay payment for December and January rent until January 3, when the tenant paid cash for both months.

Required

1. Prepare adjusting entries the company must record for these events as of December 31.

2. Assuming Trey does *not* use reversing entries, prepare journal entries to record Trey's payment of rent on January 2 and the

collection of the tenant's rent on January 3.

3. Assuming Trey uses reversing entries, prepare reversing entries on January 1. Also prepare journal entries to record Trey's payment of rent on January 2 and the receipt of the tenant's rent on January 3.

PROBLEM SET A

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Problem 3-1A

Identifying adjusting entries with explanations

P1 P2 P3 P4

For journal entries *1* through *12,* indicate the explanation that most closely describes it. You can use explanations more than once.

A. To record receipt of unearned revenue.

B. To record this period's earning of prior unearned revenue.

C. To record payment of an accrued expense.

D. To record receipt of an accrued revenue.

E. To record an accrued expense.

F. To record an accrued revenue.

G. To record this period's use of a prepaid expense.

H. To record payment of a prepaid expense.

I. To record this period's depreciation expense.

1.	Interest Expense	1,000	
	Interest Payable		1,000
2.	Depreciation Expense	4,000	
	Accumulated Depreciation		4,000
3.	Unearned Revenue	3,000	
	Services Revenue		3,000
4.	Insurance Expense	4,200	
	Prepaid Insurance		4,200
5.	Salaries Payable	1,400	
	Cash		1,400
6.	Prepaid Rent	4,500	
	Cash		4,500

7.	Salaries Expense	6,000	
	Salaries Payable		6,000
8.	Interest Receivable	5,000	
	Interest Revenue		5,000
9.	Cash	9,000	
	Accounts Receivable (from consulting)		9,000
10.	Cash	7,500	
	Unearned Revenue		7,500
11.	Cash	2,000	
	Interest Receivable		2,000
12.	Rent Expense	2,000	
	Prepaid Rent		2,000

Problem 3-2A

Preparing adjusting and subsequent journal entries

P1 P2 P3 P4

Arnez Company's annual accounting period ends on December 31. The following information concerns the adjusting entries to be recorded as of that date. Entries can draw from the following partial chart of accounts: Cash; Accounts Receivable; Office Supplies; Prepaid Insurance; Building; Accumulated Depreciation—Building; Salaries Payable; Unearned Revenue; Rent Revenue; Salaries-Expense; Office Supplies Expense; Insurance Expense; and Depreciation Expense—Building.

a. The Office Supplies account started the year with a $4,000 balance. During the year, the company purchased supplies for $13,400, which was added to the Office Supplies account. The inventory of supplies available at December 31 totaled $2,554.

b. The Prepaid Insurance account had a $20,000 debit balance at December 31 before adjusting for the costs of any expired coverage for the year. An analysis of prepaid insurance shows that $12,880 of unexpired insurance coverage remains at year-end.

c. The company has 15 employees, who earn a total of $1,960 in salaries each working day. They are paid each Monday for their work in the five-day workweek ending on the previous Friday. Assume that December 31 is a Tuesday, and all 15 employees worked the first two days of that week. Because New Year's Day is

a paid holiday, they will be paid salaries for five full days on Monday, January 6 of next year.

d. The company purchased a building at the beginning of this year. It cost $960,000 and is expected to have a $45,000 salvage value at the end of its predicted 30-year life. Annual depreciation is $30,500.

e. Since the company is not large enough to occupy the entire building it owns, it rented space to a tenant at $3,000 per month, starting on November 1. The rent was paid on time on November 1, and the amount received was credited to Rent Revenue. However, the tenant has not paid the December rent. The company has worked out an agreement with the tenant, who has promised to pay both December and January rent in full on January 31.

f. On November 1, the company rented space to another tenant for $2,800 per month. The tenant paid five months' rent in advance on that date. The payment was recorded with a credit to the Unearned Revenue account.

Required

1. Use the information to prepare adjusting entries as of December 31.

2. Prepare journal entries to record the first subsequent cash transaction in January of the next year for parts *c* and *e*.

Check(1*b*) Dr. Insurance Expense, $7,120

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(1*d*) Dr. Depreciation Expense, $30,500

Problem 3-3A

Preparing adjusting entries, adjusted trial balance, and financial statements

P1 P2 P3 P4 P5

Wells Technical Institute (WTI) provides training to individuals who pay tuition directly to the school. WTI also offers training to groups in off-site locations. Its unadjusted trial balance as of December 31 follows,

along with descriptions of items *a* through *h* that require adjusting entries on December 31.

Additional Information

a. An analysis of WTI's insurance policies shows that $2,400 of coverage has expired.

b. An inventory count shows that teaching supplies costing $2,800 are available at year-end.

c. Annual depreciation on the equipment is $13,200.

d. Annual depreciation on the professional library is $7,200.

e. On September 1, WTI agreed to do five training courses for a client for $2,500 each. Two courses will start immediately and finish before the end of the year. Three courses will not begin until next year. The client paid $12,500 cash in advance for all five training courses on September 1, and WTI credited Unearned Revenue.

f. On October 15, WTI agreed to teach a four-month class (beginning immediately) for an executive with payment due at the end of the class. At December 31, $7,500 of the tuition revenue has been earned by WTI.

g. WTI's two employees are paid weekly. As of the end of the year, two days' salaries have accrued at the rate of $100 per day for each employee.

h. The balance in the Prepaid Rent account represents rent for December.

WELLS TECHNICAL INSTITUTE Unadjusted Trial Balance December 31		
	Debit	Credit
Cash	$ 34,000	
Accounts receivable	0	
Teaching supplies	8,000	
Prepaid insurance	12,000	
Prepaid rent	3,000	
Professional library	35,000	
Accumulated depreciation—Professional library		$ 10,000
Equipment	80,000	
Accumulated depreciation—Equipment		15,000
Accounts payable		26,000
Salaries payable		0
Unearned revenue		12,500
Common stock		10,000
Retained earnings		80,000
Dividends	50,000	
Tuition revenue		123,900
Training revenue		40,000
Depreciation expense—Professional library	0	
Depreciation expense—Equipment	0	
Salaries expense	50,000	
Insurance expense	0	
Rent expense	33,000	
Teaching supplies expense	0	
Advertising expense	6,000	
Utilities expense	6,400	
Totals	$317,400	$317,400

Required

Check (2e) Cr. Training Revenue, $5,000

(2f) Cr. Tuition Revenue, $7,500

(3) Adj. trial balance totals, $345,700

(4) Net income, $49,600

1. Prepare T-accounts (representing the ledger) with balances from the unadjusted trial balance.
2. Prepare the necessary adjusting journal entries for items *a* through *h* and post them to the T-accounts. Assume that adjusting entries are made only at year-end.
3. Update balances in the T-accounts for the adjusting entries and prepare an adjusted trial balance.

4. Prepare Wells Technical Institute's income statement and statement of retained earnings for the year and prepare its balance sheet as of December 31. The Retained Earnings account balance was $80,000 on December 31 of the *prior year.*

Problem 3-4A

Preparing financial statements from the adjusted trial balance

P5

The adjusted trial balance for Chiara Company as of December 31 follows.

	Debit	Credit
Cash	$ 30,000	
Accounts receivable	52,000	
Interest receivable	18,000	
Notes receivable (due in 90 days)	168,000	
Office supplies	16,000	
Automobiles	168,000	
Accumulated depreciation—Automobiles		$ 50,000
Equipment	138,000	
Accumulated depreciation—Equipment		18,000
Land	78,000	
Accounts payable		96,000
Interest payable		20,000
Salaries payable		19,000
Unearned revenue		30,000
Long-term notes payable		138,000
Common stock		20,000
Retained earnings		235,800

Required

Check Total assets, $600,000

Use the information in the adjusted trial balance to prepare (*a*) the income statement for the year ended December 31; (*b*) the statement of retained earnings for the year ended December 31 [*Note:* Retained Earnings at December 31 of the *prior year* was $235,800.]; and (*c*) the balance sheet as of December 31.

Problem 3-5A

Applying the accounting cycle

P1 P3 P4 P5 P6

On April 1, Jiro Nozomi created a new travel agency, Adventure Travel. The following transactions occurred during the company's first month.

Apr. 2 Nozomi invested $30,000 cash and computer equipment worth $20,000 in the company in exchange for its common stock.

3 The company rented furnished office space by paying $1,800 cash for the first month's (April) rent.

4 The company purchased $1,000 of office supplies for cash.

10 The company paid $2,400 cash for a 12-month insurance policy. Coverage begins on April 11.

14 The company paid $1,600 cash for two weeks' salaries earned by employees.

24 The company collected $8,000 cash for commissions revenue.

28 The company paid $1,600 cash for two weeks' salaries earned by employees.

29 The company paid $350 cash for minor repairs to computer equipment.

30 The company paid $750 cash for this month's telephone bill.

30 The company paid $1,500 cash in dividends.

The company's chart of accounts follows.

101	Cash	209	Salaries Payable	637	Insurance Expense
106	Accounts Receivable	301	J. Nozomi, Capital	640	Rent Expense
124	Office Supplies	302	J. Nozomi, Withdrawals	650	Office Supplies Expense
128	Prepaid Insurance	403	Commissions Revenue	684	Repairs Expense
167	Computer Equipment	612	Depreciation Expense—Computer Equip.	688	Telephone Expense
168	Accumulated Depreciation—Computer Equip.	622	Salaries Expense	901	Income Summary

Required

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1. Use the balance column format to set up each ledger account listed in its chart of accounts.

2. Prepare journal entries to record the transactions for April and post them to ledger accounts.
3. Prepare an unadjusted trial balance as of April 30.

Check (3) Unadj. trial balance totals, $58,000

(4*a*) Dr. Insurance Expense, $133

(5) Net income, $2,197; Total assets, $51,117

(7) P-C trial balance totals, $51,617

4. Use the following information to journalize and post adjusting entries for the month.
    a. Prepaid insurance of $133 expired this month.
    b. At the end of the month, $600 of office supplies are still available.
    c. This month's depreciation on computer equipment is $500.
    d. Employees earned $420 of unpaid and unrecorded salaries as of month-end.
    e. The company earned $1,750 of commissions revenue that is not yet recorded at month-end.
5. Prepare the adjusted trial balance as of April 30. Prepare the income statement and the statement of retained earnings for the month of April and the balance sheet at April 30.
6. Prepare journal entries to close the temporary accounts and post these entries to the ledger.
7. Prepare a post-closing trial balance.

Problem 3-6A

Determining balance sheet classifications

C2

Common categories of a classified balance sheet include Current Assets, Long-Term Investments, Plant Assets, Intangible Assets,

Current Liabilities, Long-Term Liabilities, and Equity. For each of the following items, identify the balance sheet category where the item typically would best appear. If an item does not appear on the balance sheet, indicate that instead.

1. Long-term investment in stock
2. Depreciation expense—Building
3. Prepaid rent (2 months of rent)
4. Interest receivable
5. Taxes payable (due in 5 weeks)
6. Automobiles
7. Notes payable (due in 3 years)
8. Accounts payable
9. Cash
10. Patents
11. Unearned services revenue
12. Trucks
13. Prepaid insurance (expires in 5 months)
14. Buildings
15. Store supplies
16. Office equipment
17. Land
18. Repairs expense
19. Office supplies
20. Wages payable

Problem 3-7A

Preparing financial statements and closing entries

C2 P5 P6

The adjusted trial balance for Tybalt Construction on December 31 of the current year follows. The Retained Earnings account balance was $111,400 on December 31 of the *prior year*.

No.	Account Title	Adjusted Trial Balance December 31 Debit	Credit
101	Cash	$ 5,000	
126	Supplies	31,100	
128	Prepaid insurance	7,000	
167	Equipment	40,000	
168	Accumulated depreciation—Equipment		$20,000
173	Building	150,000	
174	Accumulated depreciation—Building		50,000
183	Land	55,000	
201	Accounts payable		16,500
203	Interest payable		2,500
208	Rent payable		3,500
210	Wages payable		2,500
213	Property taxes payable		900
236	Unearned revenue		14,500
251	Long-term notes payable		60,000
307	Common stock		15,000
318	Retained earnings		111,400
319	Dividends	13,000	
403	Services revenue		97,000
406	Rent revenue		14,000
409	Interest revenue		4,100
606	Depreciation expense—Building	11,000	
612	Depreciation expense—Equipment	6,000	
623	Wages expense	52,900	
633	Interest expense	5,100	
637	Insurance expense	10,000	
640	Rent expense	13,400	
652	Supplies expense	7,400	
683	Property taxes expense	5,000	
	Totals	$411,900	$411,900

Required

1. Prepare the income statement and the statement of retained earnings for the current year ended December 31, and the classified balance sheet at December 31.
2. Prepare the necessary closing entries at December 31 of the current year.

Check (1) Total assets $218,100; Net income, $4,300

Problem 3-8A[B]

Preparing a work sheet, adjusting and closing entries, and financial statements

C2 P1 P2 P3 P4 P5 P6 P8

The following unadjusted trial balance is for Ace Construction Co. at its June 30 current fiscal year-end. The credit balance of the Retained Earnings account was $78,660 on June 30 of the *prior year*.

Unadjusted Trial Balance June 30			
No.	**Account Title**	**Debit**	**Credit**
101	Cash	$ 18,500	
126	Supplies	9,900	
128	Prepaid insurance	7,200	
167	Equipment	132,000	
168	Accumulated depreciation—Equipment		$ 26,250
201	Accounts payable		6,800
203	Interest payable		0
208	Rent payable		0
210	Wages payable		0
213	Property taxes payable		0
251	Long-term notes payable		25,000
307	Common stock		10,000
318	Retained earnings		78,660
319	Dividends	33,000	
403	Construction revenue		132,100
612	Depreciation expense—Equipment	0	
623	Wages expense	46,860	
633	Interest expense	2,750	
637	Insurance expense	0	
640	Rent expense	12,000	
652	Supplies expense	0	
683	Property taxes expense	7,800	
684	Repairs expense	2,910	
690	Utilities expense	5,890	
	Totals	$278,810	$278,810

Required

1. Prepare and complete a 10-column work sheet for the current fiscal year, starting with the unadjusted trial balance and including adjustments using the following additional information.
   a. Supplies available at the end of the current fiscal year total $3,300.

b. Cost of expired insurance for the current fiscal year is $3,800.

c. Annual depreciation on equipment is $8,400.

d. June utilities expense of $650 is not included in the unadjusted trial balance because the bill arrived after the trial balance was prepared. The $650 amount owed must be recorded.

e. Employees have earned $1,800 of accrued and unpaid wages at fiscal year-end.

f. Rent expense incurred and not yet paid or recorded at fiscal year-end is $500.

g. Additional property taxes of $1,000 have been assessed for this fiscal year but have not been paid or recorded at fiscal year-end.

h. $250 accrued interest for June has not yet been paid or recorded.

2. Using information from the completed 10-column work sheet in part 1, journalize the adjusting entries and the closing entries.

3. Prepare the income statement and the statement of retained earnings for the year ended June 30 and the classified balance sheet at June 30.

Check (3) Net income, $30,890; Total assets, $122,550; Current liabilities, $11,000

Problem 3-9A

Preparing financial statements and closing entries

C2 P5 P6

The adjusted trial balance of Karise Repairs on December 31 follows.

No.	Account Title	Adjusted Trial Balance December 31 Debit	Credit
101	Cash	$ 14,000	
124	Office supplies	1,300	
128	Prepaid insurance	2,050	
167	Equipment	50,000	
168	Accumulated depreciation—Equipment		$ 5,000
201	Accounts payable		14,000
210	Wages payable		600
307	Common stock		10,000
318	Retained earnings		23,000
319	Dividends	16,000	
403	Services revenue		90,950
612	Depreciation expense—Equipment	5,000	
623	Wages expense	37,500	
637	Insurance expense	800	
640	Rent expense	10,600	
650	Office supplies expense	3,600	
690	Utilities expense	2,700	
	Totals	$143,550	$143,550

Required

1. Prepare an income statement and a statement of retained earnings for the year, and a classified balance sheet at December 31. *Note:* The Retained Earnings account balance was $23,000 on December 31 of the *prior year*.
2. Prepare the December 31 closing entries.

Check (1) Ending capital balance, $47,750; Net income, $30,750

Problem 3-10A[A]

Recording prepaid expenses and unearned revenues

P7

Gomez Co. had the following transactions in the last two months of its year ended December 31. Entries can draw from the following partial chart of accounts: Cash; Prepaid Insurance; Prepaid Advertising;

Prepaid Consulting; Unearned Revenue; Services Revenue; Insurance Expense; Advertising Expense; and Consulting Expense.

Nov. 1 Paid $1,800 cash for future advertising.

1 Paid $2,460 cash for 12 months of insurance through October 31 of the next year.

30 Received $3,600 cash for future services to be provided to a customer.

Dec. 1 Paid $3,000 cash for consulting to be received over the next three months.

15 Received $7,950 cash for future services to be provided to a customer.

31 Of the advertising paid for on November 1, $1,200 worth is not yet used.

31 Two months of the insurance paid for on November 1 has expired. No adjustment was made in November to Prepaid Insurance.

31 Services worth $1,500 are not yet provided to the customer who paid on November 30.

31 One-third of the consulting paid for on December 1 has been received.

31 The company has performed $3,300 of services that the customer paid for on December 15.

Required

1. Prepare entries for these transactions under the method that initially records prepaid expenses as assets and records unearned revenues as liabilities. Also prepare adjusting entries at the end of the year.

2. Prepare entries for these transactions under the method that initially records prepaid expenses as expenses and records unearned revenues as revenues. Also prepare adjusting entries at the end of the year.

Problem 3-11A[C]

Preparing reversing entries

P1 P2 P3 P4 P9

The following six-column table for Hawkeye Ranges includes the unadjusted trial balance as of December 31.

	Unadjusted Trial Balance		Adjustments		Adjusted Trial Balance	
Account Title	**Dr.**	**Cr.**	**Dr.**	**Cr.**	**Dr.**	**Cr.**
Cash	$ 14,000					
Accounts receivable	0					
Supplies	6,500					
Equipment	135,000					
Accumulated depreciation—Equipment		$ 30,000				
Interest payable		0				
Salaries payable		0				
Unearned revenue		15,000				
Notes payable		75,000				
Common stock		20,000				
Retained earnings		30,250				
Dividends	21,125					
Services revenue		42,000				
Depreciation expense—Equipment	0					
Salaries expense	30,000					
Interest expense	5,625					
Supplies expense	0					
Totals	$212,250	$212,250				

Required

1. Complete the six-column table by entering adjustments that reflect the following information.
   - **a.** As of December 31, employees had earned $1,200 of unpaid and unrecorded salaries. The next payday is January 4, at which time $1,500 of salaries will be paid.
   - **b.** Cost of supplies still available at December 31 total $3,000.
   - **c.** An interest payment is made every three months. The amount of unrecorded accrued interest at December 31 is $1,875. The next interest payment, at an amount of $2,250, is due on January 15.
   - **d.** Analysis of Unearned Revenue shows $5,800 remaining unearned at December 31.

e. Revenue of $9,300 is accrued for services provided. Payment will be collected on January 31.

f. Depreciation expense is $15,000.

2. Prepare journal entries for adjustments entered in the six-column table for part 1.

3. Prepare journal entries to reverse the effects of the adjusting entries that involve accruals.

4. Prepare journal entries to record cash payments and cash collections described in part 1 for January.

Check (1) Adjusted trial balance totals, $239,625

PROBLEM SET B

Problem 3-1B

Identifying adjusting entries with explanations

P1 P2 P3 P4

For journal entries *1* through *12,* indicate the explanation that most closely describes it. You can use explanations more than once.

A. To record payment of a prepaid expense.

B. To record this period's use of a prepaid expense.

C. To record this period's depreciation expense.

D. To record receipt of unearned revenue.

E. To record this period's earning of prior unearned revenue.

F. To record an accrued expense.

G. To record payment of an accrued expense.

H. To record an accrued revenue.

I. To record receipt of accrued revenue.

1.	Interest Receivable	3,500	
	Interest Revenue		3,500
2.	Salaries Payable	9,000	
	Cash		9,000
3.	Depreciation Expense	8,000	
	Accumulated Depreciation		8,000
4.	Cash	9,000	
	Unearned Revenue		9,000
5.	Insurance Expense	4,000	
	Prepaid Insurance		4,000
6.	Interest Expense	5,000	
	Interest Payable		5,000

7.	Cash	1,500	
	Accounts Receivable (from services)		1,500
8.	Salaries Expense	7,000	
	Salaries Payable		7,000
9.	Cash	1,000	
	Interest Receivable		1,000
10.	Prepaid Rent	3,000	
	Cash		3,000
11.	Rent Expense	7,500	
	Prepaid Rent		7,500
12.	Unearned Revenue	6,000	
	Services Revenue		6,000

Problem 3-2B

Preparing adjusting and subsequent journal entries

P1 P2 P3 P4

Natsu Company's annual accounting period ends on October 31. The following information concerns the adjusting entries that need to be recorded as of that date. Entries can draw from the following partial chart of accounts: Cash; Accounts Receivable; Office Supplies; Prepaid Insurance; Building; Accumulated Depreciation—Building; Salaries Payable; Unearned Revenue; Rent Revenue; Salaries Expense; Office Supplies Expense; Insurance Expense; and Depreciation Expense—Building.

a. The Office Supplies account started the fiscal year with a $600 balance. During the fiscal year, the company purchased supplies for $4,570, which was added to the Office Supplies account. The supplies available at October 31 totaled $800.

b. The Prepaid Insurance account had a $12,000 debit balance at October 31 before adjusting for the costs of any expired coverage for the fiscal year. An analysis of prepaid insurance shows that $7,270 of unexpired insurance coverage remains at October 31.

c. The company has four employees, who earn a total of $1,000 for each workday. They are paid each Monday for their work in the five-day workweek ending on the previous Friday. Assume that October 31 is a Monday, and all four employees worked the first

day of that week. They will be paid salaries for five full days on Monday, November 7 of the next fiscal year.

d. The company purchased a building at the beginning of this fiscal year that cost $175,000 and is expected to have a $40,000 salvage value at the end of its predicted 25-year life. Annual depreciation is $5,400.

e. Because the company does not occupy the entire building it owns, it rented space to a tenant at $1,000 per month, starting on September 1. The rent was paid on time on September 1, and the amount received was credited to the Rent Revenue account. However, the October rent has not been paid. The company has worked out an agreement with the tenant, who has promised to pay both October and November rent in full on November 30.

f. On September 1, the company rented space to another tenant for $725 per month. The tenant paid five months' rent in advance on that date. The payment was recorded with a credit to Unearned-Revenue.

Check (1*b*) Dr. Insurance Expense, $4,730

(1*d*) Dr. Depreciation Expense, $5,400

Required

1. Use the information to prepare adjusting entries as of October 31.

2. Prepare journal entries to record the first subsequent cash transaction in November for parts *c* and *e*.

Problem 3-3B

Preparing adjusting entries, adjusted trial balance, and financial statements

P1 P2 P3 P4 P5

Following is the unadjusted trial balance for Alonzo Institute as of December 31. The Institute provides one-on-one training to individuals who pay tuition directly to the business and offers extension training to

groups in off-site locations. Shown after the trial balance are items *a* through *h* that require adjusting entries as of December 31.

ALONZO INSTITUTE Unadjusted Trial Balance December 31		
	Debit	Credit
Cash	$ 60,000	
Accounts receivable	0	
Teaching supplies	70,000	
Prepaid insurance	19,000	
Prepaid rent	3,800	
Professional library	12,000	
Accumulated depreciation—Professional library		$ 2,500
Equipment	40,000	
Accumulated depreciation—Equipment		20,000
Accounts payable		11,200
Salaries payable		0
Unearned revenue		28,600
Common stock		11,000
Retained earnings		60,500
Dividends	20,000	
Tuition revenue		129,200
Training revenue		68,000
Depreciation expense—Professional library	0	
Depreciation expense—Equipment	0	
Salaries expense	44,200	
Insurance expense	0	
Rent expense	29,600	
Teaching supplies expense	0	
Advertising expense	19,000	
Utilities expense	13,400	
Totals	$331,000	$331,000

Additional Information

a. An analysis of the Institute's insurance policies shows that $9,500 of coverage has expired.

b. An inventory count shows that teaching supplies costing $20,000 are available at year-end.

c. Annual depreciation on the equipment is $5,000.

d. Annual depreciation on the professional library is $2,400.

e. On November 1, the Institute agreed to do a special two-month training course (starting immediately) for a client. The contract calls for a $14,300 monthly fee, and the client paid the two months' training fees in advance. When the cash was received, the Unearned Revenue account was credited.

f. On October 15, the Institute agreed to teach a four-month class (beginning immediately) to an executive with payment due at the end of the class. At December 31, $5,750 of the tuition revenue has been earned by the Institute.

g. The Institute's only employee is paid weekly. As of the end of the year, three days' salaries have accrued at the rate of $150 per day.

h. The balance in the Prepaid Rent account represents rent for December.

Check (2*e*) Cr. Training Revenue, $28,600

(2*f*) Cr. Tuition Revenue, $5,750

(3) Adj. trial balance totals, $344,600

(4) Net income, $54,200

Required

1. Prepare T-accounts (representing the ledger) with balances from the unadjusted trial balance.

2. Prepare the necessary adjusting journal entries for items *a* through *h* and post them to the T-accounts. Assume that adjusting entries are made only at year-end.

3. Update balances in the T-accounts for the adjusting entries and prepare an adjusted trial balance.

4. Prepare the company's income statement and statement of retained earnings for the year, and prepare its balance sheet as of December 31. The Retained Earnings account balance was $60,500 on December 31 of the *prior year*.

Problem 3-4B

Preparing financial statements from adjusted trial balance

P5

The adjusted trial balance for Speedy Courier as of December 31 follows.

	Debit	Credit
Cash	$ 58,000	
Accounts receivable	120,000	
Interest receivable	7,000	
Notes receivable (due in 90 days)	210,000	
Office supplies	22,000	
Trucks	134,000	
Accumulated depreciation—Trucks		$ 58,000
Equipment	270,000	
Accumulated depreciation—Equipment		200,000
Land	100,000	
Accounts payable		134,000
Interest payable		20,000
Salaries payable		28,000
Unearned revenue		120,000
Long-term notes payable		200,000
Common stock		15,000
Retained earnings		110,000
Dividends	50,000	
Services revenue		611,800
Interest revenue		34,000
Depreciation expense—Trucks	29,000	
Depreciation expense—Equipment	48,000	
Salaries expense	74,000	
Wages expense	300,000	
Interest expense	15,000	
Office supplies expense	31,000	
Advertising expense	27,200	
Repairs expense—Trucks	35,600	
Totals	$1,530,800	$1,530,800

Check Total assets, $663,000

Required

Use the information in the adjusted trial balance to prepare (*a*) the income statement for the year ended December 31; (*b*) the statement of retained earnings for the year ended December 31 [*Note:* Retained Earnings at Dec. 31 of the *prior year* was $110,000.]; and (*c*) the balance sheet as of December 31.

Problem 3-5B

Applying the accounting cycle

P1 P3 P4 P5 P6

On July 1, Lula Plume created a new self-storage business, Safe Storage Co. The following transactions occurred during the company's first month.

July 2 Plume invested $30,000 cash and buildings worth $150,000 in the company in exchange for its common stock.

3 The company rented equipment by paying $2,000 cash for the first month's (July) rent.

5 The company purchased $2,400 of office supplies for cash.

10. The company paid $7,200 cash for a 12-month insurance policy. Coverage begins on July 11.

14. The company paid an employee $1,000 cash for two weeks' salary earned.

24. The company collected $9,800 cash for storage revenue from customers.

28. The company paid $1,000 cash for two weeks' salary earned by an employee.

29. The company paid $950 cash for minor repairs to buildings.

30. The company paid $400 cash for this month's telephone bill.

31 The company paid $2,000 cash in dividends.

The company's chart of accounts follows:

101	Cash	209	Salaries Payable	637	Insurance Expense
106	Accounts Receivable	301	L. Plume, Capital	640	Rent Expense
124	Office Supplies	302	L. Plume, Withdrawals	650	Office Supplies Expense
128	Prepaid Insurance	403	Storage Revenue	684	Repairs Expense
173	Buildings	606	Depreciation Expense—Buildings	688	Telephone Expense
174	Accumulated Depreciation—Buildings	622	Salaries Expense	901	Income Summary

Required

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1. Use the balance column format to set up each ledger account listed in its chart of accounts.
2. Prepare journal entries to record the transactions for July and post them to ledger accounts.
3. Prepare an unadjusted trial balance as of July 31.
4. Use the following information to journalize and post adjusting entries for the month.

Check (3) Unadj. trial balance totals, $189,800

a. Prepaid insurance of $400 expired this month.

b. At the end of the month, $1,525 of office supplies are still available.

(4*a*) Dr. Insurance Expense, $400

(5) Net income, $2,725; Total assets, $180,825

(7) P-C trial balance totals, $182,325

c. This month's depreciation on buildings is $1,500.

d. An employee earned $100 of unpaid and unrecorded salary as of month-end.

e. The company earned $1,150 of storage revenue that is not yet recorded at month-end.

5. Prepare the adjusted trial balance as of July 31. Prepare the income statement and the statement of retained earnings for the month of July and the balance sheet at July 31.

6. Prepare journal entries to close the temporary accounts and post these entries to the ledger.

7. Prepare a post-closing trial balance.

Problem 3-6B

Determining balance sheet classifications

C2

Common categories of a classified balance sheet include Current Assets, Long-Term Investments, Plant Assets, Intangible Assets, Current Liabilities, Long-Term Liabilities, and Equity. For each of the following items, identify the balance sheet category where the item typically would best appear. If an item does not appear on the balance sheet, indicate that instead.

1. Commissions revenue

2. Interest receivable

3. Long-term investment in stock
4. Prepaid insurance (4 months of rent)
5. Machinery
6. Notes payable (due in 15 years)
7. Copyrights
8. Rent payable
9. Trucks
10. Office equipment
11. Rent receivable
12. Salaries payable
13. Income taxes payable (due in 11 weeks)
14. Patents
15. Office supplies
16. Interest payable
17. Rent revenue
18. Notes receivable (due in 10 years)
19. Land
20. Depreciation expense—Trucks

Problem 3-7B

Preparing financial statements and closing entries

C2 P5 P6

The adjusted trial balance for Tybalt Construction on December 31 of the current year follows. The Retained Earnings account balance was $111,400 on December 31 of the *prior year*.

No.	Account Title	Adjusted Trial Balance December 31 Debit	Credit
101	Cash	$ 7,400	
126	Supplies	15,800	
128	Prepaid insurance	1,000	
167	Equipment	24,000	
168	Accumulated depreciation—Equipment		$ 4,000
173	Building	100,000	
174	Accumulated depreciation—Building		10,000
183	Land	30,500	
201	Accounts payable		3,500
203	Interest payable		1,750
208	Rent payable		400
210	Wages payable		1,280
213	Property taxes payable		3,330
236	Unearned revenue		9,150
251	Long-term notes payable		31,600
307	Common stock		15,000
318	Retained earnings		77,800
319	Dividends	8,000	
403	Services revenue		59,600
406	Rent revenue		4,500
409	Interest revenue		2,320
606	Depreciation expense—Building	2,000	
612	Depreciation expense—Equipment	1,000	
623	Wages expense	22,030	
633	Interest expense	1,550	
637	Insurance expense	1,525	
640	Rent expense	3,600	
652	Supplies expense	1,000	
683	Property taxes expense	4,825	
	Totals	$224,230	$224,230

Required

1. Prepare the income statement and the statement of retained earnings for the current year ended December 31, and the classified balance sheet at December 31.

Check (1) Total assets, $164,700; Net income, $28,890

2. Prepare the necessary closing entries at December 31 of the current year.

Problem 3-8B [B]

Preparing a work sheet, adjusting and closing entries, and financial statements

C2 P1 P2 P3 P4 P5 P6 P8

The following unadjusted trial balance is for Power Demolition Company at its April 30 current fiscal year-end. The credit balance of the Retained Earnings account was $76,900 on April 30 of the *prior year*.

Unadjusted Trial Balance April 30			
No.	**Account Title**	**Debit**	**Credit**
101	Cash	$ 7,000	
126	Supplies	16,000	
128	Prepaid Insurance	12,600	
167	Equipment	200,000	
168	Accumulated depreciation—Equipment		$ 14,000
201	Accounts payable		6,800
203	Interest payable		0
208	Rent payable		0
210	Wages payable		0
213	Property taxes payable		0
251	Long-term notes payable		30,000
307	Common stock		10,000
318	Retained earnings		76,900
319	Dividends	12,000	
403	Demolition revenue		187,000
612	Depreciation expense—Equipment	0	
623	Wages expense	41,400	
633	Interest expense	3,300	
637	Insurance expense	0	
640	Rent expense	13,200	
652	Supplies expense	0	
683	Property taxes expense	9,700	
684	Repairs expense	4,700	
690	Utilities expense	4,800	
	Totals	$ 324,700	$324,700

Required

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1. Prepare and complete a 10-column work sheet for the current fiscal year, starting with the unadjusted trial balance and including adjustments using the following additional information.
   - **a.** Supplies available at the end of the current fiscal year total $7,900.
   - **b.** Cost of expired insurance for the current fiscal year is $10,600.
   - **c.** Annual depreciation on equipment is $7,000.
   - **d.** April utilities expense of $800 is not included in the unadjusted trial balance because the bill arrived after the trial balance was prepared. The $800 amount owed must be recorded.

e. Employees have earned $2,000 of accrued and unpaid wages at fiscal year-end.

f. Rent expense incurred and not yet paid or recorded at fiscal year-end is $3,000.

g. Additional property taxes of $550 have been assessed for this fiscal year but have not been paid or recorded at fiscal year-end.

h. $300 accrued interest for April has not yet been paid or recorded.

2. Using information from the completed 10-column work sheet in part 1, journalize the adjusting entries and the closing entries.

3. Prepare the income statement and the statement of retained earnings for the year ended April 30 and the classified balance sheet at April 30.

Check (3) Net income, $77,550; Total assets, $195,900; Current liabilities, $13,450

Problem 3-9B

Preparing financial statements and closing entries

C2 P5 P6

Santo Company's adjusted trial balance on December 31 follows.

No.	Account Title	Adjusted Trial Balance December 31 Debit	Credit
101	Cash	$ 14,450	
125	Store supplies	5,140	
128	Prepaid insurance	1,200	
167	Equipment	31,000	
168	Accumulated depreciation—Equipment		$ 8,000
201	Accounts payable		1,500
210	Wages payable		2,700
307	Common stock		10,000
318	Retained earnings		25,650
319	Dividends	15,000	
403	Services revenue		54,700
612	Depreciation expense—Equipment	2,000	
623	Wages expense	26,400	
637	Insurance expense	600	
640	Rent expense	3,600	
651	Store supplies expense	1,200	
690	Utilities expense	1,960	
	Totals	$102,550	$102,550

Required

1. Prepare an income statement and a statement of retained earnings for the year, and a classified balance sheet at December 31. *Note:* The Retained Earnings account balance was $25,650 on December 31 of the *prior year*.
2. Prepare the December 31 closing entries.

Problem 3-10B[A]

Recording prepaid expenses and unearned revenues

P7

Tremor Co. had the following transactions in the last two months of its fiscal year ended May 31. Entries can draw from the following partial chart of accounts: Cash; Prepaid Insurance; Prepaid Advertising; Prepaid Consulting; Unearned Revenue; Services Revenue; Insurance Expense; Advertising Expense; and Consulting Expense.

Apr. 1 Paid $2,450 cash to an accounting firm for future consulting services.

1	Paid $3,600 cash for 12 months of insurance through March 31 of the next year.
30	Received $8,500 cash for future services to be provided to a customer.
May 1	Paid $4,450 cash for future advertising.
23	Received $10,450 cash for future services to be provided to a customer.
31	Of the consulting paid for on April 1, $2,000 worth has been performed.
31	Two months of the insurance paid for on April 1 has expired. No adjustment was made in April to Prepaid Insurance.
31	Services worth $4,600 are not yet provided to the customer who paid on April 30.
31	Of the advertising paid for on May 1, $2,050 worth is not yet used.
31	The company has performed $5,500 of services that the customer paid for on May 23.

Required

1. Prepare entries for these transactions under the method that initially records prepaid expenses and unearned revenues in balance sheet accounts. Also prepare adjusting entries at its May 31 fiscal year-end.
2. Prepare entries for these transactions under the method that initially records prepaid expenses and unearned revenues in income statement accounts. Also prepare adjusting entries at its May 31 fiscal year-end.

Analysis Component

3. Explain why the alternative sets of entries in parts 1 and 2 result in identical financial statement amounts.

Problem 3-11B[C]

Preparing reversing entries

P1 P2 P3 P4 P9

The following six-column table for Solutions Co. includes the unadjusted trial balance as of December 31.

	Unadjusted Trial Balance		Adjustments		Adjusted Trial Balance	
Account Title	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.
Cash	$ 10,000					
Accounts receivable	0					
Supplies	7,600					
Machinery	50,000					
Accumulated depreciation—Machinery		$ 20,000				
Interest payable		0				
Salaries payable		0				
Unearned revenue		7,200				
Notes payable		30,000				
Common stock		5,000				
Retained earnings		9,200				
Dividends	9,500					
Services revenue		32,450				
Depreciation expense—Machinery	0					
Salaries expense	24,500					
Interest expense	2,250					
Supplies expense	0					
Totals	$103,850	$103,850				

Required

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1. Complete the six-column table by entering adjustments that reflect the following information.

   a. As of December 31, employees had earned $400 of unpaid and unrecorded wages. The next payday is January 4, at which time $1,200 in wages will be paid.

   b. Cost of supplies still available at December 31 is $3,450.

   c. An interest payment is made every three months. The amount of unrecorded accrued interest at December 31 is $800. The next interest payment, at an amount of $900, is due on January 15.

   d. Analysis of Unearned Revenue shows that $3,200 remains unearned at December 31.

   e. Revenue of $2,450 is accrued for services provided. Payment will be collected on January 31.

f. Depreciation expense is $3,800.

2. Prepare journal entries for adjustments entered in the six-column table for part 1.
3. Prepare journal entries to reverse the effects of the adjusting entries that involve accruals.
4. Prepare journal entries to record cash payments and cash collections described in part 1 for January.

connect

SERIAL PROBLEM

Business Solutions

P1 P2 P3 P4 P5

Serial problem began in Chapter 1. If previous chapter segments were not completed, the serial problem can begin at this point. It is available in Connect with an algorithmic option.

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SP 3 After the success of the company's first two months, Santana Rey continues to operate **Business Solutions**. (Transactions for the first two months are described in the Chapter 2 serial problem.) The November 30, 2021, unadjusted trial balance of Business Solutions (reflecting its transactions for October and November of 2021) follows.

Alexander Image/Shutterstock

No.	Account Title	Debit	Credit
101	Cash	$38,264	
106	Accounts receivable	12,618	
126	Computer supplies	2,545	
128	Prepaid insurance	2,220	
131	Prepaid rent	3,300	
163	Office equipment	8,000	
164	Accumulated depreciation—Office equipment		$ 0
167	Computer equipment	20,000	
168	Accumulated depreciation—Computer equipment		0
201	Accounts payable		0
210	Wages payable		0
236	Unearned computer services revenue		0
307	Common stock		73,000
318	Retained earnings		0
319	Dividends	5,600	
403	Computer services revenue		25,659
612	Depreciation expense—Office equipment	0	
613	Depreciation expense—Computer equipment	0	
623	Wages expense	2,625	
637	Insurance expense	0	
640	Rent expense	0	
652	Computer supplies expense	0	
655	Advertising expense	1,728	
676	Mileage expense	704	
677	Miscellaneous expenses	250	
684	Repairs expense—Computer	805	
901	Income summary		0
	Totals	$98,659	$98,659

Business Solutions had the following transactions and events in December 2021.

Dec. 2 Paid $1,025 cash to Hillside Mall for Business Solutions's share of mall advertising costs.

3 Paid $500 cash for minor repairs to the company's computer.

4 Received $3,950 cash from Alex's Engineering Co. for the receivable from November.

10 Paid cash to Lyn Addie for six days of work at the rate of $125 per day.

14 Notified by Alex's Engineering Co. that Business Solutions's bid of $7,000 on a proposed project has been accepted. Alex's paid a $1,500 cash advance to Business Solutions.

15 Purchased $1,100 of computer supplies on credit from Harris Office Products.

16 Sent a reminder to Gomez Co. to pay the fee for services recorded on November 8.

20 Completed a project for Liu Corporation and received $5,625 cash.

22–26 Took the week off for the holidays.

28 Received $3,000 cash from Gomez Co. on its receivable.

29 Reimbursed S. Rey for business automobile mileage (600 miles at $0.32 per mile).

31 Paid $1,500 cash for dividends.

The following additional facts are collected for use in making adjusting entries prior to preparing financial statements for the company's first three months.

a. The December 31 inventory count of computer supplies shows $580 still available.

b. Three months have expired since the 12-month insurance premium was paid in advance.

c. As of December 31, Lyn Addie has not been paid for four days of work at $125 per day.

d. The computer system, acquired on October 1, is expected to have a four-year life with no salvage value.

e. The office equipment, acquired on October 1, is expected to have a five-year life with no salvage value.

f. Three of the four months' prepaid rent have expired.

Required

1. Prepare journal entries to record each of the December transactions. Post those entries to the accounts in the ledger.

2. Prepare adjusting entries to reflect *a* through *f*. Post those entries to the accounts in the ledger.

3. Prepare an adjusted trial balance as of December 31, 2021.

Check (3) Adjusted trial balance totals, $109,034

4. Prepare an income statement for the three months ended December 31, 2021.
5. Prepare a statement of retained earnings for the three months ended December 31, 2021.
6. Prepare a classified balance sheet as of December 31, 2021.
7. Record and post the necessary closing entries as of December 31, 2021.
8. Prepare a post-closing trial balance as of December 31, 2021.

Check (8) Post-closing trial balance totals, $85,110

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connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA 3-1 Quick Study, Preparing adjusting entries, **P1**, **P2**—similar to QS 3-5 & 3-10

Tableau DA 3-2 Exercise, Preparing adjusting entries, **P1**, **P2**, **P3**, **P4**—similar to Exercises 3-9 & 3-11

Tableau DA 3-3 Mini-Case, Analyzing adjusting entries and preparing an adjusted trial balance, **P5**—similar to Exercises 3-10 & 3-12, QS 3-18

Tableau DA 3-4 Quick Study, Classifying balance sheet items, **C2**—similar to QS 3-26

Tableau DA 3-5 Exercise, Preparing a post-closing trial balance and current assets section of a balance sheet, **P6**, **C2**—similar to Exercise 3-20 and QS 3-29

Tableau DA 3-6 Mini-Case, Preparing a classified balance sheet, C2—similar to QS 3-31 and Exercise 3-24

GENERAL LEDGER

connect

General Ledger (GL) Assignments expose students to general ledger software similar to that in practice. **GL** is part of **Connect**, and **GL** assignments are auto-gradable and have algorithmic options. For the following **GL** assignments, prepare adjusting entries and determine their impact on net income. Financial statements are automatically generated based on entries recorded—this feature can be turned off.

GL 3-1 Based on the FastForward illustration in this chapter

For the following GL assignments, prepare the necessary adjustments, create the financial statements, and determine the impact each adjustment has on net income.

GL 3-2 Based on Problem 3-3A

GL 3-3 Extension of Problem 2-1A

GL 3-4 Extension of Problem 2-2A

GL 3-5 Based on Problem 3-5A

GL 3-6 Based on Problem 3-8A

GL 3-7 Based on Problem 3-11A

GL 3-8 Based on Serial Problem SP 3

Accounting Analysis

connect

COMPANY ANALYSIS

A1 P6

AA 3-1 Use **Apple**'s financial statements in Appendix A to answer the following.

1. Compute Apple's profit margin for fiscal years ended (*a*) September 28, 2019, and (*b*) September 29, 2018.
2. Is the change in Apple's profit margin favorable or unfavorable?
3. For the fiscal year ended September 28, 2019, what amount is credited to Income Summary to summarize its revenues earned? *Hint:* Make sure to consider any "Other income" reported on Apple's income statement.
4. For the fiscal year ended September 28, 2019, what amount is debited to Income Summary to summarize its expenses incurred?

COMPARATIVE ANALYSIS

A1

AA 3-2 Key figures for the recent two years of both **Apple** and **Google** follow.

	Apple		Google	
$ millions	Current Year	Prior Year	Current Year	Prior Year
Net income	$ 55,256	$ 59,531	$ 34,343	$ 30,736
Net sales	260,174	265,595	161,857	136,819
Current assets	162,819	131,339	152,578	135,676
Current liabilities	105,718	115,929	45,221	34,620

Required

1. Compute profit margins for (*a*) Apple and (*b*) Google for the two years of data reported above.
2. In the *prior* year, which company is more successful on the basis of profit margin?
3. Compute current ratios for (*a*) Apple and (*b*) Google for the two years reported above.
4. In the current year, which company has the better ability to pay short-term obligations according to the current ratio?

EXTENDED ANALYSIS

A1

AA 3-3 Key comparative figures for **Samsung**, **Apple**, and **Google** follow.

$ millions	Samsung	Apple	Google
Net income	$ 18,653	$ 55,256	$ 34,343
Net sales	197,691	260,174	161,857

Required

1. Compute profit margin for Samsung, Apple, and Google.
2. Which company is *least successful* on the basis of profit margin?

Discussion Questions

1. What is the difference between the cash basis and the accrual basis of accounting?
2. Why is the accrual basis of accounting generally preferred over the cash basis?
3. What type of business is most likely to select a fiscal year that corresponds to its natural business year instead of the calendar year?
4. What is a prepaid expense, and where is it reported in the financial statements?
5. What contra account is used when recording and reporting the effects of depreciation? Why is it used?
6. What is an accrued revenue? Give an example.
7. How is unearned revenue classified on the balance sheet?
8. What are the steps in recording closing entries?
9. What accounts are affected by closing entries? What accounts are not affected?
10. What two purposes are accomplished by recording closing entries?

11. What is the purpose of the Income Summary account?

12. Explain whether an error has occurred if a post-closing trial balance includes a Depreciation Expense account.

13. What is a company's operating cycle?

14. What classes of assets and liabilities are shown on a typical classified balance sheet?

15. What are the characteristics of plant assets?

16. [A] If a company initially records prepaid expenses with debits to expense accounts, what type of account is debited in the adjusting entries for those prepaid expenses?

17. [B] How do reversing entries simplify recordkeeping?

18. [B] If a company recorded accrued salaries expense of $500 at the end of its fiscal year, what reversing entry could be made? When would it be made?

Beyond the Numbers

ETHICS CHALLENGE

C1 P1

BTN 3-1 Jessica Boland works for Sea Biscuit Co. She and Farah Smith, her manager, are preparing adjusting entries for annual financial statements. Boland computes depreciation and records it as

Depreciation Expense—Equipment	123,000	
Accumulated Depreciation—Equipment		123,000

Smith agrees with her computation but says the credit entry should be directly to the Equipment account. Smith argues that while accumulated depreciation is technically correct, "it is less hassle not to use a contra account and just credit the Equipment account directly. And besides, the balance sheet shows the same amount for total assets under either method."

Required

1. How should depreciation be recorded? Do you support Boland or Smith?
2. Evaluate the strengths and weaknesses of Smith's reasons for preferring her method.
3. Indicate whether the situation Boland faces is an ethical problem. Explain.

COMMUNICATING IN PRACTICE

A1

BTN 3-2 The class should be divided into teams. Teams are to select an industry (such as automobile manufacturing, airlines, defense contractors), and each team member is to select a different company in that industry. Each team member is to acquire the annual report of the company selected. Annual reports can be downloaded from company websites or from the SEC's EDGAR database (**SEC.gov**).

Required

1. Use the annual report to compute the return on assets, debt ratio, and profit margin.
2. Communicate with team members via a meeting, e-mail, or telephone to discuss the meaning of the ratios, how different companies compare to each other, and the industry norm. The team must prepare a single memo reporting the ratios for each company and identifying the conclusions or consensus reached during the team's discussion. The memo is to be copied and distributed to the instructor and all classmates.

TEAMWORK IN ACTION

P1 P2 P3 P4

BTN 3-3 Four types of adjustments are described in the chapter: (1) prepaid expenses, (2) unearned revenues, (3) accrued expenses,

and (4) accrued revenues.

Required

1. Form *learning teams* of four (or more) members. Each team member must select one of the four adjustments as an area of expertise (each team must have at least one expert in each area).
2. Form *expert teams* from the individuals who have selected the same area of expertise. Expert teams are to discuss and write a report that each expert will present to his or her learning team addressing the following:
   - **a.** Description of the adjustment and why it's necessary.
   - **b.** Example of a transaction or event, with dates and amounts, that requires adjustment.
   - **c.** Adjusting entry(ies) for the example in requirement *b*.
   - **d.** Status of the affected account(s) before and after the adjustment in requirement *c*.
   - **e.** Effects on financial statements of not making the adjustment.
3. Each expert should return to his or her learning team. In rotation, each member should present his or her expert team's report to the learning team. Team discussion is encouraged.

ENTREPRENEURIAL DECISION

P2

BTN 3-4 Review this chapter's opening feature involving Emily and Betsy and **Sword & Plough**.

Required

1. Assume that Sword & Plough sells a $300 gift certificate to a customer, collecting the $300 cash in advance. Prepare the journal entry for (*a*) collection of the cash for delivery of the gift certificate to the customer and (*b*) revenue from the subsequent delivery of merchandise when the gift certificate is used.

2. How can keeping less inventory help to improve Sword & Plough's profit margin?

3. Emily and Betsy understand that many companies carry considerable inventory, and they are thinking of carrying additional inventory of merchandise for sale. Provide at least one reason for, and one reason against, carrying additional inventory.

4 Accounting for Merchandising Operations

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Chapter Preview

MERCHANDISING ACTIVITIES

C1 Income and inventory for merchandisers

- Operating cycle
- Inventory cost flows

NTK 4-1

MERCHANDISING PURCHASES

P2 Accounting for:

- Purchases discounts
- Purchases returns and allowances
- Transportation costs

NTK 4-2

MERCHANDISING SALES

P2 Accounting for:

Sales of merchandise

Sales discounts

Sales returns and allowances

NTK 4-3

MERCHANDISER REPORTING

P3 Adjusting and closing

P4 Multiple-step and single-step income statements

A1 Acid-test analysis

Gross margin analysis

NTK 4-4, 4-5

All content is consistent with new revenue recognition rules. Details of new adjusting entries are in Appendix 4B.

Learning Objectives

CONCEPTUAL

C1 Describe merchandising activities and cost flows.

ANALYTICAL

A1 Compute and analyze the acid-test ratio and gross margin ratio.

PROCEDURAL

P1 Analyze and record transactions for merchandise purchases using a perpetual system.

P2 Analyze and record transactions for merchandise sales using a perpetual system.

P3 Prepare adjustments and close accounts for a merchandising company.

P4 Define and prepare multiple-step and single-step income statements.

P5 Appendix 4A—Record and compare merchandising transactions using both periodic and perpetual inventory systems.

P6 Appendix 4B—Prepare adjustments for discounts, returns, and allowances per revenue recognition rules.

P7 Appendix 4C—Record and compare merchandising transactions using the gross method and net method.

State of the Art

"Go big or go home"——**—KENDRA SCOTT**

AUSTIN, TX—Kendra Scott took $500 from savings and designed her first jewelry collection from her bedroom. "My mom's family was farmers and coal miners," says Kendra. "They were very hardworking folks." She applied that same work ethic to her passion for design and business. Today, **Kendra Scott** (**KendraScott.com**) jewelry and accessories are available from over 600 stores. Kendra has opened 75

of her own stores. “I’m a girl from Kenosha, Wisconsin,” points out Kendra. “Who would’ve thought I’d be a fashion designer?”

Although Kendra has a knack for fashion, she attributes much of her company’s success to an ability to analyze trends in customer tastes. Kendra regularly applies accounting analytics to sales, purchases, and inventory data. This allows her to see which products are selling well and which are piling up in inventory. According to Kendra, analyzing accounting data and engaging with customers enable the company to “hear what [the customer] wants, what she needs, and what’s important to her.”

Her company’s accounting reports detail sales and gross profit information to help Kendra understand her business performance. Those reports also help Kendra gauge how much she can devote to charity. “I decided that if someone would call me for a charitable donation . . . I would always have something to give,” insists Kendra. “We don’t turn anyone away.”

Kendra explains that accounting, merchandising, and fashion are a perfect blend. She admits, “I feel like the luckiest person alive.”

Jarod Gibo

Sources: *Kendra Scott* website, January 2021; *Success.com*, March 2016; CBS, March 2018

MERCHANDISING ACTIVITIES

C1

Describe merchandising activities and cost flows.

Previous chapters focused on accounting for service companies. A merchandising company's activities differ from those of a service company. **Merchandise** refers to products, also called *goods,* that a company buys to resell. A **merchandiser** earns net income by buying and selling merchandise. Merchandisers are wholesalers or retailers. A **wholesaler** buys products from manufacturers and sells them to retailers. A **retailer** buys products from manufacturers or wholesalers and sells them to consumers.

Reporting Income for a Merchandiser

Net income for a merchandiser equals revenues from selling merchandise minus both the cost of merchandise sold and other expenses—see Exhibit 4.1. Revenue from selling merchandise is called *sales,* and the expense of buying and preparing merchandise is called **cost of goods sold.** (Some service companies use the term *sales* instead of revenues; cost of goods sold is also called *cost of sales*.)

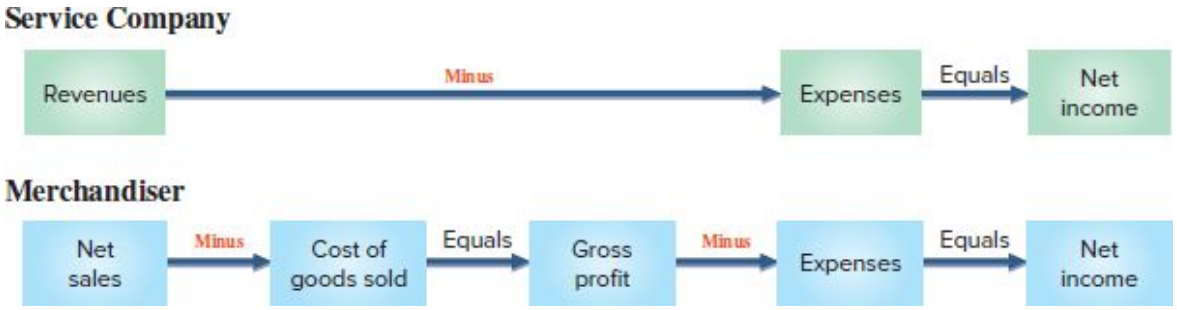


EXHIBIT 4.1

Computing Income for a Merchandising Company versus a Service Company

The income statements for a service company, **H&R Block**, and for a merchandiser, **Nordstrom**, are in Exhibit 4.2. We see that the merchandiser, Nordstrom, reports cost of goods sold, which is not reported by the service company. The merchandiser also reports **gross profit,** or **gross margin,** which is net sales minus cost of goods sold.

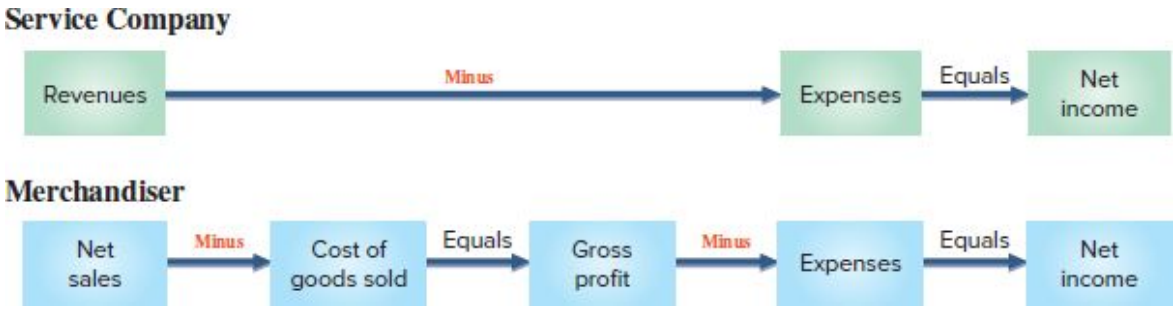


EXHIBIT 4.2

Income Statement for a Service Company and a Merchandising Company

Reporting Inventory for a Merchandiser

A merchandiser's balance sheet has a current asset called *merchandise inventory,* an item not on a service company's balance sheet. **Merchandise inventory,** or simply **inventory,** refers to products that a company owns and intends to sell. Inventory cost includes the cost to buy the goods, ship them to the store, and make them ready for sale.

Operating Cycle for a Merchandiser

Exhibit 4.3 shows an operating cycle for a merchandiser with credit sales. The cycle moves from (*a*) cash purchases of merchandise to (*b*) inventory for sale to (*c*) credit sales to (*d*) accounts receivable to (*e*) receipt of cash. The length of an operating cycle differs across the types of businesses. Department stores often have operating cycles of two to five months. Operating cycles for grocery stores are usually from two to eight weeks. Companies try to keep their operating cycles

short because assets tied up in inventory and receivables are not productive. Cash sales shorten operating cycles.

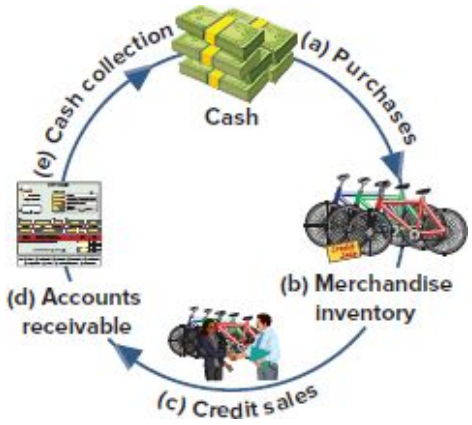


EXHIBIT 4.3

Merchandiser's Operating Cycle

Inventory Systems

Exhibit 4.4 shows that a company's merchandise available for sale consists of what it begins with (beginning inventory) and what it purchases (net purchases). The merchandise available for sale is either sold (expensed on the income statement as cost of goods sold) or kept for future sales (as inventory, a current asset on the balance sheet).

EXHIBIT 4.4

Merchandiser's Cost Flow for a Single Time Period

Companies account for inventory in one of two ways: *perpetual system* or *periodic system*.

- **Perpetual inventory system** records cost of goods sold at the time of each sale.

- **Periodic inventory system** records cost of goods sold at the end of the period.

Technology has dramatically increased the use of the perpetual system. It gives managers immediate access to information on sales and inventory levels, which allows them to strategically react and increase profit.

Analytics Insight

Tobias Ackeborn/E+/Getty Images

Buy Now, Pay Later Companies have been hiring accounting analytics experts to identify ways to shorten the operating cycle. Their aim is to increase cash available for use in expanding operations or acquiring other businesses. One area that analytics has impacted is the timing of cash payments. The **Hackett Group** reports that the largest 1,000 U.S. companies have extended their timing of payments from an average of 40.1 days to 56.7 days in the past 10 years. ■

NEED-TO-KNOW 4-1

Merchandise Accounts and Computations

C1

Use the following information from a merchandising company and from a service company to complete the requirements.

SaveCo Merchandiser			
Supplies	$ 10	Expenses	$ 20
Beginning inventory	100	Net purchases	80
Ending inventory	50	Net sales	190

Hi-Tech Services			
Expenses	$170	Prepaid rent	$25
Revenues	200	Accounts payable	35
Cash	10	Supplies	65

1. For the merchandiser only, compute (a) goods available for sale, (b) cost of goods sold, and (c) gross profit.
2. Compute net income for each company.

Solution

1. a. Computation of goods available for sale (SaveCo).

b. Computation of cost of goods sold (SaveCo).

c. Computation of gross profit (SaveCo).

Beginning inventory	$100
Plus: Net purchases	80
Goods available for sale	$180

Beginning inventory	$100
Plus: Net purchases	80
Goods available for sale	180
Less: Ending inventory	50
Cost of goods sold	$130

Net sales	$190
Less: Cost of goods sold (from part b)	130
Gross profit	$ 60

2. Computation of net income for each company.

SaveCo Merchandiser	
Net sales	$190
Less: Cost of goods sold (from part 1b)	130
Gross profit	60
Less: Expenses	20
Net income	$ 40

Hi-Tech Services	
Revenues	$200
Less: Expenses	170
Net income	$ 30

Do More: QS 4-1, QS 4-2, QS 4-3, E 4-1, E 4-2

MERCHANDISE PURCHASES

P1

Analyze and record transactions for merchandise purchases using a perpetual system.

This section explains how we record purchases under different purchase terms.

Purchases without Cash Discounts

Z-Mart records a $500 cash purchase of merchandise on November 2 as follows.

Nov. 2	Merchandise Inventory	500	
	Cash		500
	Purchased goods for cash.		

Assets = Liabilities + Equity
+500
−500

If these goods are instead *purchased on credit,* Z-Mart makes the same entry except that Accounts Payable is credited instead of Cash.

Purchases with Cash Discounts

The purchase of goods on credit requires credit terms. **Credit terms** include the amounts and timing of payments from a buyer to a seller. To demonstrate, when sellers require payment within 60 days after the invoice date, credit terms are "n/60," meaning *net 60 days*.

Credit Terms Exhibit 4.5 explains credit terms. The amount of time allowed before full payment is due is the **credit period.** Sellers can grant a **cash discount** to encourage buyers to pay earlier. A buyer views a cash discount as a **purchases discount.** A seller views a cash discount as a **sales discount.** Any cash discounts are described on the invoice. The invoice date sets the discount and credit periods. For example, credit terms of "2/10, n/60" mean that full payment is due within a 60-day credit period, but the buyer can deduct 2% of the invoice amount if payment is made within 10 days of the invoice date. This reduced payment is only for the **discount period.**

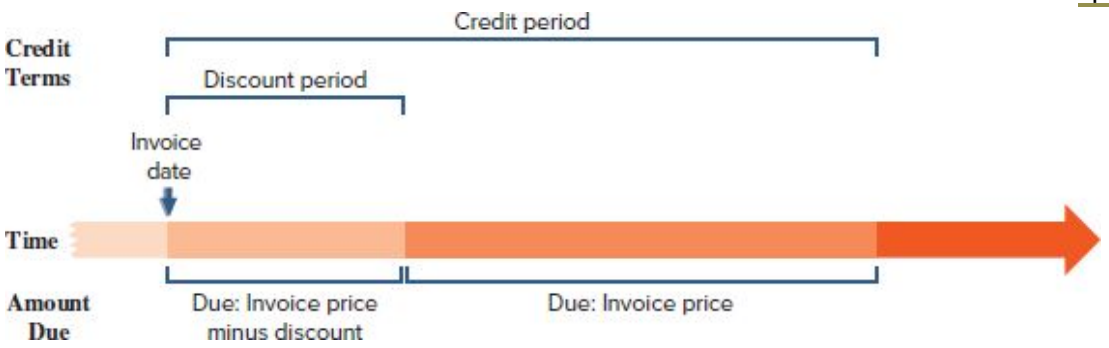
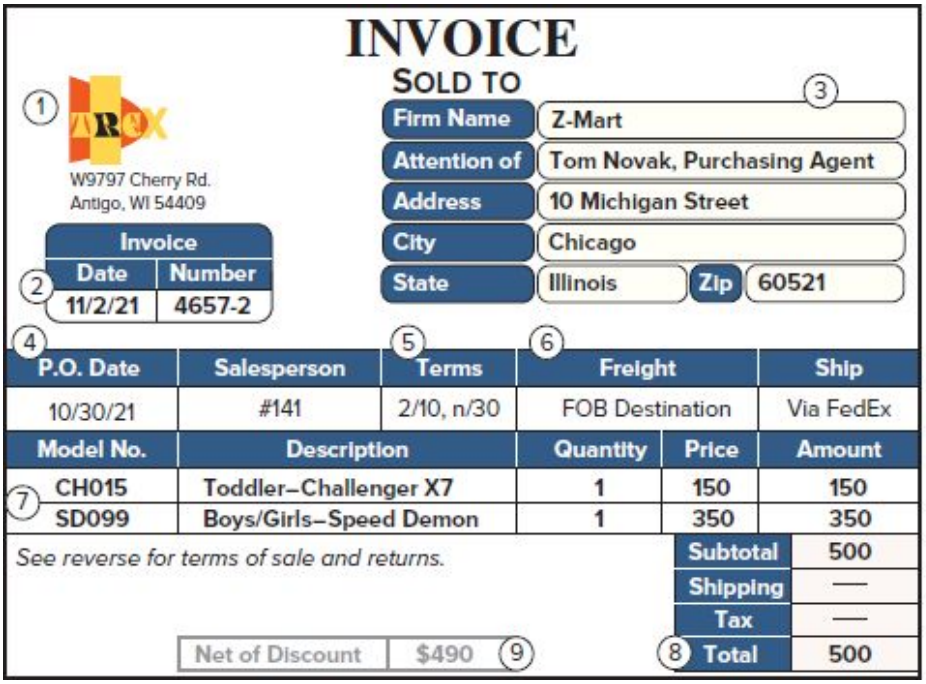


EXHIBIT 4.5

Credit Terms

Invoice On November 2, Z-Mart purchases $500 of merchandise **on credit** with terms of 2/10, n/30. The invoice for this purchase is shown in Exhibit 4.6. This is a purchase invoice for Z-Mart (buyer) and a sales

invoice for Trex (seller). The amount recorded for merchandise inventory includes its purchase cost, shipping fees, taxes, and any other costs necessary to make it ready for sale.



INVOICE

SOLD TO

(1) TREX

W9797 Cherry Rd.
Antigo, WI 54409

(3)

Firm Name	Z-Mart
Attention of	Tom Novak, Purchasing Agent
Address	10 Michigan Street
City	Chicago
State	Illinois
Zip	60521

(2)

Invoice Date	Number
11/2/21	4657-2

(4) P.O. Date	Salesperson	(5) Terms	(6) Freight	Ship
10/30/21	#141	2/10, n/30	FOB Destination	Via FedEx

(7) Model No.	Description	Quantity	Price	Amount
CH015	Toddler–Challenger X7	1	150	150
SD099	Boys/Girls–Speed Demon	1	350	350

See reverse for terms of sale and returns.

Subtotal	500
Shipping	—
Tax	—
(8) Total	500

Net of Discount $490 (9)

Key:
(1) Seller
(2) Invoice date
(3) Purchaser
(4) Order date
(5) Credit terms
(6) Freight terms
(7) Goods
(8) Total invoice amount
(9) Net amount

EXHIBIT 4.6

Invoice

Gross Method Z-Mart purchases $500 of merchandise on credit terms of 2/10, n/30. The November 2 invoice offers a 2% discount if paid within 10 days; if not, Z-Mart must pay the full amount within 30 days. The buyer has two options.

- Pay within discount period (Nov. 2 through Nov. 12): Due = $490.

  or
- Pay after discount period (Nov. 13 through Dec. 2): Due = $500.

The $490 equals the $500 invoice minus $10 discount (computed as $500 × 2%).

On the purchase date, we do not know if payment will occur within the discount period. The **gross method** records the purchase at its *gross* (full) invoice amount. For Z-Mart, the purchase of $500 of merchandise with terms of 2/10, n/30 is recorded at $500. *The gross method is used here because it (1) complies with new revenue*

recognition rules, (2) is used more in practice, and (3) is easier and less costly to apply.

Purchases on Credit Z-Mart's entry to record the November 2 purchase of $500 of merchandise on credit follows. (If Z-Mart has multiple suppliers, it helps to add the name to the payable, such as Accounts Payable—Trex.)

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(*a*) Nov. 2	Merchandise Inventory	500	
	Accounts Payable		500
	Purchased goods, terms 2/10, n/30.		

Assets = Liabilities + Equity
+500 +500

Point: Appendix 4A repeats journal entries a through *g* using the periodic system.

Payment within Discount Period Good cash management means that invoices are not paid until the last day of the discount or credit period. This is because the buyer can use that money until payment is required. If Z-Mart pays the amount due on or before November 12, the entry is

(*b1*) Nov. 12	Accounts Payable	500	
	Merchandise Inventory		10
	Cash*		490
	*Paid for goods within discount period. *$500 × (100% – 2%)*		

Assets = Liabilities + Equity
−490 −500
− 10

The Merchandise Inventory account equals the $490 net cost of purchases after these entries, and the Accounts Payable account has a zero balance.

Accounts Payable			
Nov. 12	500	Nov. 2	500
		Bal.	0

Merchandise Inventory			
Nov. 2	500		
		Nov. 12	10
Bal.	490		

Cash			
		Nov. 12	490

Payment after Discount Period If the invoice is paid *after* November 12, the discount is lost. If Z-Mart pays the gross (full)

amount due on December 2 (the n/30 due date), the entry is

(b2) Dec. 2	Accounts Payable	500	
	Cash		500
	Paid for goods outside discount period.		

Assets = Liabilities + Equity
−500 −500

Purchases with Returns and Allowances

Purchases returns are merchandise a buyer purchases but then returns. *Purchases allowances* refer to a seller granting a price reduction (allowance) to a buyer of defective or unacceptable merchandise.

Purchases Allowances On November 5, Z-Mart (buyer) agrees to a $30 allowance from Trex for defective merchandise (assume allowance is $30 whether paid within the discount period or not). Z-Mart's entry to update Merchandise Inventory and record the allowance follows. Z-Mart's allowance for defective merchandise reduces its account payable to the seller. If cash is refunded, Cash is debited instead of Accounts Payable.

(c1) Nov. 5	Accounts Payable	30	
	Merchandise Inventory		30
	Allowance for defective goods.		

Assets = Liabilities + Equity
−30 −30

Purchases Returns Returns of inventory are recorded at the amount charged for that inventory. On June 1, Z-Mart purchases $250 of merchandise with terms 2/10, n/60—see entries below. On June 3, Z-Mart returns $50 of those goods. When Z-Mart pays on June 11, it takes the 2% discount only on the $200 remaining balance ($250 − $50). When goods are returned, a buyer takes a discount on only the remaining balance. This means the discount is $4 (computed as $200 × 2%) and the cash payment is $196 (computed as $200 − $4).

Assets	=	Liabilities	+	Equity
+250		+250		

Assets	=	Liabilities	+	Equity
−50		−50		

Assets	=	Liabilities	+	Equity
−196		−200		
− 4				

June 1	Merchandise Inventory	250	
	Accounts Payable		250
	Purchased goods, terms 2/10, n/60.		
(c2) June 3	Accounts Payable	50	
	Merchandise Inventory		50
	Returned goods to seller.		
June 11	Accounts Payable	200	
	Merchandise Inventory		4
	Cash		196
	Paid for $200 of goods less $4 discount.		

These T-accounts show the final $196 in inventory, the zero balance in Accounts Payable, and the $196 cash payment.

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Accounts Payable			
Jun. 3	50	Jun. 1	250
Jun. 11	200		
		Bal.	0

Merchandise Inventory			
Jun. 1	250	Jun. 3	50
		Jun. 11	4
Bal.	196		

Cash			
		Jun. 11	196

Example: If, on June 20, Z-Mart returns all goods paid for on June 11, the entry is

Cash.....196

Merchandise Inventory 196

Purchases and Transportation Costs

The buyer and seller must agree on who is responsible for paying freight (shipping) costs and who has the risk of loss during transit. This is the same as asking at what point ownership transfers from the seller to the buyer. The point of transfer is called the **FOB** (*free on board*) point.

Exhibit 4.7 covers two alternative points of transfer.

1. *FOB shipping point* means the buyer accepts ownership when the goods depart the seller's place of business. The buyer pays shipping costs and has the risk of loss in transit. The goods are part of the buyer's inventory when they are in transit because ownership has transferred to the buyer. **1-800-Flowers.com**, a floral merchandiser, uses FOB shipping point.
2. *FOB destination* means ownership of goods transfers to the buyer when the goods arrive at the buyer's place of business. The seller pays shipping charges and has the risk of loss in transit. The seller does not record revenue until the goods arrive at the destination.

When a buyer is responsible for paying transportation costs, the payment is made to a carrier or directly to the seller. The cost principle requires that transportation costs of a buyer (often called *transportation-in* or *freight-in*) be part of the cost of merchandise inventory. Z-Mart's entry to record a $75 freight charge from **UPS** for merchandise purchased FOB shipping point is

Shipping Terms	Ownership Transfers at	Goods in Transit Owned by	Transportation Costs Paid by
FOB shipping point	Shipping point	Buyer	**Buyer** Merchandise Inventory . . . # Cash . . . . . #
FOB destination	Destination	Seller	**Seller** Delivery Expense . . . . . # Cash . . . . . #

EXHIBIT 4.7

Ownership Transfer and Transportation Costs

(*d*) Nov. 24	Merchandise Inventory	75	
	Cash.		75
	Paid freight costs on goods.		

Assets	=	Liabilities	+	Equity
+75				
−75				

When a seller is responsible for paying shipping costs, it records these costs in a Delivery Expense account. Delivery expense, also called *transportation-out* or *freight-out,* is reported as a selling expense in the seller's income statement.

Itemized Costs of Purchases In summary, purchases are recorded as debits to Merchandise Inventory. Purchases discounts, returns, and allowances are credited to (subtracted from) Merchandise Inventory. Transportation-in is debited (added) to Merchandise Inventory. Z-Mart's itemized costs of merchandise purchases for the year are in Exhibit 4.8.

The accounting system described here does not provide separate records (accounts) for total purchases, total purchases discounts, total purchases returns and allowances, and total transportation-in. Many companies collect this information in supplementary records to evaluate these costs. **Supplementary records,** or *supplemental records,* refer to information outside the usual ledger accounts.

Itemized Costs of Merchandise Purchases

Invoice cost of merchandise purchases	$ 235,800
Less: Purchases discounts received	(4,200)
Purchases returns and allowances	(1,500)
Add: Costs of transportation-in	2,300
Total net cost of merchandise purchases	$232,400

EXHIBIT 4.8

Itemized Costs of Merchandise Purchases

Point: Purchase of inventory affects balance sheet accounts only.

Decision Ethics

Payables Manager As a new accounts payable manager, you are being trained by the outgoing manager. She explains that the system prepares checks for amounts net of favorable cash discounts, and the checks are dated the last day of the discount period. She tells you that checks are not mailed until five days later, adding that "the company

gets free use of cash for an extra five days, and our department looks better." Do you continue this policy? ■ *Answer:* One point of view is that the late payment policy is unethical. A deliberate plan to make late payments means the company lies when it pretends to make payment within the discount period. Another view is that the late payment policy is acceptable. Some believe attempts to take discounts through late payments are accepted as "price negotiation."

PeopleImages/E+/Getty Images

NEED-TO-KNOW 4-2

Merchandise Purchases

P1

Prepare journal entries to record each of the following transactions. Assume a perpetual inventory system using the gross method for recording purchases.

Oct. 1 Purchased $1,000 of goods. Terms of the sale are 4/10, n/30, and FOB shipping point; the invoice is dated October 1.

3 Paid $30 cash for freight charges from UPS for the October 1 purchase.

7 Returned $50 of the $1,000 of goods from the October 1 purchase and received full credit.

11 Paid the amount due from the October 1 purchase (less the return on October 7).

31 *Assume the October 11 payment was never made*. Instead, payment of the amount due, less the return on October 7, occurred on October 31.

Solution

Oct. 1	Merchandise Inventory	1,000	
	Accounts Payable		1,000
	Purchased goods, terms 4/10, n/30.		
Oct. 3	Merchandise Inventory	30	
	Cash		30
	Paid freight on purchases FOB shipping point.		
Oct. 7	Accounts Payable	50	
	Merchandise Inventory		50
	Returned goods.		

Oct. 11	Accounts Payable	950	
	Merchandise Inventory*		38
	Cash†		912
	Paid for goods within discount period.		
	**$950 × 4% †$950 − ($950 × 4%)*		
Oct. 31	Accounts Payable‡	950	
	Cash		950
	Paid for goods outside discount period. ‡$1,000 − $50		

Do More: QS 4-4, QS 4-5, QS 4-6, QS 4-7, E 4-3, E 4-4, E 4-5, E 4-8

MERCHANDISE SALES

P2

Merchandising companies must account for sales, sales discounts, sales returns and allowances, and cost of goods sold. Z-Mart has these items in its gross profit computation—see Exhibit 4.9. This shows that customers paid $314,700 for merchandise that cost Z-Mart $230,400, yielding a gross profit of $84,300.

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Computation of Gross Profit	
Net sales (net of discounts, returns, and allowances)	$ 314,700
Cost of goods sold	230,400
Gross profit	$ 84,300

EXHIBIT 4.9

Gross Profit Computation

The perpetual accounting system requires that **each sales-transaction for a merchandiser, whether for cash or on credit, has *two entries:* one for revenue and one for cost.**

1. **Revenue recorded (and asset increased) from the customer.**
2. **Cost of goods sold incurred (and asset decreased) to the customer.**

Sales without Cash Discounts

Revenue Side: Inflow of Assets Z-Mart sold $1,000 of merchandise on credit terms n/60 on November 12. The revenue part of this transaction is recorded as follows. This entry shows an increase in Z-Mart's assets in the form of accounts receivable. It also shows the increase in revenue (Sales). If the sale is for cash, debit Cash instead of Accounts Receivable.

Assets	=	Liabilities	+	Equity
+1,000				+1,000

Nov. 12	Accounts Receivable	1,000	
	Sales		1,000
	Sold goods on credit. [Revenue recognition.]		

Cost Side: Outflow of Assets The cost side of each sale requires that Merchandise Inventory decrease by that item's cost. The cost of the merchandise Z-Mart sold on November 12 is $300, and the entry to record the cost part of this transaction follows.

Point: Gross profit on Nov. 12 sale:

Point: Gross profit on Nov. 12 sale:

Net sales	$1,000
Cost of goods sold	300
Gross profit	$ 700

Assets	=	Liabilities	+	Equity
−300				−300

Nov. 12	Cost of Goods Sold	300	
	Merchandise Inventory		300
	Record cost of Nov. 12 sale. [Expense recognition.]		

Sales with Cash Discounts

Offering discounts on credit sales benefits a seller through earlier cash receipts and reduced collection efforts. The *gross method* records sales at the full amount and records sales discounts if, and when, they are taken. The gross method is **used here as it (1) complies with new revenue recognition rules, (2) is used more in practice, and (3) is easier and less costly to apply.** (The **net method** records sales at the net amount, which assumes all discounts are taken. See Appendix 4C.)

Sales on Credit Z-Mart makes a credit sale for $1,000 on November 12 with terms of 2/10, n/45 (cost of the merchandise sold is $300). The entries to record this sale follow.

Assets = Liabilities + Equity
+1,000 +1,000

Assets = Liabilities + Equity
−300 −300

Nov. 12	Accounts Receivable	1,000	
	Sales		1,000
	Sold goods, terms 2/10, n/45.		
Nov. 12	Cost of Goods Sold	300	
	Merchandise Inventory		300
	Record cost of Nov. 12 sale.		

Buyer Pays within Discount Period One option is for page 161 the buyer to pay $980 within the 10-day discount period ending November 22. The $20 sales discount is computed as $1,000 × 2%. If the customer pays on (or before) November 22, Z-Mart records the cash receipt as follows. **Sales Discounts** is a **contra revenue account,** meaning the Sales Discounts account is subtracted from the Sales account when computing net sales. The Sales Discounts account has a *normal debit balance* because it is subtracted from Sales, which has a normal credit balance.

Point: Net sales is the amount received from the customer.

Point: Net sales is the amount received from the customer.

Sales	$1,000
Sales discounts	(20)
Net sales	$ 980

Nov. 22	Cash*	980	
	Sales Discounts	20	
	Accounts Receivable		1,000
	Received payment on Nov. 12 sale less discount.		
	**$1,000 − ($1,000 × 2%)*		

Assets = Liabilities + Equity
+ 980 −20
−1,000

Buyer Pays after Discount Period The customer's second option is to wait 45 days until December 27 (or at least until after the discount period) and then pay $1,000. Z-Mart records that cash receipt as

Dec. 27	Cash	1,000	
	Accounts Receivable		1,000
	Received payment on Nov. 12 sale after discount period.		

Assets = Liabilities + Equity
+1,000
−1,000

Sales with Returns and Allowances

If a customer is unhappy with a purchase, many sellers allow the customer to either return the merchandise for a full refund (*sales return*) or keep the merchandise along with a partial refund (*sales allowance*).

Buyer Returns Goods—Revenue Side When a buyer returns goods, it impacts the seller's revenue *and* cost sides. When a return occurs, the seller debits **Sales Returns and Allowances**, a **contra revenue account** to Sales. Assume that a customer returns merchandise on December 29 that sold for $15 and cost $9; the revenue-side returns entry is

(e1) Dec. 29	Sales Returns and Allowances	15	
	Cash		15
	Goods returned from Nov. 12 sale.		

Assets = Liabilities + Equity
−15 −15

Buyer Returns Goods—Cost Side When a return occurs, the seller must reduce the cost of sales. If the merchandise returned is not defective and can be resold, the seller adds the cost of the returned goods back to inventory and reduces cost of goods sold as follows. (Advanced courses cover cases where goods are defective.)

(e2) Dec. 29	Merchandise Inventory	9	
	Cost of Goods Sold		9
	Returned goods are added back to inventory.		

Assets = Liabilities + Equity
+9 +9

Buyer Granted Allowances If a buyer is not satisfied with the goods, the seller might offer a price reduction for the buyer to keep the goods. There is no cost-side entry in this case as the inventory is not returned. On the revenue side, the seller debits Sales Returns and Allowances and credits Cash or Accounts Receivable depending on what's agreed. Assume that $40 of merchandise previously sold is defective. The seller gives a price reduction and credits the buyer's

accounts receivable for $10. The seller records this allowance as follows.

Assets = Liabilities + Equity
−10 −10

(*f*) Nov. 24	Sales Returns and Allowances	10	
	Accounts Receivable		10
	Sales allowance granted.		

If the seller has already collected cash for the sale, the seller could give the price reduction in cash. For example, instead of crediting the buyer's Accounts Receivable in the entry above, the seller can credit Cash for $10.

Michael DeYoung/Blend Images

Decision Insight

What's Your Policy? Return policies are a competitive advantage for businesses. **REI** offers a 1-year return policy on nearly every product it sells. **Amazon** picks up returned items at your door. On the other hand, some stores like **Best Buy** allow only 14 days to return products. ■

NEED-TO-KNOW 4-3

Merchandise Sales

P2

Prepare journal entries to record each of the following transactions. Assume a perpetual inventory system and use of the gross method. Beginning inventory equals $9,000.

June 1 Sold 50 units of merchandise to a customer for $150 per unit under credit terms of 2/10, n/30, FOB shipping point, and

the invoice is dated June 1. The 50 units of merchandise had cost $100 per unit.

7 The customer returns 2 units purchased on June 1 because those units did not fit its needs. The seller restores those units to its inventory (as they are not defective) and credits Accounts Receivable from the customer.

11 The seller receives the balance due from the June 1 sale to the customer less returns and allowances.

14 The customer discovers that 10 units have minor damage but keeps them because the seller sends a $50 cash payment allowance to compensate.

Solution

Do More: QS 4-10, QS 4-11, QS 4-12, QS 4-13, E 4-6, E 4-7, E 4-9, E 4-10

June 1	Accounts Receivable	7,500	
	Sales		7,500
	Sold goods. 50 units × $150		
June 1	Cost of Goods Sold	5,000	
	Merchandise Inventory		5,000
	Cost of sale. 50 units × $100		
June 7	Sales Returns and Allowances	300	
	Accounts Receivable		300
	Returns accepted. 2 units × $150		
June 7	Merchandise Inventory	200	
	Cost of Goods Sold		200
	Returns to inventory. 2 units × $100		

June 11	Cash	7,056	
	Sales Discounts*	144	
	Accounts Receivable		7,200
	Received payment.		
	**($7,500 − $300) × 2%*		
June 14	Sales Returns and Allowances	50	
	Cash		50
	Recorded allowance on goods.		

ADJUSTING AND CLOSING FOR MERCHANDISERS

P3

Prepare adjustments and close accounts for a merchandising company.

Exhibit 4.10 shows the flow of merchandising costs during a period and where these costs are reported at period-end. Specifically,

beginning inventory plus the net cost of purchases is the merchandise available for sale. As inventory is sold, its cost is recorded in cost of goods sold on the income statement; what remains is ending inventory on the balance sheet. A period's ending inventory is the next period's beginning inventory.

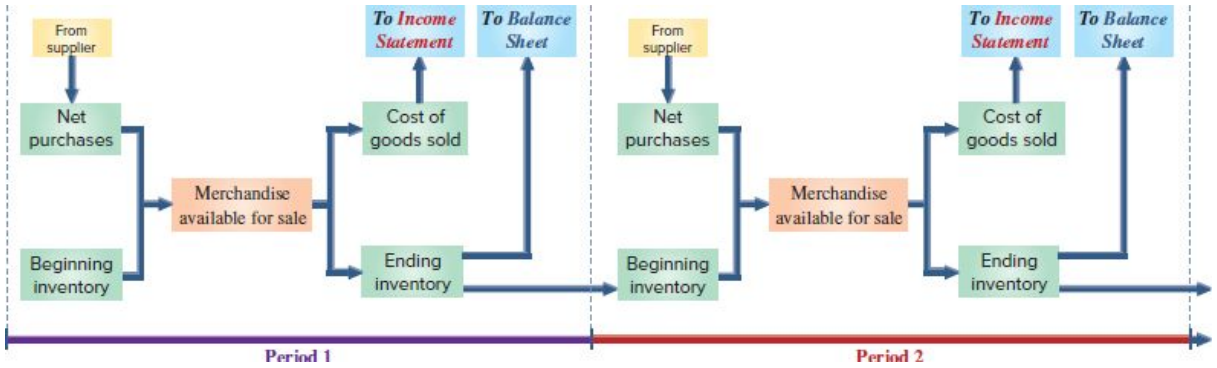

EXHIBIT 4.10

Merchandising Cost Flow in the Accounting Cycle

Adjusting Entries for Merchandisers

page 163

Each of the steps in the accounting cycle described in the prior chapter applies to a merchandiser. We expand upon three steps of the accounting cycle for a merchandiser—adjustments, financial statement preparation, and closing.

Inventory Shrinkage—Adjusting Entry A merchandiser using a *perpetual* inventory system makes an adjustment to Merchandise Inventory for any loss of merchandise, including theft and deterioration. **Shrinkage** is the loss of inventory; it is computed by comparing a physical count of inventory with recorded amounts.

Z-Mart's Merchandise Inventory account at the end of the year has a balance of $21,250, but a physical count shows only $21,000 of inventory exists. The adjusting entry to record this $250 shrinkage is

Dec. 31	Cost of Goods Sold	250	
	Merchandise Inventory		250
	Adjust for $250 shrinkage.		

Assets = Liabilities + Equity
−250 −250

Sales Discounts, Returns, and Allowances—Adjusting Entries Revenue recognition rules require sales to be reported at the amount expected to be received. This means that period-end adjusting entries are commonly made for expected returns and allowances (both revenue and cost sides) and expected sales discounts. Appendix 4B covers these entries.

Closing Entries for Merchandisers

Closing entries are similar for service companies and merchandising companies. The difference is that we close some new temporary accounts that come from merchandising activities. Z-Mart has temporary accounts unique to merchandisers: Sales (of goods), Sales Discounts, Sales Returns and Allowances, and Cost of Goods Sold. The differences are in **red** in the closing entries of Exhibit 4.11. Sales, having a normal credit balance, is debited in step 1. Sales Discounts, Sales Returns and Allowances, and Cost of Goods Sold, having normal debit balances, are credited in step 2. The third and fourth closing entries are identical for a merchandiser and a service company.

Step 1: Close Credit Balances in Temporary Accounts to Income Summary.

Dec. 31	Sales	321,000	
	Income Summary		321,000
	Close credit balances in temporary accounts.		

Step 2: Close Debit Balances in Temporary Accounts to Income Summary.

Dec. 31	Income Summary	308,100	
	Sales Discounts		4,300
	Sales Returns and Allowances		2,000
	Cost of Goods Sold		230,400
	Depreciation Expense		3,700
	Salaries Expense		43,800
	Insurance Expense		600
	Rent Expense		9,000
	Supplies Expense		3,000
	Advertising Expense		11,300
	Close debit balances in temporary accounts.		

Step 3: Close Income Summary.

Dec. 31	Income Summary	12,900	
	Retained Earnings		12,900

Step 4: Close Dividends.

Dec. 31	Retained Earnings	4,000	
	Dividends		4,000

EXHIBIT 4.11

Closing Entries for a Merchandiser

Summary of Merchandising Entries

Exhibit 4.12 summarizes the adjusting and closing entries of a merchandiser (using a perpetual inventory system).

	Merchandising Transactions	Merchandising Entries	Dr.	Cr.
Purchases	Purchasing merchandise for resale.	Merchandise Inventory	#	
		Cash or Accounts Payable		#
	Paying freight costs on purchases; FOB shipping point.	Merchandise Inventory	#	
		Cash		#
	Paying within discount period.	Accounts Payable	#	
		Merchandise Inventory		#
		Cash		#
	Paying outside discount period.	Accounts Payable	#	
		Cash		#
	Recording purchases returns or allowances.	Cash or Accounts Payable	#	
		Merchandise Inventory		#
Sales	Selling merchandise.	Cash or Accounts Receivable	#	
		Sales		#
		Cost of Goods Sold	#	
		Merchandise Inventory		#
	Receiving payment within discount period.	Cash	#	
		Sales Discounts	#	
		Accounts Receivable		#
	Receiving payment outside discount period.	Cash	#	
		Accounts Receivable		#
	Receiving sales returns of nondefective inventory.	Sales Returns and Allowances	#	
		Cash or Accounts Receivable		#
		Merchandise Inventory	#	
		Cost of Goods Sold		#
	Granting sales allowances.	Sales Returns and Allowances	#	
		Cash or Accounts Receivable		#
	Paying freight costs on sales; FOB destination.	Delivery Expense	#	
		Cash		#

EXHIBIT 4.12

Summary of Key Merchandising Entries (using perpetual system and gross method

	Merchandising Events	Adjusting and Closing Entries	Dr.	Cr.
Adjusting	Adjustment for shrinkage (occurs when recorded amount larger than physical inventory).	Cost of Goods Sold	#	
		Merchandise Inventory		#
Closing	Closing temporary accounts with credit balances.	Sales	#	
		Income Summary		#
	Closing temporary accounts with debit balances.	Income Summary	#	
		Sales Returns and Allowances		#
		Sales Discounts		#
		Cost of Goods Sold		#
		Delivery Expense		#
		"Other Expenses"		#
	No change to closing Income Summary and Dividends.			

Merchandise Inventory	
Beginning inventory	
Purchases	Pur. returns
Freight-in (FOB shp pt)	Pur. allowances
	Pur. discounts
Customer returns	Shrinkage
Goods avail. for sale	COGS
Ending inventory	

NEED-TO-KNOW 4-4

Recording Shrinkage and Closing Entries

P3

Merchandise inventory	$ 756	Sales	$4,300	Depreciation expense	$400
Common stock	1,000	Sales discounts	50	Salaries expense	600
Retained earnings	1,300	Other operating expenses	300	Sales returns and allowances	250
Dividends	150	Cost of goods sold	2,100		

A merchandising company's ledger on May 31, its fiscal year-end, includes the following accounts that have normal balances (it uses the perpetual inventory system). A physical count of its May 31 year-end inventory reveals that the cost of the merchandise inventory still available is $656. (a) Prepare the entry to record any inventory shrinkage. (b) Prepare the four closing entries as of May 31.

Merchandise inventory	$ 756	Sales	$4,300	Depreciation expense	$400
Z. Zee, Capital	2,300	Sales discounts	50	Salaries expense	600
Z. Zee, Withdrawals	150	Other operating expenses	300	Sales returns and allowances	250
		Cost of goods sold	2,100		

Solution

a.

May 31	Cost of Goods Sold	100	
	Merchandise Inventory		100
	Adjust for shrinkage ($756 – $656).		

b.

May 31	Sales	4,300	
	Income Summary		4,300
	Close temporary accounts with credit balances.		
May 31	Income Summary	3,800	
	Sales Discounts		50
	Sales Returns and Allowances		250
	Cost of Goods Sold*		2,200
	Depreciation Expense		400
	Salaries Expense		600
	Other Operating Expenses		300
	*Close temporary accounts with debit balances. *$2,100 (Unadj. bal.) + $100 (Shrinkage)*		

May 31	Income Summary	500	
	Retained Earnings		500
	Close Income Summary account.		
May 31	Retained Earnings	150	
	Dividends		150
	Close Dividends account.		

Do More: QS 4-14, QS 4-15, E 4-14, E 4-15, P 4-4

MORE ON FINANCIAL STATEMENT FORMATS

P4

Define and prepare multiple-step and singlestep income statements.

This section covers two income statement formats: multiple-step and single-step. The classified balance sheet of a merchandiser also is covered.

Multiple-Step Income Statement

A **multiple-step income statement** details net sales and page 166 expenses and reports subtotals for various types of items. Exhibit 4.13 shows a multiple-step income statement. The statement has three main parts: (1) *gross profit,* which is net sales minus cost of goods sold; (2) *income from operations,* which is gross profit minus operating expenses; and (3) *net income,* which is income from operations plus or minus nonoperating items.

Operating expenses are separated into two sections. **Selling expenses** are costs to market and distribute products and services such as advertising of merchandise, store supplies and rent, and delivery of goods to customers. **General and administrative**

expenses are costs to administer a company's overall operations such as office salaries, office equipment, and office supplies. Expenses are allocated between these two sections when they contribute to more than one. Z-Mart allocates rent expense of $9,000 from its store building between two sections: $8,100 to selling expense and $900 to general and administrative expenses.

EXHIBIT 4.13

Multiple-Step Income Statement

Z-MART
Income Statement
For Year Ended December 31, 2021

Sales		$321,000
Less: Sales discounts	$ 4,300	
Sales returns and allowances	2,000	6,300
Net sales		314,700
Cost of goods sold*		230,400
Gross profit		84,300
Operating expenses		
Selling expenses		
Depreciation expense—Store equipment	3,000	
Sales salaries expense	18,500	
Rent expense—Selling space	8,100	
Store supplies expense	1,200	
Advertising expense	11,300	
Total selling expenses		42,100
General and administrative expenses		
Depreciation expense—Office equipment	700	
Office salaries expense	25,300	
Insurance expense	600	
Rent expense—Office space	900	
Office supplies expense	1,800	
Total general and administrative expenses		29,300
Total operating expenses		71,400
Income from operations		12,900
Other revenues and gains (expenses and losses)		
Interest revenue	1,000	
Gain on sale of building	2,500	
Interest expense	(1,500)	
Total other revenues and gains (expenses and losses)		2,000
Net income		$ 14,900

Gross profit computation

Income from operations computation

Nonoperating activities computation

*Cost of goods sold:

Beginning inventory	$ 19,000
Net cost of purchases	232,400
Goods available for sale	251,400
Less ending inventory	21,000
Cost of goods sold	$230,400

EXHIBIT 4.13

Multiple-Step Income Statement

Nonoperating activities consist of other expenses, page 167 revenues, losses, and gains that are unrelated to a company's operations. *Other revenues and gains* commonly include interest revenue, dividend revenue, rent revenue, and gains from asset disposals. *Other expenses and losses* commonly include interest expense, losses from asset disposals, and casualty losses. When

there are no reportable nonoperating activities, its income from operations is simply labeled *net income*.

Single-Step Income Statement

A **single-step income statement** is shown in Exhibit 4.14. It lists cost of goods sold as another expense and shows only one subtotal for total expenses. Expenses are grouped into categories. Many companies use formats that combine features of both single- and multiple-step statements. Net income is the same under either format, so management chooses the format that best informs users.

Z-MART
Income Statement
For Year Ended December 31, 2021

Revenues		
Net sales		$314,700
Interest revenue		1,000
Gain on sale of building		2,500
Total revenues		318,200
Expenses		
Cost of goods sold	$230,400	
Selling expenses	42,100	
General and administrative expenses	29,300	
Interest expense	1,500	
Total expenses		303,300
Net Income		$ 14,900

EXHIBIT 4.14

Single-Step Income Statement

Classified Balance Sheet

The classified balance sheet reports merchandise inventory as a current asset, usually after accounts receivable, according to how quickly they can be converted to cash. Inventory is converted less quickly to cash than accounts receivable because inventory first must be sold before cash can be received. Exhibit 4.15 shows the current asset section of Z-Mart's classified balance sheet (other sections are similar to the previous chapter).

Z-MART Balance Sheet (partial) December 31, 2021	
Current assets	
Cash	$ 8,200
Accounts receivable	11,200
Merchandise inventory	21,000
Office supplies	550
Store supplies	250
Prepaid insurance	300
Total current assets	$41,500

EXHIBIT 4.15

Classified Balance Sheet (partial) of a Merchandiser

Point: Statement of retained earnings is the same for merchandisers and service companies.

NEED-TO-KNOW 4-5

Multiple- and Single-Step Income Statements

P4

Taret's adjusted account balances from its general ledger on April 30, its fiscal year-end, are shown here in random order. (a) Prepare a multiple-step income statement that begins with gross sales and includes separate categories for net sales, cost of goods sold, selling expenses, and general and administrative expenses. (b) Prepare a single-step income statement that begins with net sales and includes these expense categories: cost of goods sold, selling expenses, and general and administrative expenses.

Adjusted Account Balances	Debit	Credit
Merchandise inventory	$ 800	
Other (noninventory) assets	2,600	
Total liabilities		$ 500
Common stock		400
Retained earnings		1,700
Dividends	300	
Sales		9,500
Sales discounts	260	
Sales returns and allowances	240	
Cost of goods sold	6,500	
Sales salaries expense	450	
Rent expense—Selling space	400	
Store supplies expense	30	
Advertising expense	20	
Office salaries expense	420	
Rent expense—Office space	72	
Office supplies expense	8	
Totals	$12,100	$12,100

Solution

a. Multiple-step income statement.

TARET Income Statement For Year Ended April 30		
Sales		$9,500
Less: Sales discounts	$260	
Sales returns and allowances	240	500
Net sales		9,000
Cost of goods sold		6,500
Gross profit		2,500
Operating expenses		
Selling expenses		
Sales salaries expense	450	
Rent expense—Selling space	400	
Store supplies expense	30	
Advertising expense	20	
Total selling expenses		900
General and administrative expenses		
Office salaries expense	420	
Rent expense—Office space	72	
Office supplies expense	8	
Total general and administrative expenses		500
Total operating expenses		1,400
Net income		$1,100

b. Single-step income statement.

TARET Income Statement For Year Ended April 30		
Net sales		$9,000
Expenses		
Cost of goods sold	$6,500	
Selling expenses	900	
General and administrative expenses	500	
Total expenses		7,900
Net income		$1,100

Do More: QS 4-16 though QS 4-21, E 4-17, E 4-18, E 4-19

Decision Analysis Acid-Test and Gross Margin Ratios

A1

Compute and analyze the acid-test ratio and gross margin ratio.

Acid-Test Ratio

One measure of a merchandiser's ability to pay its current liabilities (referred to as its *liquidity*) is the acid-test ratio. The **acid-test ratio**, also called *quick ratio,* is defined as *quick assets* (cash, short-term investments, and current receivables) divided by current liabilities—see Exhibit 4.16. It differs from the current ratio by excluding less liquid current assets such as inventory and prepaid expenses that take longer to be converted to cash.

$$\text{Acid-test ratio} = \frac{\text{Cash and cash equivalents} + \text{Short-term investments} + \text{Current receivables}}{\text{Current liabilities}}$$

EXHIBIT 4.16

Acid-Test (Quick) Ratio

Exhibit 4.17 shows both the acid-test and current ratios of page 169 **Nike** and **Under Armour** for three recent years. Nike's acid-test ratio implies that it has enough quick assets to cover current liabilities. It is also on par with its competitor, Under Armour. Nike's current ratio suggests it has more than enough current assets to cover current liabilities. Analysts might argue that Nike could invest some current assets in more productive assets. An acid-test ratio less than 1.0 means that current liabilities exceed quick assets. A rule of thumb is that the acid-test ratio should have a value near, or higher than, 1.0. Less than 1.0 raises liquidity concerns unless a company can get enough cash from sales or if liabilities are not due until late in the next period.

lzf/Shutterstock

Company	$ millions	Current Year	1 Year Ago	2 Years Ago
Nike	Total quick assets	$ 8,935	$ 8,743	$ 9,856
	Total current assets	$16,525	$15,134	$16,061
	Total current liabilities	$ 7,866	$ 6,040	$ 5,474
	Acid-test ratio	1.1	1.4	1.8
	Current ratio	2.1	2.5	2.9
Under Armour	Acid-test ratio	1.1	0.9	0.9
	Current ratio	1.9	2.0	2.2

EXHIBIT 4.17

Acid-Test and Current Ratios for Two Competitors

Decision Maker

Supplier A retailer requests to purchase supplies on credit from your company. You have no prior experience with this retailer. The retailer's current ratio is 2.1, its acid-test ratio is 0.5, and inventory makes up most of its current assets. Do you extend credit? ■ *Answer:* A current ratio of 2.1 suggests sufficient current assets to cover current liabilities. An acid-test ratio of 0.5 suggests, however, that quick assets can cover only about one-half of

current liabilities. The retailer depends on money from sales of inventory to pay current liabilities. If sales decline, the likelihood that this retailer will default on its payments increases. You probably do not extend credit.

Gross Margin Ratio

Without enough gross profit, a merchandiser can fail. The gross margin ratio helps understand this link. It differs from the profit margin ratio in that it excludes all costs except cost of goods sold. The **gross margin ratio** (or *gross profit ratio*) is defined as *gross margin* (net sales minus cost of goods sold) divided by net sales—see Exhibit 4.18.

$$\text{Gross margin ratio} = \frac{\text{Net sales} - \text{Cost of goods sold}}{\text{Net sales}}$$

EXHIBIT 4.18

Gross Margin Ratio

Exhibit 4.19 shows the gross margin ratio of **Nike** for three recent years. For Nike, each $1 of sales in the current year yielded about 44.7¢ in gross margin to cover all expenses and still produce a net income. This 44.7¢ margin is up from 43.8¢ in the prior year. This increase is favorable.

$ millions	Current Year	1 Year Ago	2 Years Ago
Gross margin	$17,474	$15,956	$15,312
Net sales	$39,117	$36,397	$34,350
Gross margin ratio	44.7%	43.8%	44.6%

EXHIBIT 4.19

Nike's Gross Margin Ratio

Decision Maker

Financial Officer Your company has a 36% gross margin ratio and a 17% net profit margin ratio. Industry averages are 44% for gross margin and 16% for net profit margin. Do these comparative results concern you? ■ *Answer:* Your company's net profit margin is about equal to the

industry average. However, gross margin shows that your company is paying far more in cost of goods sold or receiving far less in sales price than competitors. You should try to find the problem with cost of goods sold, sales, or both.

NEED-TO-KNOW 4-6

COMPREHENSIVE 1

Single- and Multiple-Step Income Statements, Closing Entries, and Analysis Using Acid-Test and Gross Margin Ratios

Use the following adjusted trial balance and additional information to complete the requirements.

KC ANTIQUES
Adjusted Trial Balance

December 31	Debit	Credit
Cash	$ 7,000	
Accounts receivable	13,000	
Merchandise inventory (ending)	60,000	
Store supplies	1,500	
Equipment	45,600	
Accumulated depreciation—Equipment		$ 16,600
Accounts payable		9,000
Salaries payable		2,000
Common stock		20,000
Retained earnings		59,000
Dividends	10,000	
Sales		343,250
Sales discounts	5,000	
Sales returns and allowances	6,000	
Cost of goods sold	159,900	
Depreciation expense—Store equipment	4,100	
Depreciation expense—Office equipment	1,600	
Sales salaries expense	30,000	
Office salaries expense	34,000	
Insurance expense	11,000	
Rent expense—Selling space	16,800	
Rent expense—Office space	7,200	
Store supplies expense	5,750	
Advertising expense	31,400	
Totals	$449,850	$449,850

Supplementary records for the year reveal the following itemized costs for merchandising activities.

Invoice cost of merchandise purchases	$150,000	Purchases returns and allowances	$2,700
Purchases discounts received	2,500	Cost of transportation-in	5,000

Required

1. Use the supplementary records to compute the total cost of merchandise purchases for the year.
2. Prepare a multiple-step income statement for the year. (Beginning inventory was $70,100.)
3. Prepare a single-step income statement for the year.
4. Prepare closing entries for KC Antiques at December 31.

5. Compute the acid-test ratio and the gross margin ratio. Explain the meaning of each ratio and interpret them for KC Antiques.

SOLUTION

1.

Invoice cost of merchandise purchases	$150,000
Less: Purchases discounts received	(2,500)
Purchases returns and allowances	(2,700)
Add: Cost of transportation-in	5,000
Total cost of merchandise purchases	$149,800

2. Multiple-step income statement.

KC ANTIQUES
Income Statement
For Year Ended December 31

Sales		$343,250
Less: Sales discounts	$ 5,000	
Sales returns and allowances	6,000	11,000
Net sales		332,250
Cost of goods sold		159,900
Gross profit		172,350
Expenses		
Selling expenses		
Depreciation expense—Store equipment	4,100	
Sales salaries expense	30,000	
Rent expense—Selling space	16,800	
Store supplies expense	5,750	
Advertising expense	31,400	
Total selling expenses		88,050
General and administrative expenses		
Depreciation expense—Office equipment	1,600	
Office salaries expense	34,000	
Insurance expense	11,000	
Rent expense—Office space	7,200	
Total general and administrative expenses		53,800
Total operating expenses		141,850
Net income		$ 30,500

3. Single-step income statement.

KC ANTIQUES
Income Statement
For Year Ended December 31

Net sales		$332,250
Expenses		
Cost of goods sold	$159,900	
Selling expenses	88,050	
General and administrative expenses	53,800	
Total expenses		301,750
Net income		$ 30,500

4.

Dec. 31	Sales	343,250	
	Income Summary		343,250
	Close credit balances in temporary accounts.		
Dec. 31	Income Summary	312,750	
	Sales Discounts		5,000
	Sales Returns and Allowances		6,000
	Cost of Goods Sold		159,900
	Depreciation Expense—Store Equipment		4,100
	Depreciation Expense—Office Equipment		1,600
	Sales Salaries Expense		30,000
	Office Salaries Expense		34,000
	Insurance Expense		11,000
	Rent Expense—Selling Space		16,800
	Rent Expense—Office Space		7,200
	Store Supplies Expense		5,750
	Advertising Expense		31,400
	Close debit balances in temporary accounts.		

Dec. 31	Income Summary	30,500	
	Retained Earnings		30,500
	Close Income Summary account.		
Dec. 31	Retained Earnings	10,000	
	Dividends		10,000
	Close Dividends account.		

5. Acid-test ratio = (Cash and equivalents + Short-term investments + Current receivables)/Current liabilities

= (Cash + Accounts receivable)/(Accounts payable + Salaries payable)

= ($7,000 + $13,000)/($9,000 + $2,000) = $20,000/$11,000 = 1.82

Gross margin ratio = Gross profit/Net sales = $172,350/$332,250 = 0.52 (or 52%)

KC Antiques has a healthy acid-test ratio of 1.82. This means it has $1.82 in liquid assets to satisfy each $1.00 in current liabilities. The gross margin of 0.52 shows that KC Antiques spends 48¢ ($1.00 − $0.52) of every dollar of net sales on the costs of acquiring the merchandise it sells. This leaves 52¢ of every dollar of net sales to cover other expenses incurred in the business and to provide a net profit.

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NEED-TO-KNOW 4-7

COMPREHENSIVE 2

Recording Merchandising Transactions—Both Seller and Buyer

Prepare journal entries for the following transactions for both the seller (BMX) and buyer (Sanuk).

May 4 BMX sold $1,500 of merchandise on account to Sanuk, terms FOB shipping point, n/45, invoice dated May 4. The cost of the merchandise was $900.

6 Sanuk paid transportation charges of $30 on the May 4 purchase from BMX.

8 BMX sold $1,000 of merchandise on account to Sanuk, terms FOB destination, n/15, invoice dated May 8. The cost of the merchandise was $700. This sale permitted returns for 30 days.

10 BMX paid transportation costs of $50 for delivery of merchandise sold to Sanuk on May 8.

16 Sanuk returned $200 of merchandise purchased on May 8 for full credit. The merchandise, which had cost $140, is returned to inventory.

18 BMX received payment from Sanuk for the May 8 purchase.

21 BMX sold $2,400 of merchandise on account to Sanuk, terms FOB shipping point, 2/10, n/60. The cost of the merchandise was $1,440. This sale permitted returns for 90 days.

31 BMX received payment from Sanuk for the May 21 purchase, less discount.

Solution

	BMX (Seller)			Sanuk (Buyer)		
May 4	Accounts Receivable—Sanuk	1,500		Merchandise Inventory	1,500	
	Sales		1,500	Accounts Payable—BMX		1,500
	Cost of Goods Sold	900				
	Merchandise Inventory		900			
6	No entry.			Merchandise Inventory	30	
				Cash		30
8	Accounts Receivable—Sanuk	1,000		Merchandise Inventory	1,000	
	Sales		1,000	Accounts Payable—BMX		1,000
	Cost of Goods Sold	700				
	Merchandise Inventory		700			
10	Delivery Expense	50		No entry.		
	Cash		50			
16	Sales Returns & Allowances	200		Accounts Payable—BMX	200	
	Accounts Receivable—Sanuk		200	Merchandise Inventory		200
	Merchandise Inventory	140				
	Cost of Goods Sold		140			
18	Cash	800		Accounts Payable—BMX	800	
	Accounts Receivable—Sanuk		800	Cash		800
21	Accounts Receivable—Sanuk	2,400		Merchandise Inventory	2,400	
	Sales		2,400	Accounts Payable—BMX		2,400
	Cost of Goods Sold	1,440				
	Merchandise Inventory		1,440			
31	Cash	2,352		Accounts Payable—BMX	2,400	
	Sales Discounts	48		Merchandise Inventory		48
	Accounts Receivable—Sanuk		2,400	Cash		2,352

Record and compare merchandising transactions using both periodic and perpetual inventory systems.

Periodic Inventory System

A periodic inventory system requires updating the inventory account only at the *end of a period*. During the period, the Merchandise Inventory balance remains unchanged and cost of merchandise is recorded in a temporary *Purchases* account. When a company sells merchandise, it records revenue ***but not the cost of the goods sold.*** At the end of the period, it takes a *physical count of inventory* to get ending inventory. The cost of goods sold is then computed as cost of merchandise available for sale minus ending inventory.

Recording Merchandise Purchases Under a periodic system, the purchases, purchases returns and allowances, purchases discounts, and transportation-in transactions are recorded in separate temporary accounts. At period-end, each of these temporary accounts is closed, which updates the Merchandise Inventory account. To demonstrate, journal entries under the periodic inventory system are shown for the most common transactions (codes ***a*** through ***d*** link these transactions to those in the chapter). For comparison, perpetual system journal entries are shown to the right of each periodic entry. Differences are highlighted.

page 173

Credit Purchases with Cash Discounts The periodic system uses a temporary **Purchases** account that accumulates the cost of all purchase transactions during each period. The Purchases account has a normal debit balance, as it increases the cost of merchandise available for sale. Z-Mart's November 2 entry to record the purchase of merchandise for $500 on credit with terms of 2/10, n/30 is

(*a*)

Periodic			Perpetual		
Purchases	500		Merchandise Inventory	500	
Accounts Payable		500	Accounts Payable		500

Payment of Purchases The periodic system uses a temporary **Purchases Discounts** account that accumulates discounts taken during the period. If payment for transaction *a* is made *within the discount period,* the entry is

Accounts Payable	500	
Purchases Discounts*		10
Cash		490
*$500 × 2%		

Accounts Payable	500	
Merchandise Inventory*		10
Cash		490
*$500 × 2%		

If payment for transaction *a* is made *after the discount period expires,* the entry is

(*b2*)

Periodic		
Accounts Payable	500	
Cash		500

Perpetual		
Accounts Payable	500	
Cash		500

Purchases Allowances The buyer and seller agree to a $30 purchases allowance for defective goods (whether paid within the discount period or not). In the periodic system, the temporary **Purchases Returns and Allowances** account accumulates the cost of all returns and allowances during a period. The buyer records the $30 allowance as

Point: Purchases Discounts and Purchases Returns and Allowances are contra purchases accounts and have normal credit balances, as they both decrease the cost of merchandise available for sale.

(*c1*)

Periodic		
Accounts Payable	30	
Purchases Returns and Allowances		30

Perpetual		
Accounts Payable	30	
Merchandise Inventory		30

Purchases Returns The buyer returns $50 of merchandise within the discount period. The entry is

(*c2*)

Periodic		
Accounts Payable	50	
Purchases Returns and Allowances		50

Perpetual		
Accounts Payable	50	
Merchandise Inventory		50

Transportation-In The buyer paid a $75 freight charge to transport goods with terms FOB shipping point. In the periodic system, this cost is recorded in a temporary **Transportation-In** account, which has a normal debit balance as it increases the cost of merchandise available for sale.

	Periodic			Perpetual		
(d)	Transportation-In	75		Merchandise Inventory	75	
	Cash		75	Cash		75

Recording Merchandise *Sales* Journal entries under the page 174 periodic system are shown for the most common transactions (codes ***e*** through ***h*** link these transactions to those in the chapter). Perpetual system entries are shown to the right of each periodic entry. Differences are highlighted.

Credit Sales and Receipt of Payments Both the periodic and perpetual systems record sales entries similarly, using the gross method. The same holds for entries related to payment of receivables from sales both during and after the discount period. However, under the periodic system, the cost of goods sold is *not* recorded at the time of each sale (whereas it is under the perpetual system). The entry to record $1,000 in credit sales (costing $300) is

Accounts Receivable	1,000			Accounts Receivable	1,000	
Sales		1,000		Sales		1,000
				Cost of Goods Sold	300	
No cost-side entry				Merchandise Inventory		300

Returns Received by Seller A customer returned merchandise for a cash refund. The goods sell for $15 and cost $9. (*Recall:* The periodic system records only the revenue effect, not the cost effect, for sales transactions.) The entry for the seller to take back the return is

	Periodic			Perpetual		
(e1)	Sales Returns and Allowances	15		Sales Returns and Allowances	15	
	Cash		15	Cash		15
(e2)				Merchandise Inventory	9	
	No entry			Cost of Goods Sold		9

Allowances Granted by Seller The seller gives a price reduction and credits the buyer's accounts receivable for $10. The entry is identical under the periodic and perpetual systems. The seller records this allowance as

	Periodic			Perpetual		
(f)	Sales Returns and Allowances	10		Sales Returns and Allowances	10	
	Accounts Receivable		10	Accounts Receivable		10

Recording Adjusting Entries

Shrinkage—Adjusting Entry Adjusting entries for the two systems are in Exhibit 4A.1. The $250 shrinkage is only recorded under the perpetual system—see entry *z* in Exhibit 4A.1. Shrinkage in cost of goods is unknown using a periodic system because inventory is not continually updated and therefore cannot be compared to the physical count.

Periodic—Adjusting Entries

(z)	None		
(g)	Sales Discounts	50	
	Allowance for Sales Discounts		50
(h1)	Sales Returns and Allowances	900	
	Sales Refund Payable		900
(h2)	Inventory Returns Estimated	300	
	Purchases		300

Entries in gray are covered in Appendix 5B.

Perpetual—Adjusting Entries

Cost of Goods Sold	250	
Merchandise Inventory		250
Sales Discounts	50	
Allowance for Sales Discounts		50
Sales Returns and Allowances	900	
Sales Refund Payable		900
Inventory Returns Estimated	300	
Cost of Goods Sold		300

Entries in gray are covered in Appendix 5B.

EXHIBIT 4A.1

Comparison of Adjusting Entries-Periodic and Perpetual

Expected Sales Discounts—Adjusting Entry Both the page 175 periodic and perpetual methods make a period-end adjusting entry under the gross method to estimate the $50 sales discounts arising from current-period sales that are likely to be taken in future periods. Z-Mart made the period-end adjusting entry *g* in Exhibit 4A.1 for expected sales discounts.

Expected Returns and Allowances—Adjusting Entry Both the periodic and perpetual inventory systems estimate returns and allowances arising from current-period sales that will occur in future periods. The adjusting entry for both systems is identical for the sales side, but slightly different for the cost side. The period-end entries *h1* and *h2* in Exhibit 4A.1 are used to record the updates to expected sales refunds of $900 and the cost side of $300. Under both systems, the seller sets up a **Sales Refund Payable** account, which is a current liability reflecting the amount expected to be refunded to customers, and an **Inventory Returns Estimated** account, which is a current asset reflecting the inventory estimated to be returned.

Recording Closing Entries Periodic and perpetual inventory systems have slight differences in closing entries. The period-end Merchandise Inventory balance (unadjusted) is $19,000 under the periodic system. Because the periodic system does not update the Merchandise Inventory balance during the period, the $19,000 amount is the beginning inventory. A physical count of inventory taken at the end of the period reveals $21,000 of merchandise available. Closing entries for the two systems follow. Recording the periodic inventory balance is a two-step process. The ending inventory balance of $21,000 is entered by debiting the inventory account in the first closing entry. The beginning inventory balance of $19,000 is deleted by crediting the inventory account in the second closing entry.[1]

	Periodic Closing Entries			Perpetual Closing Entries		
(1)	Sales	321,000		Sales	321,000	
	Merchandise Inventory (ending)	21,000				
	Purchases Discounts	4,200				
	Purchases Returns and Allowances	1,500				
	Income Summary		347,700	Income Summary		321,000
(2)	Income Summary	334,800		Income Summary	308,100	
	Sales Discounts		4,300	Sales Discounts		4,300
	Sales Returns and Allowances		2,000	Sales Returns and Allowances		2,000
	Merch. Inven. (beginning)		19,000			
	Purchases		235,800	Cost of Goods Sold		230,400
	Transportation-In		2,300			
	Depreciation Expense		3,700	Depreciation Expense		3,700
	Salaries Expense		43,800	Salaries Expense		43,800
	Insurance Expense		600	Insurance Expense		600
	Rent Expense		9,000	Rent Expense		9,000
	Supplies Expense		3,000	Supplies Expense		3,000
	Advertising Expense		11,300	Advertising Expense		11,300
(3)	Income Summary	12,900		Income Summary	12,900	
	Retained Earnings		12,900	Retained Earnings		12,900
(4)	Retained Earnings	4,000		Retained Earnings	4,000	
	Dividends		4,000	Dividends		4,000

[1]This approach is called the *closing entry method*. An alternative approach, referred to as the *adjusting entry method,* would not make any entries to Merchandise Inventory in the closing entries, but instead would make two adjusting entries. Using Z-Mart data, the two adjusting entries would be (1) Dr. Income Summary and Cr. Merchandise Inventory for $19,000 each and (2) Dr. Merchandise Inventory and Cr. Income Summary for $21,000 each. The first entry removes the beginning balance of Merchandise Inventory, and the second entry records the actual ending balance.

By updating Merchandise Inventory and closing Purchases, page 176
Purchases Discounts, Purchases Returns and Allowances, and Transportation-In, the periodic system transfers the cost of sales

amount to Income Summary. Review the periodic side of the closing entries and see that the **red** items affect Income Summary as follows.

Credit to Income Summary in the first closing entry includes amounts from	
Merchandise inventory (ending)	$ 21,000
Purchases discounts	4,200
Purchases returns and allowances	1,500
Debit to Income Summary in the second closing entry includes amounts from	
Merchandise inventory (beginning)	(19,000)
Purchases	(235,800)
Transportation-in	(2,300)
Net effect on Income Summary (net debit = cost of goods sold)	$(230,400)

This $230,400 effect on Income Summary is the cost of goods sold amount (which is equal to cost of goods sold reported in a perpetual inventory system). The periodic system transfers cost of goods sold to the Income Summary account but without using a Cost of Goods Sold account. Also, the periodic system does not separately measure shrinkage. Instead, it computes cost of goods available for sale, subtracts the cost of ending inventory, and defines the difference as cost of goods sold, which includes shrinkage.

Preparing Financial Statements The financial statements of a merchandiser using the periodic system are similar to those for a service company described in prior chapters. The income statement mainly differs by the inclusion of *cost of goods sold* and *gross profit*—of course, net sales is affected by discounts, returns, and allowances. The cost of goods sold section under the periodic system is shown here. The balance sheet mainly differs by the inclusion of *merchandise inventory,* inventory returns estimated, allowance for sales discounts, and sales refund payable. Visit the Additional Student Resource section of the Connect eBook to view sample chart of accounts for periodic and perpetual systems.

Calculation of Cost of Goods Sold	
Beginning inventory	$ 19,000
Net cost of purchases	232,400
Cost of goods available for sale	251,400
Less ending inventory	21,000
Cost of goods sold	$230,400

APPENDIX

4B

P6

Prepare adjustments for discounts, returns, and allowances per revenue recognition rules.

Adjusting Entries under New Revenue Recognition Rules

Expected Sales Discounts—Adjusting Entry New revenue recognition rules require sales to be reported at the amount expected to be received. This means that a period-end adjusting entry is made to estimate sales discounts for current-period sales that are expected to be taken in future periods. To demonstrate, assume Z-Mart has the following unadjusted balances.

Accounts Receivable	$11,250

Allowance for Sales Discounts	$0

Of the $11,250 of receivables, $2,500 of them are within the 2% discount period, for which we expect buyers to take $50 in future-period discounts (computed as $2,500 × 2%) arising from this period's sales. The adjusting entry for the $50 update to Allowance for Sales Discounts is

Assets	=	Liabilities	+	Equity
−50				−50

(*g*) Dec. 31	Sales Discounts	50	
	Allowance for Sales Discounts		50
	Adjustment for future discounts.		

Allowance for Sales Discounts is a **contra asset account** and is reported on the balance sheet as a reduction to the Accounts Receivable asset account. The Allowance for Sales Discounts account has a *normal credit balance* because it reduces Accounts Receivable, which has a normal debit balance. This adjusting entry results in both accounts receivable and sales being reported at expected amounts.*

Allowance for Sales Discounts	
	Beg. bal. 0
	Req. adj. 50
	Est. bal. 50

Balance Sheet—partial	
Accounts receivable	$11,250
Less allowance for sales discounts	50
Accounts receivable, net	$11,200

Income Statement—partial	
Sales	$321,000
Less sales discounts, returns & allowances	6,300
Net sales	$314,700

****Next Period Adjustment*** The Allowance for Sales Discounts balance remains unchanged during a period except for the period-end adjusting entry. At next period-end, assume that Z-Mart computes an $80 balance for the Allowance for Sales Discounts. Using our three-step adjusting process we get:

Step 1: Current bal. *is* $50 credit in Allowance for Sales Discounts.

Step 2: Current bal. should be $80 credit in Allowance for Sales Discounts.

Step 3: Record entry to get from step 1 to step 2. Sales Discounts..... 30

Allowance for Sales Discounts..... 30

Expected Returns and Allowances—Adjusting Entries To avoid overstatement of sales and cost of sales, sellers estimate sales returns and allowances in the period of the sale. Estimating returns and allowances requires companies to maintain the following two balance sheet accounts that are set up with adjusting entries. Two adjusting entries are made: one for the revenue side *and* one for the cost side.

Current Asset→Inventory Returns Estimated

Current Liability→Sales Refund Payable

Revenue Side for Expected R&A When returns and allowances are expected, a seller sets up a **Sales Refund Payable** account, which is **a current liability showing the amount expected to be refunded to customers.** Assume that on December 31 the company estimates future sales refunds to be $1,200. Assume also that the *unadjusted balance* in Sales Refund Payable is a $300 credit. The adjusting entry for the $900 update to Sales Refund Payable follows. The Sales Refund Payable account is updated only during the adjusting entry

process. Its balance remains unchanged during the period when actual returns and allowances are recorded.

(*h1*) Dec. 31	Sales Returns and Allowances	900	
	Sales Refund Payable		900
	*Expected refund of sales.**		

Assets = Liabilities + Equity
+900 −900

*This entry uses our three-step adjusting process:
Step 1: Current bal. is $300 credit for Sales Refund Payable.
Step 2: Current bal. should be $1,200 credit for Sales Refund Payable.
Step 3: Record entry to get from step 1 to step 2.

Sales Refund Payable

Beg. bal.	300
Req. adj.	900
Est. bal.	1,200

Cost Side for Expected R&A On the cost side, some inventory is expected to be returned, which means that cost of goods sold recorded at the time of sale is overstated due to expected returns. A seller sets up an **Inventory Returns Estimated** account, which is **a current asset showing the inventory estimated to be returned.** Extending the example above, assume that the company estimates future inventory returns to be $500 (which is the cost side of the $1,200 expected returns and allowances above). Assume also that the (beginning) *unadjusted balance* in Inventory Returns Estimated is a $200 debit. The adjusting entry for the $300 update to expected returns follows. The Inventory Returns Estimated account is updated only during the adjusting entry process. Its balance remains unchanged during the period when actual returns and allowances are recorded. If estimates of returns and allowances prove too high or too low, we adjust future estimates accordingly.

(*h2*) Dec. 31	Inventory Returns Estimated	300	
	Cost of Goods Sold		300
	*Expected return of inventory.**		

Assets = Liabilities + Equity
+300 +300

*This entry uses our three-step adjusting process:
Step 1: Current bal. is $200 debit for Inventory Returns Estimated.
Step 2: Current bal. should be $500 debit for Inventory Returns Estimated.
Step 3: Record entry to get from step 1 to step 2.

Inventory Returns Estimated

Beg. bal.	200
Req. adj.	300
Est. bal.	500

NEED-TO-KNOW 4-8

Estimating Discounts, Returns, and Allowances

P6

At the current year-end, a company shows the following unadjusted balances for selected accounts.

Allowance for Sales Discounts	$ 75 credit	Sales Discounts	$1,850 debit
Sales Refund Payable	800 credit	Sales Returns and Allowances	4,825 debit
Inventory Returns Estimated	450 debit	Cost of Goods Sold	9,875 debit

a. After an analysis of future sales discounts, the company estimates that the Allowance for Sales Discounts account should have a $275 credit balance. Prepare the current year-end adjusting journal entry for future sales discounts.

b. After an analysis of future sales returns and allowances, the company estimates that the Sales Refund Payable account should have an $870 credit balance (revenue side).

c. After an analysis of future inventory returns, the company estimates that the Inventory Returns Estimated account should have a $500 debit balance (cost side).

Solution

a. Dec. 31	Sales Discounts	200	
	Allowance for Sales Discounts		200
	Adjustment for future discounts. $275 Cr. – $75 Cr.		
b. Dec. 31	Sales Returns and Allowances	70	
	Sales Refund Payable		70
	Adjustment for future sales refund. $870 Cr. – $800 Cr.		
c. Dec. 31	Inventory Returns Estimated	50	
	Cost of Goods Sold		50
	Adjustment for future inventory returns. $500 Dr. – $450 Dr.		

Do More: QS 4-28, QS 4-29, E 4-25, E 4-26, E 4-27

APPENDIX 4C

P7

Record and compare merchandising transactions using the gross method and net method.

Net Method for Merchandising

The **net method** records an invoice at its *net* amount (net of any cash discount). The **gross method,** covered earlier in the chapter, initially records an invoice at its gross (full) amount. This appendix records merchandising transactions using the net method. Differences with the gross method are highlighted.

When invoices are recorded at *net* amounts, any cash discounts are deducted from the balance of the Merchandise Inventory account when initially recorded. **This assumes that all cash discounts will be taken.** If any discounts are later lost, they are recorded in a **Discounts Lost** expense account reported on the income statement.

Perpetual Inventory System

PURCHASES—Perpetual A company purchases merchandise on November 2 at a $500 invoice price ($490 net) with terms of 2/10, n/30. Its November 2 entries under the gross and net methods are

Gross Method—Perpetual

Merchandise Inventory	500	
Accounts Payable		500

Net Method—Perpetual

Merchandise Inventory	490	
Accounts Payable		490

If the invoice is paid on (or before) November 12 within the discount period, it records

Gross Method—Perpetual

Accounts Payable	500	
Merchandise Inventory		10
Cash		490

Net Method—Perpetual

Accounts Payable	490	
Cash		490

If the invoice is paid *after the discount period,* it records

Gross Method—Perpetual

Accounts Payable	500	
Cash		500

Net Method—Perpetual

Accounts Payable	490	
Discounts Lost*	10	
Cash		500

*For simplicity, we record Discounts Lost on the *payment date*.

SALES—Perpetual A company sells merchandise on November 2 at a $500 invoice price ($490 net) with terms of 2/10, n/30. The goods cost $200. Its November 2 entries are

Accounts Receivable	500	
Sales		500

Accounts Receivable	490	
Sales		490

Cost of Goods Sold	200	
Merchandise Inventory		200

Cost of Goods Sold	200	
Merchandise Inventory		200

If cash is received on (or before) November 12 within the discount period, it records

Gross Method—Perpetual

Cash	490	
Sales Discounts	10	
Accounts Receivable		500

Net Method—Perpetual

Cash	490	
Accounts Receivable		490

If cash is received *after the discount period,* it records

Gross Method—Perpetual

Cash	500	
Accounts Receivable		500

Net Method—Perpetual

Cash	500	
Interest Revenue		10
Accounts Receivable		490

Summary: Cheat Sheet

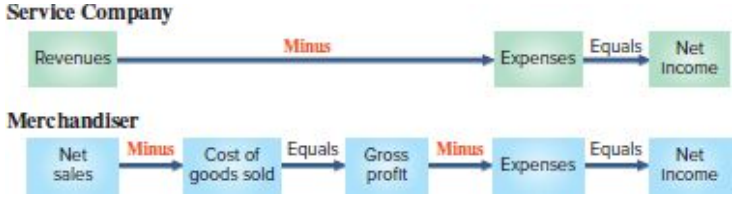
MERCHANDISING ACTIVITIES

Merchandise: Goods a company buys to resell.

Cost of goods sold: Costs of merchandise sold.

Gross profit (gross margin): Net sales minus cost of goods sold.

Computing net income (service company vs. merchandiser):



Inventory: Costs of merchandise owned but not yet sold. It is a current asset on the balance sheet.

Merchandise Cost Flows:

Perpetual inventory system: Updates accounting records for each purchase and each sale of inventory.

Periodic inventory system: Updates accounting records for purchases and sales of inventory only at the end of a period.

MERCHANDISING PURCHASES

Cash discount: A purchases discount on the price paid by the buyer, or a sales discount on the amount received for the seller.

Credit terms example: "2/10, n/60" means full payment is due within 60 days, but the buyer can deduct 2% of the invoice amount if payment is made within 10 days.

Gross method: Initially record purchases at gross (full) invoice amounts.

Purchasing Merchandise for Resale Entries:

Purchasing merchandise on credit	Merchandise Inventory	500	
	Accounts Payable		500
Paying within discount period (Inventory reduced by discount taken)	Accounts Payable	500	
	Merchandise Inventory		10
	Cash		490
Paying outside discount period	Accounts Payable	500	
	Cash		500
Recording purchases returns or allowances	Cash or Accounts Payable	30	
	Merchandise Inventory		30

Transportation Costs and Ownership Transfer Rules:

Shipping Terms	Ownership Transfers at	Goods in Transit Owned by	Transportation Costs Paid by
FOB shipping point	Shipping point	Buyer	**Buyer** Merchandise Inventory . . . # Cash . . . . . #
FOB destination	Destination	Seller	**Seller** Delivery Expense . . . . . # Cash . . . . . #

MERCHANDISING SALES

Selling merchandise on credit	Accounts Receivable	1,000	
	Sales		1,000
	Cost of Goods Sold	300	
	Merchandise Inventory		300
Receiving payment within discount period	Cash	980	
	Sales Discounts	20	
	Accounts Receivable		1,000

Receiving payment outside discount period	Cash	1,000	
	Accounts Receivable		1,000

Sales Discounts: A contra revenue account, meaning Sales Discounts is subtracted from Sales when computing net sales.

Customer Merchandise Returns Entries:

Receiving sales returns of nondefective inventory	Sales Returns and Allowances . .	15	
	Cash or Accounts Receivable		15
	Merchandise Inventory	9	
	Cost of Goods Sold		9

Sales allowance: A price reduction agreed to when a buyer is unsatisfied with the goods.

Recognizing sales allowances	Sales Returns and Allowances . .	10	
	Cash or Accounts Receivable		10

MERCHANDISER REPORTING

Inventory shrinkage: An adjusting entry to account for the loss of inventory due to theft or deterioration. It is computed by comparing a physical count of inventory with recorded amounts.

Adjustment for shrinkage (occurs when recorded amount larger than physical inventory)	Cost of Goods Sold	250	
	Merchandise Inventory.....		250

Closing Entries: Differences between merchandisers and service companies in red.

Step 2: Close Debit Balances in Temporary Accounts to Income Summary	Income Summary.....	308,100	
	Sales Discounts		4,300
	Sales Returns and Allowances..		2,000
	Cost of Goods Sold.....		230,400
	Other Expenses		71,400

Step 3: Close Income Summary (same entry as for service company)

Step 4: Close Dividends (same entry as for service company)

Multiple-step income statement: Three parts: (1) gross profit; (2) income from operations, which is gross profit minus operating expenses; and (3) net income, which is income from operations plus or minus nonoperating items.

Operating expenses: Separated into selling expenses and general & administrative expenses.

Selling expenses: Expenses of advertising merchandise, making sales, and delivering goods to customers.

General & administrative expenses: Expenses that support a company's overall operations, including accounting and human resources.

Nonoperating activities: Consist of expenses, revenues, losses, and gains that are unrelated to a company's main operations.

Multiple-Step Income Statement Example

Income Statement		
Sales		$321,000
Less: Sales discounts	$4,300	
Sales returns and allowances	2,000	6,300
Net sales		314,700
Cost of goods sold		230,400
Gross profit		84,300
Operating expenses		
Selling expenses†		
General and administrative expenses†		
Total operating expenses		71,400
Income from operations		12,900
Total other revenues and gains (expenses and losses)		2,000
Net income		$ 14,900

†Must list all individual expenses and amounts—see Exhibit 5.13 (not done here for brevity).

Single-Step Income Statement Example

Income Statement	
Revenues	
Total revenues*	$318,200
Expenses	
Total expenses*	303,300
Net income	$ 14,900

*Must list all individual items and amounts-see Exhibit 4.14 (not done here for brevity).

Key Terms

Acid-test ratio (168)

Allowance for Sales Discounts (177)

Cash discount (155)

Cost of goods sold (153)

Credit period (155)

Credit terms (155)

Discount period (156)

Discounts Lost (178)

FOB (158)

General and administrative expenses (166)

Gross margin (154)

Gross margin ratio (169)

Gross method (156)

Gross profit (154)

Inventory (154)

Inventory Returns Estimated (175)

Merchandise (153)

Merchandise inventory (154)

Merchandiser (153)

Multiple-step income statement (166)

Net method (160)

Periodic inventory system (154)

Perpetual inventory system (154)

Purchases discount (155)

Retailer (153)

Sales discount (156)

Sales Refund Payable (175)

Sales Returns and Allowances (161)

Selling expenses (166)

Shrinkage (163)

Single-step income statement (167)

Supplementary records (159)

Wholesaler (153)

Multiple Choice Quiz

1. A company has $550,000 in net sales and $193,000 in gross profit. This means its cost of goods sold equals

a. $743,000.

b. $550,000.

c. $357,000.

e. $(193,000).

d. $193,000.

2. A company purchased $4,500 of merchandise on May 1 with terms of 2/10, n/30. On May 6, it returned $250 of that merchandise. On May 8, it paid the balance owed for merchandise, taking any discount it is entitled to. The cash paid on May 8 is

a. $4,500.

b. $4,250.

c. $4,160.

d. $4,165.

e. $4,410.

3. A company has cash sales of $75,000, credit sales of $320,000, sales returns and allowances of $13,700, and sales discounts of $6,000. Its net sales equal

a. $395,000.

b. $375,300.

c. $300,300.

d. $339,700.

e. $414,700.

4. A company's quick assets are $37,500, its current assets are $80,000, and its current liabilities are $50,000. Its acid-test ratio equals

a. 1.600.

b. 0.750.

c. 0.625.

d. 1.333.

e. 0.469.

5. A company's net sales are $675,000, its cost of goods sold is $459,000, and its net income is $74,250. Its gross margin ratio equals

a. 32%.

b. 68%.

c. 47%.

d. 11%.

e. 34%.

ANSWERS TO MULTIPLE CHOICE QUIZ

1. c; Gross profit = $550,000 − $193,000 = $357,000

2. d; ($4,500 − $250) × (100% − 2%) = $4,165

3. b; Net sales = $75,000 + $320,000 − $13,700 − $6,000 = $375,300

4. b; Acid-test ratio = $37,500/$50,000 = 0.75

5. a; Gross margin ratio = ($675,000 − $459,000)/$675,000 = 32%

Superscript letter A, B, or C denotes assignments based on Appendix 4A, 4B, or 4C.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

connect

QUICK STUDY

QS 4-1

Applying merchandising terms

C1 P1

Match each phrase with its definition.

A. Sales discount

B. Credit period

C. Discount period

D. FOB destination

E. FOB shipping point

F. Gross profit

G. Merchandise inventory

H. Purchases discount

1. Goods a company owns and expects to sell to its customers.

2. Time period that can pass before a customer's full payment is due.

3. Seller's description of a cash discount granted to buyers in return for early payment.

4. Ownership of goods is transferred when the seller delivers goods to the carrier.

5. Purchaser's description of a cash discount received from a supplier of goods.

6. Difference between net sales and the cost of goods sold.

7. Time period in which a cash discount is available.

8. Ownership of goods is transferred when delivered to the buyer's place of business.

QS 4-2

Identifying inventory costs

C1

Costs of $5,000 were incurred to acquire goods and make them ready for sale. The goods were shipped to the buyer (FOB shipping point) for a cost of $200. Additional necessary costs of $400 were incurred to acquire the goods. No other incentives or discounts were available. Compute the buyer's total cost of merchandise inventory.

QS 4-3

Merchandise accounts and computations

C1

Use the following information (in random order) from a merchandising company and from a service company. *Hint:* Not all information may be necessary for the solutions.

a. For the merchandiser only, compute (1) goods available for sale, (2) cost of goods sold, and (3) gross profit.

b. Compute net income for each company.

McNeil Merchandising Company			
Accumulated depreciation	$ 700	Expenses	$1,450
Beginning inventory	5,000	Net purchases	3,900
Ending inventory	1,700	Net sales	9,500

Krug Service Company			
Expenses	$12,500	Prepaid rent	$ 800
Revenues	14,000	Accounts payable	200
Cash	700	Equipment	1,300

QS 4-4

Computing net invoice amounts

P1

Compute the amount to be paid for each of the four separate invoices assuming that all invoices are paid *within* the discount period.

	Merchandise (gross)	Terms		Merchandise (gross)	Terms
a.	$5,000	2/10, n/60	**c.**	$75,000	1/10, n/30
b.	$20,000	1/15, n/90	**d.**	$10,000	3/15, n/45

QS 4-5

Recording purchases, returns, and discounts taken

P1

Prepare journal entries to record each of the following transactions of a merchandising company. The company uses a perpetual inventory system and the gross method.

Nov. 5 Purchased 600 units of product at a cost of $10 per unit. Terms of the sale are 2/10, n/60; the invoice is dated November 5.

7 Returned 25 defective units from the November 5 purchase and received full credit.

15 Paid the amount due from the November 5 purchase, minus the return on November 7.

QS 4-6

Recording purchases and discounts taken

P1

Prepare journal entries to record each of the following transactions. The company records purchases using the gross method and a perpetual inventory system.

Aug. 1 Purchased merchandise with an invoice price of $60,000 and credit terms of 3/10, n/30.

11 Paid supplier the amount owed from the August 1 purchase.

QS 4-7

Recording purchases and discounts missed

P1

Prepare journal entries to record each of the following transactions. The company records purchases using the gross method and a perpetual inventory system.

Sep. 15 Purchased merchandise with an invoice price of $35,000 and credit terms of 2/5, n/15.

29 Paid supplier the amount owed on the September 15 purchase.

QS 4-8

Recording purchases and returns; **no** discounts

P1

Prepare journal entries to record each of the following transactions. The company records purchases using the gross method and a perpetual inventory system.

May 1 Purchased merchandise with a price of $800 and credit terms of n/30.

7 Returned merchandise that had a price of $100.

31 Paid the amount due from the May 1 purchase, minus the May 7 return.

QS 4-9

Recording purchases and allowances; **no** discounts

P1

Prepare journal entries to record each of the following transactions. The company records purchases using the gross method and a perpetual inventory system.

June 1 Purchased merchandise with a price of $450 and credit terms of n/45.

9 Received a $50 allowance (for scratched merchandise) toward the June 1 purchase.

July 16 Paid the amount due from the June 1 purchase, minus the June 9 allowance.

QS 4-10

Recording sales, returns, and discounts taken

P2

Prepare journal entries to record each of the following sales transactions of a merchandising company. The company uses a perpetual inventory system and the gross method.

Apr. 1 Sold merchandise for $3,000, with credit terms n/30; invoice dated April 1. The cost of the merchandise is $1,800.

4 The customer in the April 1 sale returned $300 of merchandise for full credit. The merchandise, which had cost $180, is returned to inventory.

8 Sold merchandise for $1,000, with credit terms of 1/10, n/30; invoice dated April 8. Cost of the merchandise is $700.

11 Received payment for the amount due from the April 1 sale less the return on April 4.

QS 4-11

Recording sales and returns; **no** discounts

P2

Prepare journal entries to record each of the following sales transactions of EcoMart Merchandising. EcoMart uses a *perpetual* inventory system and the *gross* method.

Oct. 1 Sold merchandise for $1,500, with credit terms n/30, invoice dated October 1. The cost of the merchandise is $900.

6 The customer in the October 1 sale returned $150 of merchandise for full credit. The merchandise, which had cost $90, is returned to inventory.

9 Sold merchandise for $700 cash. Cost of the merchandise is $450.

30 Received payment for the amount due from the October 1 sale less the return on October 6.

QS 4-12

Effects of sales transactions on income statement **P2**

Analyze each transaction in QS 4-11 by indicating its effects on the components of the income statement—specifically, identify the following six accounts and dollar effects (including + or −) for each transaction: sales (gross), sales discounts, sales returns and allowances, net sales, cost of goods sold, and gross profit.

QS 4-13

Recording sales, returns, and allowances; **no** discounts

P2

Prepare journal entries to record each of the following sales transactions of TFC Merchandising. TFC uses a perpetual inventory system and the gross method.

May 1 Sold merchandise for $600, with credit terms n/60. The cost of the merchandise is $400.

9 The customer discovers slight defects in some units. TFC gives a price reduction (allowance) and credits the customer's accounts receivable for $40 to compensate for the defects.

June 4 The customer in the May 1 sale returned $75 of merchandise for full credit. The merchandise, which had cost $50, is returned to inventory.

30 Received payment for the amount due from the May 1 sale less the May 9 allowance and June 4 return.

QS 4-14

Accounting for shrinkage—perpetual system

P3

Telo Company's ledger on July 31, its fiscal year-end, shows merchandise inventory of $37,800 before accounting for any shrinkage. A physical count of its July 31 year-end inventory discloses that the cost of the merchandise inventory still available is $35,900. Prepare the entry to record any inventory shrinkage.

QS 4-15

Closing entries **P3**

Nix'It Company's ledger on July 31, its fiscal year-end, includes the following selected accounts that have normal balances. Nix'It uses the

perpetual inventory system. Prepare the company's year-end closing entries.

Retained earnings	$115,300	Sales returns and allowances	$ 6,500
Dividends	7,000	Cost of goods sold	106,900
Sales	170,000	Depreciation expense	10,300
Sales discounts	4,700	Salaries expense	32,500
		Miscellaneous expenses	5,000

QS 4-16

Identifying type of income statement

P4

Indicate whether each statement describes a multiple-step income statement or a single-step income statement.

1. Commonly reports detailed computations of net sales and other costs and expenses.
2. Statement limited to two main categories (revenues and expenses).
3. Reports gross profit on a separate line.
4. Separates income from operations from the other revenues and gains.

QS 4-17

Computing missing amounts using income statement relations

P4

Compute the missing amounts in the separate (partial) income statements A, B, and C.

	A	B	C
Sales	$?	$20,000	$90,000
Sales discounts	1,500	500	2,000
Sales returns and allowances	4,000	?	7,000
Net sales	35,000	16,500	?
Cost of goods sold	?	14,000	?
Gross profit	13,000	?	21,000

QS 4-18

Computing net sales and gross profit **P4**

Vitamix reports the following information for its year ended December 31: cash sales of $60,000; sales on credit of $90,000; general and administrative expenses of $17,000; sales returns of $11,000; cost of goods sold of $80,000; sales discounts of $2,000; and selling expenses of $24,000.

Compute (*a*) net sales and (*b*) gross profit.

QS 4-19

Preparing gross profit section of a multiple-step income statement **P4**

Using the year-end information from QS 4-18, prepare the gross profit section of a multiple-step income statement.

QS 4-20

Preparing a multiple-step income statement

P4

Save-the-Earth Co. reports the following income statement accounts for the year ended December 31. Prepare a multiple-step income statement that includes separate categories for net sales, cost of goods sold, selling expenses, and general and administrative expenses. Categorize the following accounts as selling expenses: Sales Staff Salaries Expense and Advertising Expense. Categorize the remaining expenses as general and administrative.

Sales discounts	$ 750	Office supplies expense	$ 500
Office salaries expense	2,000	Cost of goods sold	9,000
Rent expense—Office space	1,500	Sales	20,000
Advertising expense	500	Insurance expense	1,000
Sales returns and allowances	250	Sales staff salaries expense	2,500

QS 4-21

Preparing a classified balance sheet for a merchandiser

P4

Clear Water Co. reports the following balance sheet accounts as of December 31. Prepare a classified balance sheet.

Buildings	$25,000	Notes payable (due in 7 years)	$30,000
Accounts receivable	2,000	Office supplies	1,000
Land	15,000	Common stock	10,000
Merchandise inventory	7,000	Retained earnings	6,000
Accounts payable	5,000	Wages payable	3,000
Cash	8,000	Accumulated Depreciation—Buildings	4,000

QS 4-22

Computing and interpreting acid-test ratio

A1

The following information on current assets and current liabilities is for Belkin Company. (a) Compute Belkin's acid-test ratio. (b) If its competitor, Logit, has an acid-test ratio of 1.2, which company is better able to pay for current liabilities with its quick assets?

Cash	$1,490	Prepaid expenses	$ 700
Accounts receivable	2,800	Accounts payable	5,750
Inventory	6,000	Other current liabilities	850

QS 4-23

Computing and analyzing gross margin ratio

A1

(*a*) Compute net sales, gross profit, and the gross margin ratio for each of the four separate companies.

(*b*) Which company has the best gross margin ratio?

	Carrier	Lennox	Trane	York
Sales	$150,000	$550,000	$38,700	$255,700
Sales discounts	5,000	17,500	600	4,800
Sales returns and allowances	20,000	6,000	5,100	900
Cost of goods sold	79,750	329,589	24,453	126,500

QS 4-24[A]

Contrasting periodic and perpetual systems

P5

Identify whether each description best applies to a periodic or a perpetual inventory system.

a. Updates the inventory account only at period-end.

b. Requires an adjusting entry to record inventory shrinkage.

c. Returns immediately affect the account balance of Merchandise Inventory.

d. Records cost of goods sold each time a sales transaction occurs.

e. Provides more timely information to managers.

QS 4-25[A]

Periodic: Computing cost of goods sold

P5

Chazen Company's inventory balance at the beginning of the year was $6,000. During the year, the company had Purchases of $30,000 and Purchases Returns and Allowances of $2,000. The company's inventory balance at the end of the year is $4,000.

Compute cost of goods sold for the year assuming Chazen uses the periodic inventory system.

QS 4-26[A]

Periodic: Recording purchases, returns, and discounts P5

Refer to QS 4-5 and prepare journal entries to record each of the merchandising transactions assuming that the company records purchases using the *gross* method and a *periodic* inventory system.

QS 4-27[A]

Periodic: Recording sales, returns, and discounts **P5**

Refer to QS 4-10 and prepare journal entries to record each of the merchandising transactions assuming that the company records purchases using the *gross* method and a *periodic* inventory system.

QS 4-28[B]

Recording estimates of future discounts

P6

ProBuilder has the following June 30 fiscal-year-end unadjusted balances: Allowance for Sales Discounts, $0; and Accounts Receivable, $10,000. Of the $10,000 of receivables, $2,000 are within a 3% discount period, meaning that it expects buyers to take $60 in future discounts arising from this period's sales.

a. Prepare the June 30 fiscal-year-end adjusting journal entry for future sales discounts.

b. Assume the same facts above *and* that there is a $10 fiscal-year-end unadjusted credit balance in the Allowance for Sales Discounts. Prepare the June 30 fiscal-year-end adjusting journal entry for future sales discounts.

QS 4-29[B]

Recording estimates of future returns

P6

ProBuilder reports merchandise sales of $50,000 and cost of merchandise sales of $20,000 in its first year of operations ending June 30. It makes fiscal-year-end adjusting entries for estimated future

returns and allowances equal to 2% of sales, or $1,000, and 2% of cost of sales, or $400.

a. Prepare the June 30 fiscal-year-end adjusting journal entry for future returns and allowances related to sales.

b. Prepare the June 30 fiscal-year-end adjusting journal entry for future returns and allowances related to cost of sales.

QS 4-30[C]

Net method: Recording purchases, returns, and discounts **P7**

Refer to QS 4-5 and prepare journal entries to record each of the merchandising transactions assuming that the company records purchases using the *net* method and a *perpetual* inventory system.

QS 4-31[C]

Net method: Recording sales, returns, and discounts **P7**

Refer to QS 4-10 and prepare journal entries to record each of the merchandising transactions assuming that the company records purchases using the *net* method and a *perpetual* inventory system.

EXERCISES

Exercise 4-1

Computing revenues, expenses, and income

C1

Fill in the blanks in the following separate income statements *a* through *e*.

	a	b	c	d	e
Sales	$62,000	$43,500	$55,000	$?	$25,600
Cost of goods sold					
Merchandise inventory, beginning	8,000	17,050	7,500	8,000	4,560
Total cost of merchandise purchases	38,000	?	?	32,000	6,600
Merchandise inventory, ending	?	3,000	9,000	6,600	?
Cost of goods sold	34,050	16,000	?	?	7,000
Gross profit	?	?	12,750	45,600	?
Expenses	10,000	10,650	12,150	3,600	6,000
Net income (loss)	$?	$16,850	$ 600	$42,000	$?

Exercise 4-2

Operating cycle for merchandiser

C1

The operating cycle of a merchandiser with credit sales includes the following five activities. Starting with merchandise acquisition, identify the chronological order of these five activities.

a. Prepare merchandise for sale.

b. Collect cash from customers on account.

c. Make credit sales to customers.

d. Purchase merchandise.

e. Monitor and service accounts receivable.

Exercise 4-3

Recording purchases, purchases returns, and purchases allowances

P1

Prepare journal entries to record the following transactions for a retail store. The company uses a perpetual inventory system and the gross method.

Apr. 2 Purchased $4,600 of merchandise from Lyon Company with credit terms of 2/15, n/60, invoice dated April 2, and FOB shipping point.

3 Paid $300 cash for shipping charges on the April 2 purchase.

4 Returned to Lyon Company unacceptable merchandise that had an invoice price of $600.

17 Sent a check to Lyon Company for the April 2 purchase, net of the discount and the returned merchandise.

18 Purchased $8,500 of merchandise from Frist Corp. with credit terms of 1/10, n/30, invoice dated April 18, and FOB destination.

21 After negotiations over scuffed merchandise, received from Frist a $500 allowance toward the $8,500 owed on the April 18 purchase.

28 Sent check to Frist paying for the April 18 purchase, net of the allowance and the discount.

Check Apr. 28, Cr. Cash, $7,920

Exercise 4-4

Purchasing transactions

P1

Prepare journal entries to record the following transactions of Recycled Fashion retail store. Recycled Fashion uses a perpetual inventory system and the gross method.

Mar. 3 Purchased $1,150 of merchandise from GreenWorld Company with credit terms of 2/15, n/60, invoice dated March 3, and FOB shipping point.

4 Paid $75 cash for shipping charges on the March 3 purchase.

5 Returned to GreenWorld unacceptable merchandise that had an invoice price of $150.

18 Paid GreenWorld for the March 3 purchase, net of the discount and the returned merchandise.

19 Purchased $425 of merchandise from PeopleFirst Corp. with credit terms of 1/10, n/30, invoice dated March 19, and FOB

destination.

21 After negotiations, received from PeopleFirst a $25 allowance (for scuffed merchandise) toward the $425 owed on the March 19 purchase.

29 Sent check to PeopleFirst paying for the March 19 purchase, net of the allowance and the discount.

Exercise 4-5

Determining inventory ownership and costs in transit

P1

For each transaction of Sealy Co., (a) determine whether or not Sealy owns the goods during transit. (b) If Sealy is responsible for transportation costs, record the entry for shipping costs assuming they are paid in cash and the perpetual inventory system is used.

1. Sealy purchased goods FOB shipping point. Transportation costs are $600.
2. Sealy sold goods FOB destination. Transportation costs are $200.
3. Sealy sold goods FOB shipping point. Transportation costs are $350.
4. Sealy purchased goods FOB destination. Transportation costs are $125.

Exercise 4-6

Recording sales, sales returns, and sales allowances

P2

Allied Merchandisers was organized on May 1. Macy Co. is a major customer (buyer) of Allied (seller) products. Prepare journal entries to record the following transactions for Allied assuming it uses a perpetual inventory system and the gross method.

May 3 Allied made its first and only purchase of inventory for the period on May 3 for 2,000 units at a price of $10 cash per unit

(for a total cost of $20,000).

5 Allied sold 1,500 of the units in inventory for $14 per unit (invoice total: $21,000) to Macy Co. under credit terms 2/10, n/60. The goods cost Allied $15,000.

7 Macy returns 125 units because they did not fit the customer's needs (invoice amount: $1,750). Allied restores the units, which cost $1,250, to its inventory.

8 Macy discovers that 200 units are scuffed but are still of use and, therefore, keeps the units. Allied gives a price reduction (allowance) and credits Macy's accounts receivable for $300 to compensate for the damage.

15 Allied receives payment from Macy for the amount owed on the May 5 purchase; payment is net of returns, allowances, and any cash discount.

Exercise 4-7

Effects of sales transactions on income statement **P2**

Analyze each transaction in Exercise 4-6 by indicating its effects on the income statement—specifically, identify the following six accounts and dollar effects (including + or −) for each transaction: sales (gross), sales discounts, sales returns and allowances, net sales, cost of goods sold, and gross profit.

Exercise 4-8

Recording purchases, purchases returns, and purchases allowances **P1**

Refer to Exercise 4-6 and prepare journal entries for Macy Co. to record each of the May transactions. Macy is a retailer that uses the gross method and a perpetual inventory system; it purchases these units for resale.

Exercise 4-9

Recording sales, purchases, and cash discounts—buyer and seller

P1 P2

Santa Fe Retailing purchased merchandise from Mesa Wholesalers with credit terms of 3/10, n/60 and an invoice price of $24,000. The merchandise had cost Mesa $16,000. Assume that both buyer and seller use a perpetual inventory system and the gross method.

1. Prepare entries that the *buyer* records for the (*a*) purchase, (*b*) cash payment *within* the discount period, and (*c*) cash payment *after* the discount period.
2. Prepare entries that the *seller* records for the (*a*) sale, (*b*) cash collection *within* the discount period, and (*c*) cash collection *after* the discount period.

Exercise 4-10

Recording sales, purchases, shipping, and returns—buyer and seller

P1 P2

Sydney Retailing (buyer) and Troy Wholesalers (seller) enter into the following transactions. Both Sydney and Troy use a perpetual inventory system and the gross method.

May 11 Sydney accepts delivery of $40,000 of merchandise it purchases for resale from Troy: invoice dated May 11, terms 3/10, n/90, FOB shipping point. The goods cost Troy $30,000. Sydney pays $345 cash to Express Shipping for delivery charges on the merchandise.

12 Sydney returns $1,400 of the $40,000 of goods to Troy, who receives them the same day and restores them to its inventory. The returned goods had cost Troy $1,050.

20 Sydney pays Troy for the amount owed. Troy receives the cash immediately.

1. Prepare journal entries that Sydney Retailing (buyer) records for these three transactions.

2. Prepare journal entries that Troy Wholesalers (seller) records for these three transactions.

Check (1) May 20, Cr. Cash, $37,442

Exercise 4-11

Inventory and cost of sales transactions in T-accounts

P1 P2

The following summarizes Tesla's merchandising activities for the year. Set up T-accounts for Merchandise Inventory and for Cost of Goods Sold. Enter each line item into one or both of the two T-accounts and compute the T-account balances.

Cost of merchandise sold to customers	$196,000
Merchandise inventory, beginning-of-year	25,000
Merchandise purchases, gross amount	192,500
Shrinkage on inventory as of year-end	800
Transportation-in for merchandise purchases	2,900
Cost of merchandise returned by customers (and restored to inventory)	2,100
Discounts received from suppliers on merchandise purchases	1,700
Returns to and allowances from suppliers on merchandise purchases	4,000

Check Ending Merch. Inventory, $20,000

Exercise 4-12

Recording purchases, sales, returns, and shipping

P1 P2

Prepare journal entries for the following merchandising transactions of Dollar Store assuming it uses a perpetual inventory system and the gross method.

Nov. 1 Dollar Store purchases merchandise for $1,500 on terms of 2/5, n/30, FOB shipping point, invoice dated November 1.

5 Dollar Store pays cash for the November 1 purchase.

7 Dollar Store discovers and returns $200 of defective merchandise purchased on November 1, and paid for on

November 5, for a cash refund.

10 Dollar Store pays $90 cash for transportation costs for the November 1 purchase.

13 Dollar Store sells merchandise for $1,600 with terms n/30. The cost of the merchandise is $800.

16 Merchandise is returned to the Dollar Store from the November 13 transaction. The returned items are priced at $160 and cost $80; the items were not damaged and were returned to inventory.

Exercise 4-13

Recording purchases, sales, and returns; **no** discounts

P1 P2

Prepare journal entries for the following merchandising transactions of Powell Company assuming it uses a perpetual inventory system and the gross method.

May 1 Powell purchased merchandise with a price of $875 and credit terms of n/30.

12 Powell returned merchandise that had a price of $125.

31 Powell paid the amount due from the May 1 purchase, minus the May 12 return.

June 3 Powell sold merchandise for $450, with credit terms n/15. Cost of the merchandise is $300.

5 The customer discovers some of the units are scratched. Powell gives a price reduction (allowance) and credits the customer's accounts receivable for $20 to compensate for the scratches.

18 Powell received payment for the amount due from the June 3 sale less the June 5 allowance.

Exercise 4-14

Accounting for shrinkage

P3

At the beginning of the year, SnapIt had $10,000 of inventory. During the year, SnapIt purchased $35,000 of merchandise and sold $30,000 of merchandise. A physical count of inventory at year-end shows $14,000 of inventory exists. Prepare the entry to record inventory shrinkage.

Exercise 4-15

Preparing closing entries for a merchandiser

P3

The following listing of temporary accounts with normal balances is from the December 31 adjusted trial balance of Emiko Co. Use these normal account balances to journalize closing entries.

Dividends	$ 33,000	Sales salaries expense	$ 49,700
Sales	529,000	Utilities expense	15,000
Sales returns and allowances	17,500	Selling expenses	39,000
Sales discounts	5,000	Administrative expenses	105,000
Cost of goods sold	213,300		

Exercise 4-16

Impacts of inventory error on key accounts

P3

A retailer completed a physical count of ending merchandise inventory. When counting inventory, employees did not include $3,000 of incoming goods shipped by a supplier on December 31 under FOB shipping point. These goods had been recorded in Merchandise Inventory, but *they were not included in the physical count because they were in transit*. This means shrinkage was incorrectly overstated by $3,000.

Compute the amount of overstatement or understatement for each of the following amounts for this period.

a. Ending inventory

b. Total assets

c. Net income

d. Total equity

Exercise 4-17

Computing net sales for multiple-step income statement

P4

A company reports the following sales-related information. Compute and prepare the net sales portion only of this company's multiple-step income statement.

Sales, gross	$200,000	Sales returns and allowances	$16,000
Sales discounts	4,000	Sales salaries expense	10,000

Exercise 4-18

Preparing a multiple-step income statement

P4

Fit-for-Life Foods reports the following income statement accounts for the year ended December 31. Prepare a multiple-step income statement that includes separate categories for net sales; cost of goods sold; selling expenses; general and administrative expenses; and other revenues, gains, expenses, and losses. Categorize the following accounts as selling expenses: Sales Salaries Expense, Rent Expense–Selling Space, TV Advertising Expense, and Sales Commission Expense. Categorize the remaining expenses as general and administrative.

Gain on sale of equipment	$ 6,250	Depreciation expense—Office copier	$ 500
Office supplies expense	700	Sales discounts	16,000
Insurance expense	1,300	Sales returns and allowances	4,000
Sales	220,000	TV advertising expense	2,000
Office salaries expense	32,500	Interest revenue	750
Rent expense—Selling space	10,000	Cost of goods sold	90,000
Sales salaries expense	23,000	Sales commission expense	13,000

Exercise 4-19

Preparing a classified balance sheet for a merchandiser

P4

Adams Co. reports the following balance sheet accounts as of December 31. Prepare a classified balance sheet.

Salaries payable	$ 6,000	D. Adams, Capital	$60,000
Buildings	55,000	Notes payable (due in 9 years)	30,000
Prepaid rent	7,000	Office supplies	2,000
Merchandise inventory	14,000	Land	22,000
Accounts payable	10,000	Accumulated depreciation—Building	5,000
Prepaid insurance	3,000	Mortgages payable (due in 5 years)	12,000
Accounts receivable	4,000	Cash	16,000

Exercise 4-20

Inventory error impact on ratios **A1**

Indicate whether the failure to include in-transit inventory as part of the physical count results in an overstatement, understatement, or no effect on the following ratios.

a. Gross margin ratio

b. Profit margin ratio

c. Acid-test ratio

d. Current ratio

Exercise 4-21

Computing and analyzing the acid-test ratio

A1

a. Compute the acid-test ratio for each of the following separate cases.

b. Which company is in the best position to meet short-term obligations?

	Camaro	GTO	Torino
Cash	$2,000	$ 110	$1,000
Short-term investments	50	0	580
Current receivables	350	470	700
Inventory	2,600	2,420	4,230
Prepaid expenses	200	500	900
Total current assets	$5,200	$3,500	$7,410
Current liabilities	$2,000	$1,000	$3,800

Exercise 4-22[A]

Periodic: Recording purchases, returns, and allowances **P5**

Refer to Exercise 4-3 and prepare journal entries to record each of the merchandising transactions assuming that the buyer uses the *periodic inventory system* and the *gross method.*.

Exercise 4-23[A]

Periodic: Recording sales, purchases, and discounts: buyer and seller **P5**

Refer to Exercise 4-9 and prepare journal entries to record each of the merchandising transactions assuming that the *periodic inventory system* and the *gross method* are used by both the buyer and the seller.

Exercise 4-24[A]

Periodic: Recording sales, purchases, shipping, and returns: buyer and seller **P5**

Refer to Exercise 4-10 and prepare journal entries to record each of the merchandising transactions assuming that the *periodic inventory system* and the *gross method* are used by both the buyer and the seller.

Exercise 4-25[B]

Recording estimates of future discounts

P6

Med Labs has the following December 31 year-end unadjusted balances: Allowance for Sales Discounts, $0; and Accounts Receivable, $5,000. Of the $5,000 of receivables, $1,000 are within a 2% discount period, meaning that it expects buyers to take $20 in future-period discounts arising from this period's sales.

a. Prepare the December 31 year-end adjusting journal entry for future sales discounts.

b. Assume the same facts above *and* that there is a $5 year-end unadjusted credit balance in Allowance for Sales Discounts. Prepare the December 31 year-end adjusting journal entry for future sales discounts.

c. Is Allowance for Sales Discounts a contra asset or a contra liability account?

Exercise 4-26[B]

Recording estimates of future returns

P6

Chico Company allows its customers to return merchandise within 30 days of purchase.

- At December 31, the end of its first year of operations, Chico estimates future-period merchandise returns of $60,000 (cost of $22,500) related to its current-year sales.

- A few days later, on January 3, a customer returns merchandise with a selling price of $2,000 for a cash refund; the returned merchandise cost $750 and is returned to inventory as it is not defective.

a. Prepare the December 31 year-end adjusting journal entry for estimated future sales returns and allowances (revenue side).

b. Prepare the December 31 year-end adjusting journal entry for estimated future inventory returns and allowances (cost side).

c. Prepare the January 3 journal entries to record the merchandise returned.

Exercise 4-27[B]

Recording estimates of future returns

P6

Lopez Company reports unadjusted first-year merchandise sales of $100,000 and cost of merchandise sales of $30,000.

a. Compute gross profit (using the unadjusted numbers above).

b. The company expects future returns and allowances equal to 5% of sales and 5% of cost of sales.

1. Prepare the year-end adjusting entry to record the sales expected to be refunded.

2. Prepare the year-end adjusting entry to record the cost side of sales returns and allowances.

3. Recompute gross profit using the adjusted numbers from parts 1 and 2.

c. Is Sales Refund Payable an asset, liability, or equity account?

d. Is Inventory Returns Estimated an asset, liability, or equity account?

Exercise 4-28[C]

Net method: Recording sales, purchases, shipping, and returns—buyer and seller **P7**

Refer to Exercise 4-10 and prepare journal entries to record each of the merchandising transactions assuming that the *perpetual inventory system* and the *net method* are used by both the buyer and the seller.

Exercise 4-29[C]

Net & gross methods: Recording purchases, sales, returns, and discounts—buyer and seller

P7

Piere Imports uses the perpetual system in accounting for merchandise inventory and had the following transactions during the month of October. Prepare entries to record these transactions assuming that Piere Imports records invoices (*a*) at gross amounts and (*b*) at net amounts.

Oct. 2 Purchased merchandise at a $3,000 price ($2,940 net), invoice dated October 2, terms 2/10, n/30.

10 Returned $500 ($490 net) of merchandise purchased on October 2 and debited its account payable for that amount.

17 Purchased merchandise at a $5,400 price ($5,292 net), invoice dated October 17, terms 2/10, n/30.

27 Paid for the merchandise purchased on October 17, less the discount.

31 Paid for the merchandise purchased on October 2.

PROBLEM SET A

Problem 4-1A

Preparing journal entries for merchandising activities

P1 P2

Prepare journal entries to record the following merchandising transactions of Cabela's, which uses the perpetual inventory system and the gross method.

July 1 Purchased merchandise from Boden Company for $6,000 under credit terms of 1/15, n/30, FOB shipping point, invoice dated July 1.

2 Sold merchandise to Creek Co. for $900 under credit terms of 2/10, n/60, FOB shipping point, invoice dated July 2. The merchandise had cost $500.

3 Paid $125 cash for freight charges on the purchase of July 1.

8 Sold merchandise that had cost $1,300 for $1,700 cash.

9 Purchased merchandise from Leight Co. for $2,200 under credit terms of 2/15, n/60, FOB destination, invoice dated July 9.

11 Returned $200 of merchandise purchased on July 9 from Leight Co. and debited its account payable for that amount.

12 Received the balance due from Creek Co. for the invoice dated July 2, net of the discount.

Check July 12, Dr. Cash, $882

July 16, Cr. Cash, $5,940

16 Paid the balance due to Boden Company within the discount period.

19 Sold merchandise that cost $800 to Art Co. for $1,200 under credit terms of 2/15, n/60, FOB shipping point, invoice dated July 19.

21 Gave a price reduction (allowance) of $100 to Art Co. for merchandise sold on July 19 and credited Art's accounts receivable for that amount.

24 Paid Leight Co. the balance due, net of discount.

July 24, Cr. Cash, $1,960

July 30, Dr. Cash, $1,078

30 Received the balance due from Art Co. for the invoice dated July 19, net of discount.

31 Sold merchandise that cost $4,800 to Creek Co. for $7,000 under credit terms of 2/10, n/60, FOB shipping point, invoice dated July 31.

Problem 4-2A

Preparing journal entries for merchandising activities

P1 P2

Prepare journal entries to record the following merchandising transactions of Lowe's, which uses the perpetual inventory system and the gross method.

Aug. 1 Purchased merchandise from Aron Company for $7,500 under credit terms of 1/10, n/30, FOB destination, invoice dated August 1.

5 Sold merchandise to Baird Corp. for $5,200 under credit terms of 2/10, n/60, FOB destination, invoice dated August 5. The merchandise had cost $4,000.

8 Purchased merchandise from Waters Corporation for $5,400 under credit terms of 1/10, n/45, FOB shipping point, invoice dated August 8.

9 Paid $125 cash for shipping charges related to the August 5 sale to Baird Corp.

Check Aug. 9, Dr. Delivery Expense, $125

10 Baird returned merchandise from the August 5 sale that had cost Lowe's $400 and was sold for $600. The merchandise was restored to inventory.

12 After negotiations with Waters Corporation concerning problems with the purchases on August 8, Lowe's received a price reduction from Waters of $400 off the $5,400 of goods purchased. Lowe's debited accounts payable for $400.

14 At Aron's request, Lowe's paid $200 cash for freight charges on the August 1 purchase, reducing the amount owed (accounts payable) to Aron.

15 Received balance due from Baird Corp. for the August 5 sale less the return on August 10.

18 Paid the amount due Waters Corporation for the August 8 purchase less the price allowance from August 12.

Aug. 18, Cr. Cash, $4,950

19 Sold merchandise to Tux Co. for $4,800 under credit terms of n/10, FOB shipping point, invoice dated August 19. The merchandise had cost $2,400.

22 Tux requested a price reduction on the August 19 sale because the merchandise did not meet specifications. Lowe's gave a price reduction (allowance) of $500 to Tux and credited Tux's accounts receivable for that amount.

29 Received Tux's cash payment for the amount due from the August 19 sale less the price allowance from August 22.

Aug. 29, Dr. Cash, $4,300

30 Paid Aron Company the amount due from the August 1 purchase.

Problem 4-3A

Computing merchandising amounts and formatting income statements

C1 P4

Valley Company's adjusted account balances from its general ledger on August 31, its fiscal year-end, follows. It categorizes the following accounts as selling expenses: Sales Salaries Expense, Rent Expense—Selling Space, Store Supplies Expense, and Advertising Expense. It categorizes the remaining expenses as general and administrative.

Adjusted Account Balances	Debit	Credit
Merchandise inventory (ending)	$ 41,000	
Other (noninventory) assets	130,400	
Total liabilities		$ 25,000
Common stock		10,000
Retained earnings		94,550
Dividends	8,000	
Sales		225,600
Sales discounts	2,250	
Sales returns and allowances	12,000	
Cost of goods sold	74,500	
Sales salaries expense	32,000	
Rent expense—Selling space	8,000	
Store supplies expense	1,500	
Advertising expense	13,000	
Office salaries expense	28,500	
Rent expense—Office space	3,600	
Office supplies expense	400	
Totals	$355,150	$355,150

Beginning merchandise inventory was $25,400. Supplementary records of merchandising activities for the year ended August 31 reveal the following itemized costs.

Invoice cost of merchandise purchases	$92,000	Purchases returns and allowances	$4,500
Purchases discounts received	2,000	Costs of transportation-in	4,600

Required

1. Compute the company's net sales for the year.
2. Compute the company's total cost of merchandise purchased for the year.

Check (2) $90,100

(3) Gross profit, $136,850; Net income, $49,850

(4) Total expenses, $161,500

3. Prepare a multiple-step income statement that includes separate categories for net sales, cost of goods sold, selling expenses, and general and administrative expenses.

4. Prepare a single-step income statement that includes these expense categories: cost of goods sold, selling expenses, and general and administrative expenses.

Problem 4-4A

Preparing closing entries and interpreting information about discounts and returns **C1 P3**

Use the data for Valley Company in Problem 4-3A to complete the following requirement.

Required

Prepare closing entries as of August 31 (the perpetual inventory system is used).

Problem 4-5A

Preparing adjusting entries and income statements; computing gross margin, acid-test, and current ratios

A1 P3 P4

The following unadjusted trial balance is prepared at fiscal year-end for Nelson Company. Nelson Company uses a perpetual inventory system. It categorizes the following accounts as selling expenses: Depreciation Expense—Store Equipment, Sales Salaries Expense, Rent Expense—Selling Space, Store Supplies Expense, and Advertising Expense. It categorizes the remaining expenses as general and administrative.

NELSON COMPANY Unadjusted Trial Balance January 31	Debit	Credit
Cash	$ 1,000	
Merchandise inventory	12,500	
Store supplies	5,800	
Prepaid insurance	2,400	
Store equipment	42,900	
Accumulated depreciation—Store equipment		$ 15,250
Accounts payable		10,000
Common stock		5,000
Retained earnings		27,000
Dividends	2,200	
Sales		111,950
Sales discounts	2,000	
Sales returns and allowances	2,200	
Cost of goods sold	38,400	
Depreciation expense—Store equipment	0	
Sales salaries expense	17,500	
Office salaries expense	17,500	
Insurance expense	0	
Rent expense—Selling space	7,500	
Rent expense—Office space	7,500	
Store supplies expense	0	
Advertising expense	9,800	
Totals	$169,200	$169,200

Required

1. Prepare adjusting journal entries to reflect each of the following:
   - **a.** Store supplies still available at fiscal year-end amount to $1,750.
   - **b.** Expired insurance, an administrative expense, is $1,400 for the fiscal year.
   - **c.** Depreciation expense on store equipment, a selling expense, is $1,525 for the fiscal year.
   - **d.** To estimate shrinkage, a physical count of ending merchandise inventory is taken. It shows $10,900 of inventory is still available at fiscal year-end.
2. Prepare a multiple-step income statement for the year ended January 31 that begins with gross sales and includes separate categories for net sales, cost of goods sold, selling expenses, and general and administrative expenses.

Check (2) Gross profit, $67,750

(3) Total expenses, $106,775; Net income, $975

3. Prepare a single-step income statement for the year ended January 31.
4. Compute the current ratio, acid-test ratio, and gross margin ratio as of January 31. (Round ratios to two decimals.)

PROBLEM SET B

Problem 4-1B

Preparing journal entries for merchandising activities

P1 P2

Prepare journal entries to record the following merchandising transactions of IKEA, which uses the perpetual inventory system and gross method.

May 2 Purchased merchandise from Havel Co. for $10,000 under credit terms of 1/15, n/30, FOB shipping point, invoice dated May 2.

4 Sold merchandise to Rath Co. for $11,000 under credit terms of 2/10, n/60, FOB shipping point, invoice dated May 4. The merchandise had cost $5,600.

5 Paid $250 cash for freight charges on the purchase of May 2.

9 Sold merchandise that had cost $2,000 for $2,500 cash.

10 Purchased merchandise from Duke Co. for $3,650 under credit terms of 2/15, n/60, FOB destination, invoice dated May 10.

12 Returned $650 of merchandise purchased on May 10 from Duke Co. and debited its account payable for that amount.

14 Received the balance due from Rath Co. for the invoice dated May 4, net of the discount.

Check May 14, Dr. Cash, $10,780

17 Paid the balance due to Havel Co. within the discount period.

20 Sold merchandise that cost $1,450 to Tamer Co. for $2,800 under credit terms of 2/15, n/60, FOB shipping point, invoice dated May 20. page 193

May 17, Cr. Cash, $9,900

22 #9;Gave a price reduction (allowance) of $300 to Tamer Co. for merchandise sold on May 20 and credited Tamer's accounts receivable for that amount.

25 Paid Duke Co. the balance due, net of the discount.

30 Received the balance due from Tamer Co. for the invoice dated May 20, net of discount and allowance.

May 30, Dr. Cash, $2,450

31 Sold merchandise that cost $3,600 to Rath Co. for $7,200 under credit terms of 2/10, n/60, FOB shipping point, invoice dated May 31.

Problem 4-2B

Preparing journal entries for merchandising activities

P1 P2

Prepare journal entries to record the following merchandising transactions of Menards, which applies the perpetual inventory system and gross method.

July 3 Purchased merchandise from OLB Corp. for $15,000 under credit terms of 1/10, n/30, FOB destination, invoice dated July 3.

7 Sold merchandise to Brill Co. for $11,500 under credit terms of 2/10, n/60, FOB destination, invoice dated July 7. The merchandise had cost $7,750.

10 Purchased merchandise from Rupert Co. for $14,200 under credit terms of 1/10, n/45, FOB shipping point, invoice dated July 10.

11 Paid $300 cash for shipping charges related to the July 7 sale to Brill Co.

12 Brill returned merchandise from the July 7 sale that had cost Menards $1,450 and been sold for $2,000. The merchandise was restored to inventory.

14 After negotiations with Rupert Co. concerning problems with the merchandise purchased on July 10, Menards received a price reduction from Rupert of $1,200. Menards debited accounts payable for $1,200.

15 At OLB's request, Menards paid $200 cash for freight charges on the July 3 purchase, reducing the amount owed (accounts payable) to OLB.

Check July 17, Dr. Cash, $9,310

17 Received balance due from Brill Co. for the July 7 sale less the return on July 12.

20 Paid the amount due Rupert Co. for the July 10 purchase less the price reduction granted on July 14.

21 Sold merchandise to Brown for $11,000 under credit terms of 1/10, n/30, FOB shipping point, invoice dated July 21. The merchandise had cost $7,000.

24 Brown requested a price reduction on the July 21 sale because the merchandise did not meet specifications. Menards gave a price reduction (allowance) of $1,000 to Brown and credited Brown's accounts receivable for that amount.

July 30, Dr. Cash, $9,900

July 31, Cr. Cash, $14,800

30 Received Brown's cash payment for the amount due from the July 21 sale less the price allowance from July 24.

31 Paid OLB Corp. the amount due from the July 3 purchase.

Problem 4-3B

Computing merchandising amounts and formatting income statements

C1 P4

Barkley Company's adjusted account balances from its general ledger on March 31, its fiscal year-end, follows. It categorizes the following accounts as selling expenses: Sales Salaries Expense, Rent Expense—Selling Space, Store Supplies Expense, and Advertising Expense. It categorizes the remaining expenses as general and administrative.

Adjusted Account Balances	Debit	Credit
Merchandise inventory (ending)	$ 56,500	
Other (noninventory) assets	202,600	
Total liabilities		$ 42,500
Common stock		10,000
Retained earnings		154,425
Dividends	3,000	
Sales		332,650
Sales discounts	5,875	
Sales returns and allowances	20,000	
Cost of goods sold	115,600	
Sales salaries expense	44,500	
Rent expense—Selling space	16,000	
Store supplies expense	3,850	
Advertising expense	26,000	
Office salaries expense	40,750	
Rent expense—Office space	3,800	
Office supplies expense	1,100	
Totals	$539,575	$539,575

Beginning merchandise inventory was $37,500. Supplementary records of merchandising activities for the year ended March 31 reveal the following itemized costs.

Invoice cost of merchandise purchases	$138,500	Purchases returns and allowances	$6,700
Purchases discounts received	2,950	Costs of transportation-in	5,750

Required

1. Compute the company's net sales for the year.

Check (2) $134,600

(3) Gross profit, $191,175; Net income, $55,175

(4) Total expenses, $251,600

2. Compute the company's total cost of merchandise purchased for the year.

3. Prepare a multiple-step income statement that includes separate categories for net sales, cost of goods sold, selling expenses, and general and administrative expenses.
4. Prepare a single-step income statement that includes these expense categories: cost of goods sold, selling expenses, and general and administrative expenses.

Problem 4-4B

Preparing closing entries and interpreting information about discounts and returns C1 P3

Use the data for Barkley Company in Problem 4-3B to complete the following requirement.

Required

Prepare closing entries as of March 31 (the perpetual inventory system is used).

Problem 4-5B

Preparing adjusting entries and income statements; computing gross margin, acid-test, and current ratios

P3 P4 A1

The following unadjusted trial balance is prepared at fiscal year-end for Foster Products Company. Foster Products Company uses a perpetual inventory system. It categorizes the following accounts as selling expenses: Depreciation Expense—Store Equipment, Sales Salaries Expense, Rent Expense—Selling Space, Store Supplies Expense, and Advertising Expense. It categorizes the remaining expenses as general and administrative.

FOSTER PRODUCTS COMPANY Unadjusted Trial Balance October 31	Debit	Credit
Cash	$ 7,400	
Merchandise inventory	24,000	
Store supplies	9,700	
Prepaid insurance	6,600	
Store equipment	81,800	
Accumulated depreciation—Store equipment		$ 32,000
Accounts payable		18,000
Common stock		3,000
Retained earnings		40,000
Dividends	2,000	
Sales		227,100
Sales discounts	1,000	
Sales returns and allowances	5,000	
Cost of goods sold	75,800	
Depreciation expense—Store equipment	0	
Sales salaries expense	31,500	
Office salaries expense	31,500	
Insurance expense	0	
Rent expense—Selling space	13,000	
Rent expense—Office space	13,000	
Store supplies expense	0	
Advertising expense	17,800	
Totals	$320,100	$320,100

Required

1. Prepare adjusting journal entries to reflect each of the following:
   - **a.** Store supplies still available at fiscal year-end amount to $3,700.
   - **b.** Expired insurance, an administrative expense, is $2,800 for the fiscal year.
   - **c.** Depreciation expense on store equipment, a selling expense, is $3,000 for the fiscal year.
   - **d.** To estimate shrinkage, a physical count of ending merchandise inventory is taken. It shows $21,300 of inventory is still available at fiscal year-end.
2. Prepare a multiple-step income statement for the year ended October 31 that begins with gross sales and includes separate categories for net sales, cost of goods sold, selling expenses, and general and administrative expenses.

Check (2) Gross profit, $142,600

(3) Total expenses, $197,100; Net income, $24,000

3. Prepare a single-step income statement for the year ended October 31.
4. Compute the current ratio, acid-test ratio, and gross margin ratio as of October 31. (Round ratios to two decimals.)

SERIAL PROBLEM

page 195

Business Solutions

P1 P2 P3 P4

Serial problem began in Chapter 1. If previous chapter segments were not completed, the serial problem can begin at this point. It is available in Connect with an algorithmic option.

SP 4 Santana Rey created **Business Solutions** on October 1, 2021. The company has been successful, and its list of customers has grown. To accommodate the growth, the accounting system is modified to set up separate accounts for each customer. The following chart of accounts includes the account number used for each account and any balance as of December 31, 2021. Santana Rey decided to add a fourth digit with a decimal point to the 106 account number that had been used for the single Accounts Receivable account. This change allows the company to continue using the existing chart of accounts.

No.	Account Title	Dr.	Cr.
101	Cash	$48,372	
106.1	Alex's Engineering Co.	0	
106.2	Wildcat Services	0	
106.3	Easy Leasing	0	
106.4	IFM Co.	3,000	
106.5	Liu Corp.	0	
106.6	Gomez Co.	2,668	
106.7	Delta Co.	0	
106.8	KC, Inc.	0	
106.9	Dream, Inc.	0	
119	Merchandise inventory	0	
126	Computer supplies	580	
128	Prepaid insurance	1,665	
131	Prepaid rent	825	
163	Office equipment	8,000	
164	Accumulated depreciation—Office equipment		$ 400
167	Computer equipment	20,000	
168	Accumulated depreciation—Computer equipment		1,250
201	Accounts payable		1,100
210	Wages payable		$ 500
236	Unearned computer services revenue		1,500
307	Common stock		73,000
318	Retained earnings		7,360
319	Dividends	$0	
403	Computer services revenue		0
413	Sales		0
414	Sales returns and allowances	0	
415	Sales discounts	0	
502	Cost of goods sold	0	
612	Depreciation expense—Office equipment	0	
613	Depreciation expense—Computer equipment	0	
623	Wages expense	0	
637	Insurance expense	0	
640	Rent expense	0	
652	Computer supplies expense	0	
655	Advertising expense	0	
676	Mileage expense	0	
677	Miscellaneous expenses	0	
684	Repairs expense—Computer	0	

In response to requests from customers, S. Rey will begin selling computer software. The company will extend credit terms of 1/10, n/30, FOB shipping point, to all customers who purchase this merchandise. However, no cash discount is available on consulting fees. Additional accounts (Nos. 119, 413, 414, 415, and 502) are added to its general ledger to accommodate the company's new merchandising activities. Its transactions for January through March follow.

Alexander Image/Shutterstock

Jan. 4 The company paid cash to Lyn Addie for five days' work at the rate of $125 per day. Four of the five days relate to wages payable that were accrued in the prior year.

5 Santana Rey invested an additional $25,000 cash in the company in exchange for more common stock.

7. The company purchased $5,800 of merchandise from Kansas Corp. with terms of 1/10, n/30, FOB shipping point, invoice dated January 7.

9. The company received $2,668 cash from Gomez Co. as full payment on its account.

11. The company completed a five-day project for Alex's Engineering Co. and billed it $5,500, which is the total price of $7,000 less the advance payment of $1,500. The company debited Unearned Computer Services Revenue for $1,500.

13. The company sold merchandise with a retail value of page 196 $5,200 and a cost of $3,560 to Liu Corp., invoice dated January 13.

15. The company paid $600 cash for freight charges on the merchandise purchased on January 7.

16. The company received $4,000 cash from Delta Co. for computer services provided.

17. The company paid Kansas Corp. for the invoice dated January 7, net of the discount.

20. The company gave a price reduction (allowance) of $500 to Liu Corp. and credited Liu's accounts receivable for that amount.

22. The company received the balance due from Liu Corp., net of the discount and the allowance.

24. The company returned defective merchandise to Kansas Corp. and accepted a credit against future purchases (debited accounts payable). The defective merchandise invoice cost, net of the discount, was $496.

26. The company purchased $9,000 of merchandise from Kansas Corp. with terms of 1/10, n/30, FOB destination, invoice dated January 26.

26. The company sold merchandise with a $4,640 cost for $5,800 on credit to KC, Inc., invoice dated January 26.

31. The company paid cash to Lyn Addie for 10 days' work at $125 per day.

Feb. 1 The company paid $2,475 cash to Hillside Mall for another three months' rent in advance.

3. The company paid Kansas Corp. for the balance due, net of the cash discount, less the $496 credit from merchandise returned on January 24.

5. The company paid $600 cash to Facebook for an advertisement to appear on February 5 only.

11. The company received the balance due from Alex's Engineering Co. for fees billed on January 11.

15. The company paid a $4,800 cash dividend.

23. The company sold merchandise with a $2,660 cost for $3,220 on credit to Delta Co., invoice dated February 23.

26. The company paid cash to Lyn Addie for eight days' work at $125 per day.

27. The company reimbursed Santana Rey $192 cash for business automobile mileage. The company recorded the reimbursement as "Mileage Expense."

Mar. 8 The company purchased $2,730 of computer supplies from Harris Office Products on credit with terms of n/30, FOB destination, invoice dated March 8.

9. The company received the balance due from Delta Co. for merchandise sold on February 23.

11. The company paid $960 cash for minor repairs to the company's computer.

16. The company received $5,260 cash from Dream, Inc., for computing services provided.

19. The company paid the full amount due of $3,830 to Harris Office Products, consisting of amounts created on December 15 (of $1,100) and March 8.

24. The company billed Easy Leasing for $9,047 of computing services provided.

25. The company sold merchandise with a $2,002 cost for $2,800 on credit to Wildcat Services, invoice dated March 25.

30. The company sold merchandise with a $1,048 cost for $2,220 on credit to IFM Company, invoice dated March 30.

31 The company reimbursed Santana Rey $128 cash for business automobile mileage. The company recorded the reimbursement as “Mileage Expense.”

The following additional facts are available for preparing adjustments on March 31 prior to financial statement preparation.

a. The March 31 amount of computer supplies still available totals $2,005.

b. Prepaid insurance coverage of $555 expired during this three-month period.

c. Lyn Addie has not been paid for seven days of work at the rate of $125 per day.

d. Prepaid rent of $2,475 expired during this three-month period.

e. Depreciation on the computer equipment for January 1 through March 31 is $1,250.

f. Depreciation on the office equipment for January 1 through March 31 is $400.

g. The March 31 amount of merchandise inventory still available totals $704.

Required

1. Prepare journal entries to record each of the January through March transactions.

2. Post the journal entries in part 1 to the accounts in the company’s general ledger. *Note:* Begin with the ledger’s post-closing adjusted balances as of December 31, 2021.

Check (2) Ending balances at March 31: Cash, $68,057; Sales, $19,240

(3) Unadj. TB totals, $151,557; Adj. TB totals, $154,082

3. Prepare a 6-column work sheet (similar to the one shown in Exhibit 3.13) that includes the unadjusted trial balance, the March 31 adjustments (*a*) through (*g*), and the adjusted trial balance. Do not prepare closing entries and do not journalize the adjustments or post them to the ledger.

4. Prepare an income statement (from the adjusted trial balance in part 3) for the three months ended March 31, 2022.

a. Use a single-step format. List all expenses without differentiating between selling expenses and general and administrative expenses.

b. Use a multiple-step format that begins with gross sales (service revenues plus gross product sales) and includes separate categories for net sales, cost of goods sold, selling expenses, and general and administrative expenses. Categorize the following accounts as selling expenses: Wages Expense, Mileage Expense, and Advertising Expense. Categorize the remaining expenses as general and administrative.

(4) Net income, $18,833

5. Prepare a statement of retained earnings (from the adjusted trial balance in part 3) for the three months ended March 31, 2022.

6. Prepare a classified balance sheet (from the adjusted trial balance) as of March 31, 2022.

(6) Total assets, $120,268

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA 4-1 Quick Study, Analyzing credit terms and computing gross profit, C1, P1—similar to QS 4-18

Tableau DA 4-2 Exercise, Analyzing credit terms and computing gross profit, C1, P1—similar to Exercise 4-17

Tableau DA 4-3 Mini-Case, Preparing a classified balance sheet, P1, P4—similar to Exercise 4-19

GENERAL LEDGER

connect

General Ledger (GL) Assignments For the following GL assignments, prepare journal entries highlighting the operating cycle of a merchandising company. A trial balance is automatically generated based on the journal entries recorded—this feature can be turned off.

GL 4-1 Based on Problem 4-1A

GL 4-2 Based on Problem 4-2A

GL 4-3 Based on Problem 4-5A

Accounting Analysis

connect

COMPANY ANALYSIS

A1

AA 4-1 Refer to **Apple**'s financial statements in Appendix A to answer the following.

Required

1. Assume that the amounts reported for inventories and cost of sales reflect items purchased in a form ready for resale.

Compute the net cost of goods purchased for the year ended September 28, 2019.

2. Compute the current ratio and acid-test ratio as of September 28, 2019, and September 29, 2018. *Note:* Do not include vendor non-trade receivables with quick assets.
3. Does Apple's 2019 current ratio outperform or underperform the (assumed) industry average of 1.5?
4. Does Apple's 2019 acid-test ratio outperform or underperform the (assumed) industry average of 1.0?

COMPARATIVE ANALYSIS

A1

AA 4-2 Key comparative figures for **Apple** and **Google** follow.

$ millions	Samsung	Apple	Google
Net Sales	$197,691	$260,174	$161,857
Cost of Sales	126,336	161,782	71,896

Required

1. Compute the amount of gross margin and the gross margin ratio for the two years shown for each of these companies.
2. Which company earns more in gross margin for each dollar of net sales for the current year?
3. Does the company's current-year gross margin underperform or outperform the 35% industry average in the case of (*a*) Apple and (*b*) Google?
4. Is the change in the company's current-year gross margin favorable or unfavorable for (*a*) Apple and (*b*) Google?

EXTENDED ANALYSIS

A1 P4

AA 4-3 Key comparative figures for **Samsung**, **Apple**, and **Google** follow.

$ millions	Samsung	Apple	Google
Net Sales	$197,691	$260,174	$161,857
Cost of Sales	126,336	161,782	71,896

Required

1. Compute the gross margin ratio for each of the three companies.
2. Is Samsung's gross margin ratio better or worse than that for (*a*) Apple? (*b*) Google?
3. Is the single-step or multiple-step income statement format used in the case of (a) Apple, (b) Google, and (c) Samsung?

Discussion Questions

1. What items appear in financial statements of merchandising companies but not in the statements of service companies?
2. In comparing the accounts of a merchandising company with those of a service company, what additional accounts would the merchandising company likely use, assuming it employs a perpetual inventory system?
3. Explain how a business can earn a positive gross profit on its sales and still have a net loss.
4. Why do companies offer a cash discount?
5. How does a company that uses a perpetual inventory system determine the amount of inventory shrinkage?
6. What is the difference between a sales discount and a purchases discount?
7. What is the difference between the single-step and multiple-step income statement formats?
8. Buyers negotiate purchase contracts with suppliers. What type of shipping terms should a buyer attempt to negotiate to minimize

transportation costs?

Beyond the Numbers

ETHICS CHALLENGE

C1 P2

BTN 4-1 Amy Martin is a student who plans to attend approximately four professional events a year at her college. Each event necessitates payment of $100 to $200 for a new suit and accessories. After incurring a major hit to her savings for the first event, Amy develops a different approach. She buys the suit on credit the week before the event, wears it to the event, and returns it the next week to the store for a full refund on her charge card.

Required

1. Comment on the ethics exhibited by Amy and possible consequences of her actions.
2. How does the merchandising company account for the suits that Amy returns?

COMMUNICATING IN PRACTICE

C1 P3 P5

BTN 4-2 You are the financial officer for Music Plus, a retailer that sells goods for home entertainment needs. The business owner, Vic Velakturi, recently reviewed the annual financial statements you prepared and sent you an e-mail stating that he thinks you overstated net income. He explains that although he has invested a great deal in security, he is sure shoplifting and other forms of inventory shrinkage have occurred, but he does not see any deduction for shrinkage on the income statement. The store uses a perpetual inventory system.

Required

Prepare a brief memorandum that responds to the owner's concerns.

TEAMWORK IN ACTION

C1

BTN 4-3 Official Brands's general ledger and supplementary records at the end of its current period reveal the following. page 199

Sales, gross	$600,000	Merchandise inventory (beginning of period)	$ 98,000
Sales returns & allowances	20,000	Invoice cost of merchandise purchases	360,000
Sales discounts	13,000	Purchases discounts received	9,000
Cost of transportation-in	22,000	Purchases returns and allowances	11,000
Operating expenses	50,000	Merchandise inventory (end of period)	84,000

Required

1. *Each* member of the team is to assume responsibility for computing *one* of the following items. You are not to duplicate your teammates' work. Get any necessary amounts to compute your item from the appropriate teammate. Each member is to explain his or her computation to the team in preparation for reporting to the class.
   - **a.** Net sales
   - **b.** Total cost of merchandise purchases
   - **c.** Cost of goods sold
   - **d.** Gross profit
   - **e.** Net income

Point: In teams of four, assign the same student a and e. Rotate teams for reporting on a different computation and the analysis in step 3.

2. Check your net income with the instructor. If correct, proceed to step 3.
3. Assume that a physical inventory count finds that actual ending inventory is $76,000. Discuss how this affects previously computed amounts in step 1.

ENTREPRENEURIAL DECISION

C1 P1

BTN 4-4 Refer to the opening feature about **Kendra Scott**. Assume the business reports current annual sales at approximately $1 million and prepares the following income statement.

KENDRA SCOTT
Income Statement
For Current Year Ended December 31

Net sales	$1,000,000
Cost of sales	610,000
Expenses (other than cost of sales)	200,000
Net income	$ 190,000

Assume the business sells to individuals and retailers, ranging from small shops to large chains. Assume that it currently offers credit terms of 1/15, n/60, and ships FOB destination. To improve its cash flow, it is considering changing credit terms to 3/10, n/30. In addition, it proposes to change shipping terms to FOB shipping point. It expects that the increase in discount rate will increase net sales by 9%, but the gross margin ratio (and ratio of cost of sales divided by net sales) is expected to remain unchanged. It also expects that delivery expenses will be zero under this proposal; thus, expenses other than cost of sales are expected to increase only 6%.

Required

1. Prepare a forecasted income statement for the next year ended December 31 based on the proposal.
2. Based on the forecasted income statement alone (from your part 1 solution), do you recommend that the business implement the new sales policies? Explain.
3. What else should the business consider before deciding whether to implement the new policies? Explain.

5 Inventories and Cost of Sales

page 200

Chapter Preview

INVENTORY BASICS

C1 Determining inventory items

Determining inventory costs

Control of inventory

NTK 5-1

INVENTORY COSTING

P1 Inventory measurement:

Specific identification

First-in, first-out

Last-in, first-out

Weighted average

A1 Financial statements

NTK 5-2

INVENTORY VALUATION, ERRORS, AND ANALYSIS

P2 Lower of cost or market

A2 Effects of inventory errors

A3 Inventory management

P3 *Appendix:* Periodic system

NTK 5-3, 5-4

Learning Objectives

CONCEPTUAL

C1 Identify the items and costs of merchandise inventory.

ANALYTICAL

A1 Analyze the effects of inventory methods for both financial and tax reporting.

A2 Analyze the effects of inventory errors on current and future financial statements.

A3 Assess inventory management using both inventory turnover and days' sales in inventory.

PROCEDURAL

P1 Compute inventory in a perpetual system using the methods of specific identification, FIFO, LIFO, and weighted average.

P2 Compute the lower of cost or market amount of inventory.

P3 *Appendix 5A*—Compute inventory in a periodic system using the methods of specific identification, FIFO, LIFO, and weighted

average.

P4 *Appendix 5B*—Apply both the retail inventory and gross profit methods to estimate inventory.

Dream of Doing

"Humans are unbelievably data efficient"—**JEFF BEZOS**

SEATTLE—Jeff Bezos, founder and CEO of **Amazon**, started the company in his garage. "The first initial start-up capital for Amazon.com came primarily from my parents, and they invested a large fraction of their life savings," recalls Jeff. "My dad's first question was, 'What's the Internet?' He wasn't making a bet on this company or this concept. He was making a bet on his son."

Jeff has grown Amazon from an online bookstore into one of the world's most valuable companies. Amazon's success is tied to several factors, including its accounting system and data analytics. Amazon is expanding its accounting system, using its sales and inventory accounting data to predict customer purchases and shipments before orders are placed.

While Jeff has been able to dominate the retail industry with accounting analytics, he has his sights set on groceries. With the acquisition of **Whole Foods**, Jeff has begun implementing the same accounting analytics to those stores.

To ensure fresh sourced produce at Whole Foods, Amazon set up an analytics-based inventory tracking system. Store managers receive inventory reports, often in the form of a **Tableau** Dashboard. The inventory system tracks all transactions and uses predictive analytics to identify which items to stock at which stores and when.

Sajjad Hussain/AFP/Getty Images

Jeff encourages young people to start businesses. He stresses the importance of accounting: “If you don’t understand the details of your business, you are going to fail.”

Sources: *Amazon website,* January 2021; *Biography.com,* January 2016; *Fundable,* June 2015; *GreenBiz,* August 2014; *Inc.com,* May 2014; *Bloomberg,* January 2013; *Wall Street Journal,* October 2011

INVENTORY BASICS

Determining Inventory Items

C1

Identify the items and costs of merchandise inventory.

Merchandise inventory includes all goods that a company owns and holds for sale. This is true regardless of where the goods are located when inventory is counted. Special attention is directed at goods in transit, goods on consignment, and goods that are damaged or obsolete.

Goods in Transit Does a buyer's inventory include goods in transit from a supplier? If ownership has passed to the buyer, the goods are included in the buyer's inventory. We determine this by reviewing shipping terms, which are illustrated in Exhibit 5.1.

- FOB shipping point—goods are included in buyer's inventory once they are shipped.
- FOB destination—goods are included in buyer's inventory after arrival at the destination.

EXHIBIT 5.1

Terms of Sale

Goods on Consignment Goods on consignment are goods sent by the owner, called the **consignor,** to another party, the **consignee.** A consignee sells goods for the owner. The consignor owns the consigned goods and reports them in its inventory. For example, **Upper Deck** pays sports celebrities such as Russell Wilson of the Seattle Seahawks to sign memorabilia, which are offered to card shops on consignment. Upper Deck, the consignor, reports these items in its inventory until sold. The consignee *never* reports consigned goods in inventory.

Goods Damaged or Obsolete Damaged, obsolete (out-of-date), and deteriorated goods are not reported in inventory if they cannot be sold. If these goods can be sold at a lower price, they are included in inventory at **net realizable value.** Net realizable value is sales price minus the cost of making the sale. A loss is recorded when the damage or obsolescence occurs.

Determining Inventory Costs

Merchandise inventory includes costs to bring an item to a salable condition and location. Inventory costs include invoice cost minus any discount, plus any other costs. Other costs include shipping, storage, import duties, and insurance. The *expense recognition principle* says that inventory costs are expensed as cost of goods sold when inventory is sold.

Internal Controls and Taking a Physical Count

Events can cause the Inventory account balance to be different than the actual inventory available. Such events include theft, loss, damage, and errors. Thus, nearly all companies take a *physical count of inventory* at least once each year. This physical count is used to adjust the Inventory account balance to the actual inventory available.

Fraud: Auditors observe employees as they count inventory. Auditors also take their own count to ensure accuracy.

Peathegee Inc/Blend Images

Decision Insight

Down for the Count A company applies internal controls when taking a physical count of inventory that usually include the following to minimize fraud and to increase reliability.

- *Prenumbered inventory tickets* are distributed to *counters*—each ticket must be accounted for.
- Counters of inventory are assigned and do not include those responsible for inventory.
- Counters confirm the existence, amount, and condition of inventory.

- A second count is taken by a different counter.
- A manager confirms all inventories are ticketed once, and only once. ■

NEED-TO-KNOW 5-1

Inventory Items and Costs

C1 ▶

1. A master carver of wooden birds operates her business out of a garage. At the end of the current period, the carver has 17 units (carvings) in her garage, 3 of which were damaged by water and cannot be sold. She also has another 5 units in her truck, ready to deliver per a customer order, terms FOB destination, and another 11 units out on consignment at retail stores. How many units does she include in the business's period-end inventory?
2. A distributor of artistic iron-based fixtures acquires a piece for $1,000, terms FOB shipping point. Additional costs in obtaining it and offering it for sale include $150 for transportation-in, $300 for import duties, $100 for insurance during shipment, $200 for advertising, a $50 voluntary gratuity to the delivery person, $75 for enhanced store lighting, and $250 for sales staff salaries. For computing inventory, what cost is assigned to this artistic piece?

Solutions

1.

Units in ending inventory	
Units in storage	17 units
Less damaged (unsalable) units	(3)
Plus units in transit	5
Plus units on consignment	11
Total units in ending inventory	30 units

2.

Merchandise cost	$1,000
Plus:	
Transportation-in	150
Import duties	300
Insurance	100
Total inventory cost	$1,550

Do More: QS 5-1, QS 5-2, QS 5-3, E 5-1, E 5-2

INVENTORY COSTING UNDER A PERPETUAL SYSTEM

When identical items are purchased at different costs, we must decide which amounts to record in cost of goods sold (COGS) and which amounts remain in inventory. We describe four methods to assign costs to inventory and to cost of goods sold: (1) specific identification; (2) first-in, first-out (FIFO); (3) last-in, first-out (LIFO); and (4) weighted average.

Each method has a pattern for how costs flow through inventory. The cost flow assumption does not have to match the actual physical flow of goods. For example, **Kroger**'s grocery chain sells food first-in, first-out, meaning they sell the oldest food in inventory first. However, Kroger can use last-in, first-out to assign costs to food sold. With the exception of specific identification, the **physical flow and cost flow do not have to be the same**.

Inventory Cost Flow Methods

To show inventory cost flow methods, assume that three identical units are purchased separately at the following three dates and costs: May 1 at $45, May 3 at $65, and May 6 at $70. One unit is then sold on May 7 for $100. Exhibit 5.2 shows the flow of costs to either cost of goods sold on the income statement or inventory reported on the balance sheet for FIFO, LIFO, and weighted average.

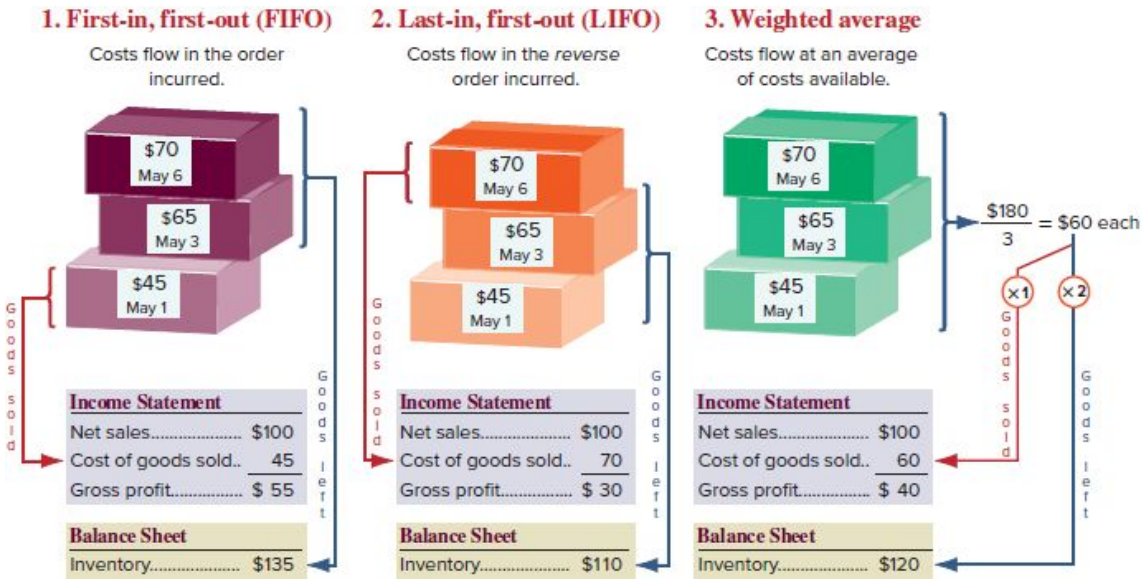


EXHIBIT 5.2

Cost Flow Methods

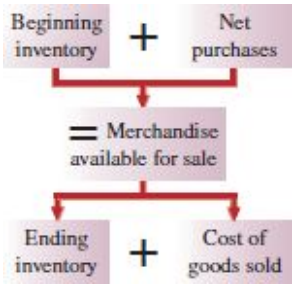
(1) *FIFO assumes costs flow in the order incurred.* The unit purchased on May 1 for $45 is the earliest cost incurred—it is sent to cost of goods sold on the income statement first. The remaining two units ($65 and $70) are reported in inventory on the balance sheet.

(2) *LIFO assumes costs flow in the reverse order incurred.* The unit purchased on May 6 for $70 is the most recent cost incurred—it is sent to cost of goods sold on the income statement. The remaining two units ($45 and $65) are reported in inventory on the balance sheet.

(3) *Weighted average assumes costs flow at an average of the costs available.* The units available at the May 7 sale average $60 in cost, computed as ($45 + $65 + $70)/3. One unit's $60 average cost is sent to cost of goods sold on the income statement. The remaining two units' average costs are reported in inventory at $120 on the balance sheet.

Cost flow methods impact gross profit and inventory numbers. Exhibit 5.2 shows that gross profit ranges from $30 to $55 due to the cost flow method.

Point: Recall inventory cost flow



The following sections on inventory costing use the *perpetual system*. Appendix 5A uses the periodic system. An instructor can choose to cover either one or both systems. If the perpetual system is skipped, then read Appendix 5A and return to the "Valuing Inventory at LCM and the Effects of Inventory Errors" section.

Inventory Costing Illustration

P1

Compute inventory in a perpetual system using the methods of specific identification, FIFO, LIFO, and weighted average.

This section demonstrates inventory costing methods. We use information from Trekking, a sporting goods store. Among its products, Trekking sells one type of mountain bike whose sales are directed at resorts that provide inexpensive bikes for guest use. We use Trekking's data from August. Its mountain bike (unit) inventory at the beginning of August and its purchases and sales during August are in Exhibit 5.3. It ends August with 12 bikes in inventory.

Date	Activity	Units Acquired at Cost	Units Sold at Retail	Unit Inventory
Aug. 1	Beginning inventory	10 units @ $ 91 = $ 910		10 units
Aug. 3	Purchases	15 units @ $106 = $ 1,590		25 units
Aug. 14	Sales		20 units @ $130	5 units
Aug. 17	Purchases	20 units @ $115 = $ 2,300		25 units
Aug. 28	Purchases	10 units @ $119 = $ 1,190		35 units
Aug. 30	Sales		23 units @ $150	12 units
	Totals	55 units	43 units	
		$5,990		

Units available for sale | Goods available for sale | Units sold | Units left

EXHIBIT 5.3

Purchases and Sales of Goods

Warut Chinsai/Shutterstock

Trekking uses the **perpetual inventory system**, which means that its Merchandise Inventory account is updated for each purchase and sale of inventory. **Appendix 5A describes the assignment of costs to inventory using a periodic system**.

Specific Identification

When each item in inventory can be matched with a specific purchase and invoice, we can use **specific identification** or **SI** to assign costs. The first two columns of Exhibit 5.4 show Trekking's dates and amounts of each purchase. Total goods available for sale is **$5,990**.

Point: Specific identification is common for custom-made inventory such as jewelry.

We then need sales records that identify exactly which items were sold and when. Trekking's internal documents show goods sold consist of 10 from the August 1 purchase, 15 from the August 3 purchase, 15 from the August 17 purchase, and 3 from the August 28 purchase. These goods sold are entered in the third column of Exhibit 5.4 and total $4,582.

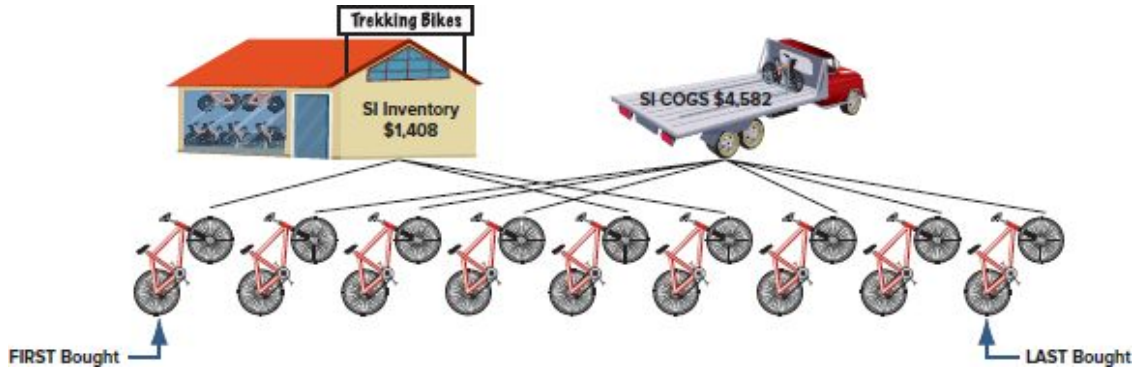
In the Ending Inventory column we enter the 12 units not sold. The **$1,408** total is ending inventory.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Aug. 1	10 @ $ 91 = $ 910	10 @ $ 91 = $ 910	
Aug. 3	15 @ $106 = $1,590	15 @ $106 = $1,590	
Aug. 17	20 @ $115 = $2,300	15 @ $115 = $1,725	5 @ $115 = $ 575
Aug. 28	10 @ $119 = $1,190	3 @ $119 = $ 357	7 @ $119 = $ 833
	$5,990	43 $4,582	12 $1,408

EXHIBIT 5.4

Specific Identification

Trekking's cost of goods sold reported on the income statement is **$4,582**, and ending inventory reported on the balance sheet is **$1,408**. The following graphic shows this flow of costs.



Point: SI yields identical results under both periodic and perpetual.

First-In, First-Out

First-in, first-out (FIFO) assumes that inventory items are sold in the order acquired. When sales occur, the costs of the earliest units acquired are charged to cost of goods sold. This leaves the costs from the most recent purchases in ending inventory.

Exhibit 5.5 starts with beginning inventory of 10 bikes at $91 each.

Purchased 15 bikes costing $106 each. We update the Inventory Balance column to consist of 10 bikes at $91 each and 15 bikes at $106 each.

Sold 20 bikes. Using FIFO, we enter in the Cost of Goods Sold column the *first* 10 sold at the earliest cost of $91 each and the next 10 sold at a cost of $106 each. In the Inventory Balance column we enter the 5 not sold costing $106 each.

Purchased 20 bikes costing $115 each. We add these to the Inventory Balance column.

Purchased 10 bikes at $119 each. We add these to the Inventory Balance column.

Sold 23 bikes. Using FIFO, in the Cost of Goods Sold column we enter the 23 bikes purchased *first*: 5 at $106 and then 18 at $115. This leaves 12 bikes costing $1,420 in ending inventory.

Date	Goods Purchased	Cost of Goods Sold		Inventory Balance	
Aug. 1	Beginning balance			10 @ $ 91	= $ 910
Aug. 3	15 @ $106 = $1,590			10 @ $ 91 15 @ $106	= $ 2,500
Aug. 14		10 @ $ 91 = $ 910 10 @ $106 = $1,060	= $1,970	5 @ $106	= $ 530
Aug. 17	20 @ $115 = $2,300			5 @ $106 20 @ $115	= $ 2,830
Aug. 28	10 @ $119 = $1,190			5 @ $106 20 @ $115 10 @ $119	= $ 4,020
Aug. 30		5 @ $106 = $ 530 18 @ $115 = $2,070	= $2,600 $4,570	2 @ $115 10 @ $119	= $1,420

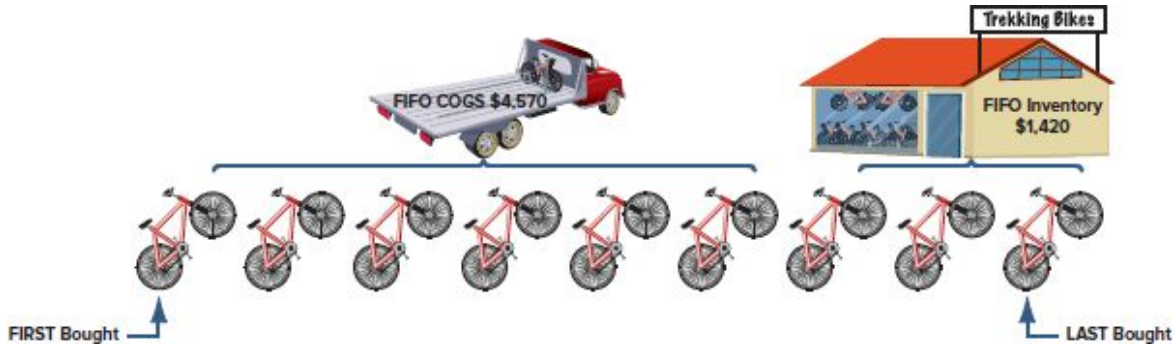
Merchandise Inventory (FIFO)

Aug. 1	910		
Aug. 3	1,590		
		Aug. 14	1,970
Aug. 17	2,300		
Aug. 28	1,190		
		Aug. 30	2,600
Aug. 31	1,420		

EXHIBIT 5.5

FIFO—Perpetual

The **$4,570** total in cost of good sold is reported on the income statement. The ending inventory of **$1,420** from the Inventory Balance column is reported on the balance sheet.



Point: For FIFO, the COGS and ending inventory are the same for periodic and perpetual.

Last-In, First-Out

Last-in, first-out (LIFO) assumes that the most recent purchases are sold first. These more recent costs are charged to the goods sold, and the costs of the earliest purchases are assigned to inventory.

Exhibit 5.6 starts with beginning inventory of 10 bikes at $91 each.

Purchased 15 bikes costing $106 each. We update the Inventory Balance column to consist of 10 bikes at $91 each and 15 bikes at $106 each.

Sold 20 bikes. Using LIFO, we enter in the Cost of Goods Sold column the 20 sold, beginning with last units purchased: 15 sold from the most recent purchase at $106 each, and the next 5 sold from the next most recent purchase at $91 each. In the Inventory Balance column we enter the 5 not sold at a cost of $91 each.

Purchased 20 bikes costing $115 each. We add these to the Inventory Balance column.

Purchased 10 bikes at $119 each. We add these to the Inventory Balance column.

page 206

Sold 23 bikes. Using LIFO, in the Cost of Goods Sold column we enter the 23 bikes purchased *last*: 10 at $119 and then 13 at $115. This leaves 12 bikes costing $1,260 in ending inventory.

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Date	Goods Purchased	Cost of Goods Sold	Inventory Balance
Aug. 1	Beginning balance		10 @ $ 91 = $ 910 (10 @ $ 91 per unit)
Aug. 3	15 @ $106 = $1,590		10 @ $ 91 15 @ $106 } = $2,500 (25 @ $100 per unit)[a]
Aug. 14		20 @ $100 = **$2,000**	5 @ $100 = $ 500 (5 @ $100 per unit)[b]
Aug. 17	20 @ $115 = $2,300		5 @ $100 20 @ $115 } = $2,800 (25 @ $112 per unit)[c]
Aug. 28	10 @ $119 = $1,190		25 @ $112 10 @ $119 } = $3,990 (35 @ $114 per unit)[d]
Aug. 30		23 @ $114 = **$2,622**	12 @ $114 = **$1,368** (12 @ $114 per unit)[e]
		$4,622	

[a]$100 per unit = ($2,500 inventory balance ÷ 25 units in inventory).
[b]$100 per unit = ($500 inventory balance ÷ 5 units in inventory).
[c]$112 per unit = ($2,800 inventory balance ÷ 25 units in inventory).
[d]$114 per unit = ($3,990 inventory balance ÷ 35 units in inventory).
[e]$114 per unit = ($1,368 inventory balance ÷ 12 units in inventory).

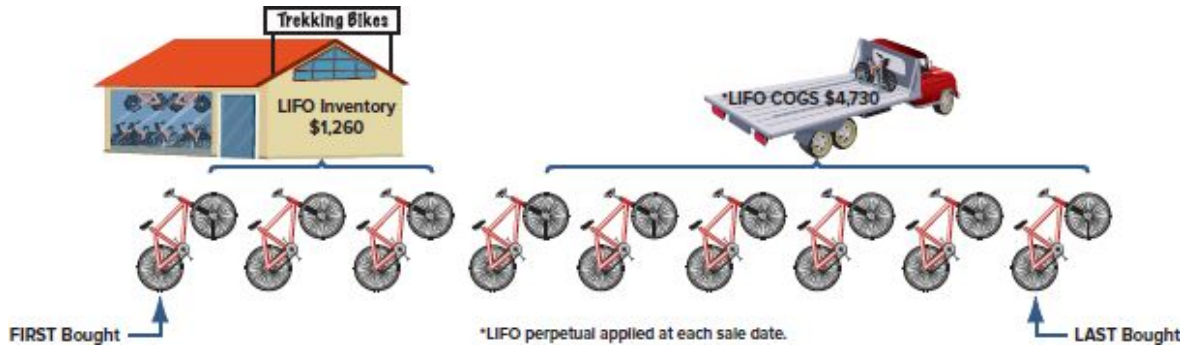
Merchandise Inventory (WA)

Aug. 1	910		
Aug. 3	1,590		
		Aug. 14	2,000
Aug. 17	2,300		
Aug. 28	1,190		
		Aug. 30	2,622
Aug. 31	1,368		

EXHIBIT 5.6

LIFO—Perpetual

The **$4,730** total in cost of good sold is reported on the income statement. The ending inventory of **$1,260** from the Inventory Balance column is reported on the balance sheet.



Weighted Average

Weighted average or **WA** (also called **average cost**) requires that we use the weighted average cost per unit of inventory at the time of each sale.

$$\text{Weighted average cost per unit at time of each sale} = \frac{\text{Cost of goods available for sale (at each sale)}}{\text{Number of units available for sale (at each sale)}}$$

Exhibit 5.7 starts with beginning inventory of 10 bikes at $91 each.

Purchased 15 bikes costing $106 each for $1,590. We upd the Inventory Balance column to consist of 10 bikes at $91 each and 15 bikes at $106 each. The *average cost* per bike for that inventory is $100, computed as $2,500/(10 bikes + 15 bikes).

Sold 20 bikes. Applying WA, the 20 sold are assigned the $100 average cost. This leaves 5 bikes with an average cost of $100 each in inventory.

Purchased 20 bikes at $115 each. We add these to the Inventory Balance column. The *average cost* per bike is now $112.

Purchased 10 bikes at $119 each. We add these to the Inventory Balance column. The *average cost* per bike is now $114, computed as $3,990/35 bikes.

Sold 23 bikes. Applying WA, the 23 sold are assigned the $114 average cost. This leaves 12 bikes costing $1,368 in ending inventory.

Date	Goods Purchased	Cost of Goods Sold	Inventory Balance
Aug. 1	Beginning balance		10 @ $ 91 = $ 910 (10 @ $ 91 per unit)
Aug. 3	15 @ $106 = $1,590		10 @ $ 91 15 @ $106 } = $2,500 (25 @ $100 per unit)[a]
Aug. 14		20 @ $100 = **$2,000**	5 @ $100 = $ 500 (5 @ $100 per unit)[b]
Aug. 17	20 @ $115 = $2,300		5 @ $100 20 @ $115 } = $2,800 (25 @ $112 per unit)[c]
Aug. 28	10 @ $119 = $1,190		25 @ $112 10 @ $119 } = $3,990 (35 @ $114 per unit)[d]
Aug. 30		23 @ $114 = **$2,622**	12 @ $114 = **$1,368** (12 @ $114 per unit)[e]
		$4,622	

[a] $100 per unit = ($2,500 inventory balance ÷ 25 units in inventory).
[b] $100 per unit = ($500 inventory balance ÷ 5 units in inventory).
[c] $112 per unit = ($2,800 inventory balance ÷ 25 units in inventory).
[d] $114 per unit = ($3,990 inventory balance ÷ 35 units in inventory).
[e] $114 per unit = ($1,368 inventory balance ÷ 12 units in inventory).

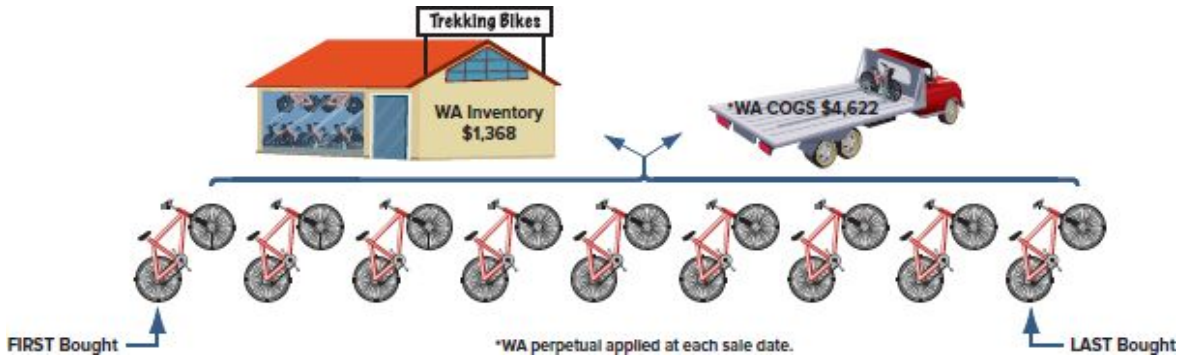
Merchandise Inventory (WA)

Aug. 1	910		
Aug. 3	1,590		
		Aug. 14	2,000
Aug. 17	2,300		
Aug. 28	1,190		
		Aug. 30	2,622
Aug. 31	1,368		

EXHIBIT 5.7

Weighted Average—Perpetual

The **$4,622** total in cost of good sold is reported on the income statement. The ending inventory of **$1,368** from the Inventory Balance column is reported on the balance sheet.



A1

Analyze the effects of inventory methods for both financial and tax reporting.

Financial Statement Effects of Costing Methods

When purchase prices do not change, each inventory costing method assigns the same cost amounts to inventory and to cost of goods sold. When purchase prices are different, the methods assign different cost amounts. We show these differences in Exhibit 5.8 using Trekking's data.

Rising Costs When purchase costs *regularly rise,* as in Trekking's case, the following occurs.

- FIFO reports the lowest cost of goods sold—yielding the highest gross profit and net income.
- LIFO reports the highest cost of goods sold—yielding the lowest gross profit and net income.
- Weighted average yields results between FIFO and LIFO.

Trekking Company For Month Ended August 31	Specific Identification	FIFO	LIFO	Weighted Average
Income Statement				
Sales	$ 6,050	$ 6,050	$ 6,050	$ 6,050
Cost of goods sold	4,582	4,570	4,730	4,622
Gross profit	$ 1,468	$ 1,480	$ 1,320	$ 1,428
Balance Sheet				
Inventory	$1,408	$1,420	$1,260	$1,368

EXHIBIT 5.8

Financial Statement Effects of Inventory Costing Methods

Falling Costs When costs *regularly decline,* the reverse occurs for FIFO and LIFO.

- FIFO gives the highest cost of goods sold—yielding the lowest gross profit and net income.
- LIFO gives the lowest cost of goods sold—yielding the highest gross profit and net income.

Method Advantages Each method offers advantages.

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- FIFO—inventory on the balance sheet approximates its current cost; it also follows the actual flow of goods for most businesses.
- LIFO—cost of goods sold on the income statement approximates its current cost; it also better matches current costs with revenues.
- Weighted average—smooths out erratic changes in costs.
- Specific identification—matches the costs of items with the revenues they generate.

Point: LIFO inventory is often less than the inventory's replacement cost because LIFO inventory is valued using the oldest inventory purchase costs.

Tax Effects of Costing Methods

Inventory costs affect net income and have potential tax effects. Exhibit 5.8 shows that Trekking gains a temporary tax advantage by using LIFO because it has less income to be taxed. Many companies use LIFO for this reason. The IRS requires that when LIFO is used for tax reporting, it also must be used for financial reporting—called *LIFO conformity rule*.

Caia Image/Image Source

Decision Ethics

Inventory Manager Your compensation as inventory manager includes a bonus plan based on gross profit. Your superior asks your opinion on changing the inventory costing method from FIFO to LIFO. As costs are expected to continue to rise, your superior predicts that LIFO would match higher current costs against sales, thereby lowering taxable income (and gross profit). What do you recommend? ■ *Answer:* It seems your company can save (or at least postpone) taxes by switching to LIFO, but the switch is likely to reduce bonus money that you believe you have earned and deserve. Your best decision is to tell your superior about the tax savings with LIFO. You should discuss your bonus plan and how this is likely to hurt you unfairly.

NEED-TO-KNOW 5-2

Perpetual SI, FIFO, LIFO, and WA

P1

A company reported the following December purchase and sales data for its only product. The company uses a *perpetual inventory system.* Determine the cost assigned to ending inventory and to cost of goods sold using (a) specific identification, (b) FIFO, (c) LIFO, and (d) weighted average.

Date	Activities	Units Acquired at Cost	Units Sold at Retail
Dec. 1	Beginning inventory	5 units @ $3.00 = $ 15.00	
Dec. 8	Purchase	10 units @ $4.50 = 45.00	
Dec. 9	Sales		8 units @ $7.00
Dec. 19	Purchase	13 units @ $5.00 = 65.00	
Dec. 24	Sales		18 units @ $8.00
Dec. 30	Purchase	8 units @ $5.30 = 42.40	
Totals		36 units $167.40	26 units

For specific identification, ending inventory consists of 10 units, where 8 are from the December 30 purchase and 2 are from the December 8 purchase.

Solutions

a. Specific identification.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Dec. 1	5 units @ $3.00 = $ 15.00	5 units @ $3.00 = $ 15.00	
Dec. 8	10 units @ $4.50 = $ 45.00	8 units @ $4.50 = $ 36.00	2 units @ $4.50 = $ 9.00
Dec. 19	13 units @ $5.00 = $ 65.00	13 units @ $5.00 = $ 65.00	
Dec. 30	8 units @ $5.30 = $ 42.40		8 units @ $5.30 = $42.40
	$167.40	26 $116.00	10 $51.40

b. FIFO—Perpetual.

Date	Goods Purchased	Cost of Goods Sold	Inventory Balance
Dec. 1			5 @ $3.00 = $ 15.00
Dec. 8	10 @ $4.50		5 @ $3.00 10 @ $4.50 } = $ 60.00
Dec. 9		5 @ $3.00 3 @ $4.50 } = $ 28.50	7 @ $4.50 = $ 31.50
Dec. 19	13 @ $5.00		7 @ $4.50 13 @ $5.00 } = $ 96.50
Dec. 24		7 @ $4.50 11 @ $5.00 } = $ 86.50	2 @ $5.00 = $ 10.00
Dec. 30	8 @ $5.30		2 @ $5.00 8 @ $5.30 } = $52.40
		$115.00	

Merchandise Inventory (FIFO)

Beg. inventory	15.00		
Dec. 8	45.00		
		Dec. 9	28.50
Dec. 19	65.00		
		Dec. 24	86.50
Dec. 30	42.40		
End. inventory	52.40		

c. LIFO—Perpetual.

Date	Goods Purchased	Cost of Goods Sold	Inventory Balance
Dec. 1			5 @ $3.00 = $ 15.00
Dec. 8	10 @ $4.50		5 @ $3.00 10 @ $4.50 } = $ 60.00
Dec. 9		8 @ $4.50 = $ 36.00	5 @ $3.00 2 @ $4.50 } = $ 24.00
Dec. 19	13 @ $5.00		5 @ $3.00 2 @ $4.50 13 @ $5.00 } = $ 89.00
Dec. 24		13 @ $5.00 2 @ $4.50 3 @ $3.00 } = $ 83.00	2 @ $3.00 = $ 6.00
Dec. 30	8 @ $5.30		2 @ $3.00 8 @ $5.30 } = $48.40
		$119.00	

Merchandise Inventory (LIFO)

Beg. inventory	15.00		
Dec. 8	45.00		
		Dec. 9	36.00
Dec. 19	65.00		
		Dec. 24	83.00
Dec. 30	42.40		
End. inventory	48.40		

d. Weighted Average—Perpetual.

Date	Goods Purchased	Cost of Goods Sold	Inventory Balance
Dec. 1			5 @ $3.00 = $15.00 (5 @ $3.00 per unit)
Dec. 8	10 @ $4.50		5 @ $3.00 10 @ $4.50 } = $60.00 ($60.00/15 units = $4.00 avg. cost)
Dec. 9		8 @ $4.00 = $ 32.00	7 @ $4.00 = $28.00 (7 @ $4.00 per unit)
Dec. 19	13 @ $5.00		7 @ $4.00 13 @ $5.00 } = $93.00 ($93.00/20 units = $4.65 avg. cost)
Dec. 24		18 @ $4.65 = $ 83.70	2 @ $4.65 = $ 9.30 (2 @ $4.65 per unit)
Dec. 30	8 @ $5.30		2 @ $4.65 8 @ $5.30 } = $51.70 ($51.70/10 units = $5.17 avg. cost)
		$115.70	

Merchandise Inventory (WA)

Beg. inventory	15.00		
Dec. 8	45.00	Dec. 9	32.00
Dec. 19	65.00	Dec. 24	83.70
Dec. 30	42.40		
End. inventory	51.70		

Do More: QS 5-5, QS 5-6, QS 5-7, QS 5-11, QS 5-12, QS 5-13, QS 5-14, E 5-3, E 5-5

VALUING INVENTORY AT LCM AND ANALYZING INVENTORY ERRORS

Lower of Cost or Market

P2

Compute the lower of cost or market amount of inventory.

After companies apply one of four costing methods (FIFO, LIFO, weighted average, or specific identification), inventory is reviewed to ensure it is reported at the **lower of cost or market (LCM).**

Computing the Lower of Cost or Market *Market* in the term *LCM* is *replacement cost* for LIFO, but *net realizable value* for the other three methods—advanced courses cover specifics. A decline in market value means a loss of value in inventory. When market value is lower than cost of inventory, a loss is recorded. When market value is higher than cost of inventory, no adjustment is made.

Point: LCM applied to each individual item always yields the lowest inventory.

LCM is applied in one of three ways: (1) to each individual item separately, (2) to major categories of items, or (3) to the whole of inventory. With the increasing use of technology and inventory tracking, companies increasingly apply LCM to each individual item separately. Accordingly, we show that method only; advanced courses cover other methods. To demonstrate LCM, we apply it to the ending inventory of a motorsports retailer in Exhibit 5.9.

Inventory Items	Units	Per Unit Cost	Per Unit Market	Total Cost	Total Market	LCM Applied to Items	
Roadster.....	20	$8,500	$7,000	$170,000	$140,000	$ 140,000	← $140,000 is the lower of $170,000 or $140,000.
Sprint.....	10	5,000	6,000	50,000	60,000	50,000	
Totals.....				$220,000		$190,000	← $190,000 is lower than $220,000 recorded cost.

EXHIBIT 5.9

Lower of Cost or Market Computations

For Roadster, $140,000 is the lower of the $170,000 cost and the $140,000 market. For Sprint, $50,000 is the lower of the $50,000 cost and the $60,000 market. This yields a $190,000 reported inventory, computed from $140,000 for Roadster plus $50,000 for Sprint.

Recording the Lower of Cost or Market Inventory is adjusted downward when total "LCM applied to items" is less than total cost of inventory. To demonstrate, if LCM is applied in Exhibit 5.9, the Merchandise Inventory account must be adjusted from the $220,000 recorded cost down to the $190,000 LCM amount as follows.

NEED-TO-KNOW 5-3

LCM Method

P2

A company has the following products in its ending inventory, along with cost and market values. (a) Compute the lower of cost or

market for its inventory when applied *separately to each product*. (b) If the market amount is less than the recorded cost of the inventory, then record the December 31 LCM adjustment to the Merchandise Inventory account.

	Units	Cost per Unit	Market per Unit
Road bikes	5	$1,000	$800
Mountain bikes	4	500	600
Town bikes	10	400	450

Solution

a.

Inventory Items	Units	Cost per Unit	Market per Unit	Total Cost	Total Market	LCM Items
Road bikes	5	$1,000	$800	$ 5,000	$4,000	$ 4,000
Mountain bikes	4	500	600	2,000	2,400	2,000
Town bikes	10	400	450	4,000	4,500	4,000
Totals				$11,000		$ 10,000
LCM applied to each product						$10,000

b.

Dec. 31	Cost of Goods Sold	1,000	
	Merchandise Inventory		1,000
	Adjust inventory cost to market ($11,000 – $10,000).		

Do More: QS 5-23, E 5-16, P 5-5

Financial Statement Effects of Inventory Errors

A2

Analyze the effects of inventory errors on current and future financial statements.

An inventory error causes misstatements in cost of goods sold, gross profit, net income, current assets, and equity. It also causes misstatements in the next period's statements because ending inventory of one period is the beginning inventory of the next. As we

consider financial statement effects, we recall the following ***inventory relation***.

Beginning inventory + Net purchases − Ending inventory = Cost of goods sold

Income Statement Effects Exhibit 5.10 shows the effects of inventory errors in the current and next period's income statements.

- Row 1, Year 1. Understating ending inventory overstates cost of goods sold. This is because we subtract a smaller ending inventory in computing cost of goods sold. A higher cost of goods sold yields a lower income.
- Row 1, Year 2. Understated ending inventory for Year 1 becomes an understated beginning inventory for Year 2. If beginning inventory is understated, cost of goods sold is understated (because we are starting with a smaller amount). A lower cost of goods sold yields a higher income.
- Row 2, Year 1. Overstating ending inventory understates cost of goods sold. A lower cost of goods sold yields a higher income.
- Row 2, Year 2. Overstated ending inventory for Year 1 becomes an overstated beginning inventory for Year 2. If beginning inventory is overstated, cost of goods sold is overstated. A higher cost of goods sold yields a lower income.

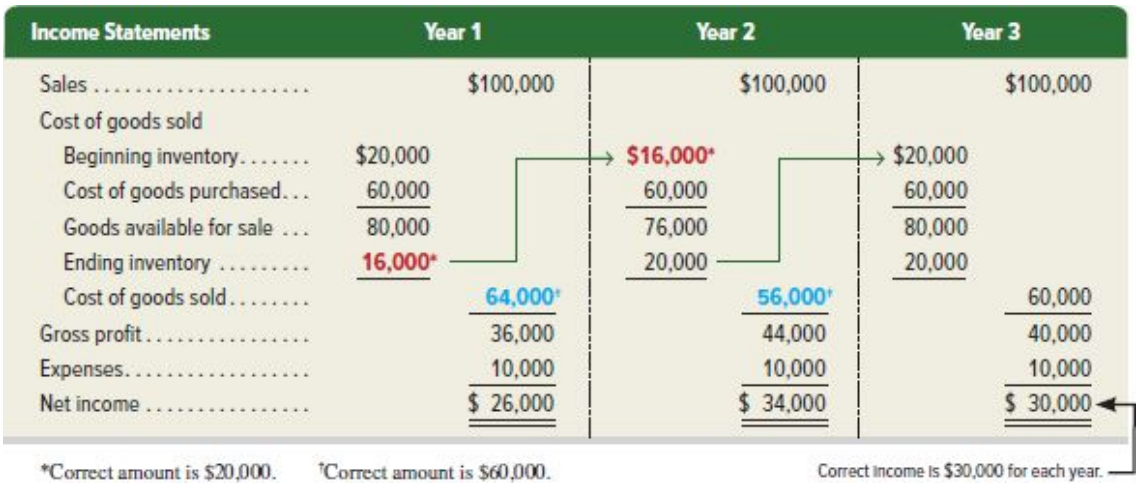
	Year 1		Year 2	
Ending Inventory	Cost of Goods Sold	Net Income	Cost of Goods Sold	Net Income
Understated ↓	Overstated ↑	Understated ↓	Understated ↓	Overstated ↑
Overstated ↑	Understated ↓	Overstated ↑	Overstated ↑	Understated ↓

EXHIBIT 5.10

Effects of Inventory Errors on the Income Statement

Inventory Error Example Consider an inventory error for a company with $100,000 in sales for each of Year 1, Year 2, and Year 3. If this company has a steady $20,000 inventory level and makes $60,000 in purchases in each year, its cost of goods sold is $60,000 and its gross profit is $40,000.

Year 1 Impact Assume the company makes an error in page 212 computing its Year 1 ending inventory and reports $16,000 instead of the correct amount of $20,000. The effects of this error are in Exhibit 5.11. The $4,000 understatement of Year 1 ending inventory causes a $4,000 overstatement in Year 1 cost of goods sold and a $4,000 understatement in both gross profit and net income for Year 1.



Income Statements	Year 1		Year 2		Year 3	
Sales		$100,000		$100,000		$100,000
Cost of goods sold						
Beginning inventory	$20,000		$16,000*		$20,000	
Cost of goods purchased	60,000		60,000		60,000	
Goods available for sale	80,000		76,000		80,000	
Ending inventory	16,000*		20,000		20,000	
Cost of goods sold		64,000†		56,000†		60,000
Gross profit		36,000		44,000		40,000
Expenses		10,000		10,000		10,000
Net income		$ 26,000		$ 34,000		$ 30,000

*Correct amount is $20,000. †Correct amount is $60,000. Correct income is $30,000 for each year.

EXHIBIT 5.11

Effects of Inventory Errors on Three Periods' Income Statements

Example: If Year 1 ending inventory in Exhibit 5.11 is overstated by $3,000, cost of goods sold is understated by $3,000 in Year 1 and overstated by $3,000 in Year 2. Net income is overstated in Year 1 and understated in Year 2. Assets and equity are overstated in Year 1.

Year 2 Impact The Year 1 understated ending inventory becomes the Year 2 understated beginning inventory. This error causes an understatement in Year 2 cost of goods sold and a $4,000 overstatement in both gross profit and net income for Year 2.

Year 3 Impact The Year 1 understated ending inventory affects only that period and the next. It does not affect Year 3 results or any period

thereafter.

Balance Sheet Effects Understating ending inventory understates both current and total assets. An understatement in ending inventory also yields an understatement in equity because of the understatement in net income. Exhibit 5.12 shows the effects of inventory errors on the current period's balance sheet amounts.

Ending Inventory	Assets	Equity
Understated ↓	Understated ↓	Understated ↓
Overstated ↑	Overstated ↑	Overstated ↑

EXHIBIT 5.12

Effects of Inventory Errors on Current Period's Balance Sheet

Konstantin Inozemtsev/E+/Getty Images

Ethical Risk

Eyes in the Sky One of the largest builders, **Homex**, was accused of faking the construction and sale of 100,000 homes. How was it caught? When the SEC used satellite imagery to confirm the existence of homes, it found nothing but bare soil. SEC 2017-60 ■

NEED-TO-KNOW 5-4

Effects of Inventory Errors

A2

A company had $10,000 of sales, and it purchased merchandise costing $7,000 in each of Year 1, Year 2, and Year 3. It also maintained a $2,000 physical inventory from the beginning to the

end of that three-year period. In accounting for inventory, it made an error at the end of Year 1 that caused its Year 1 ending inventory to appear on its statements as $1,600 rather than the correct $2,000. (a) Determine the correct amount of the company's gross profit in each of Year 1, Year 2, and Year 3. (b) Prepare comparative income statements as in Exhibit 5.11 to show the effect of this error on the company's cost of goods sold and gross profit for each of Year 1, Year 2, and Year 3.

Solution

a. Correct gross profit = $10,000 − $7,000 = $3,000 (for each year).

b. Cost of goods sold and gross profit figures follow.

	Year 1		Year 2		Year 3	
Sales		$10,000		$10,000		$10,000
Cost of goods sold						
Beginning inventory	$2,000		$1,600		$2,000	
Cost of purchases	7,000		7,000		7,000	
Goods available for sale	9,000		8,600		9,000	
Ending inventory	1,600		2,000		2,000	
Cost of goods sold		7,400		6,600		7,000
Gross profit		$ 2,600		$ 3,400		$ 3,000

Do More: QS 5-24, E 5-17, P 5-6

Decision Analysis Inventory Turnover and Days' Sales in Inventory

Inventory Turnover

A3

Assess inventory management using both inventory turnover and days' sales in inventory

Inventory turnover, also called *merchandise inventory turnover,* is defined in Exhibit 5.13. Inventory turnover tells how many *times* a company turns over (sells) its inventory in a period. It

page 213

is used to assess whether management is doing a good job controlling the amount of inventory. A low ratio means the company may have more inventory than it needs or is struggling to sell inventory. A very high ratio means inventory might be too low. This can cause lost sales if customers must back-order merchandise. Inventory turnover has no simple rule except to say *a high ratio is preferable if inventory is adequate to meet demand.*

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

EXHIBIT 5.13

Inventory Turnover

Days' Sales in Inventory

Days' sales in inventory is a ratio that shows how much inventory is available in terms of the number of days' sales. It can be interpreted as the number of days one can sell from existing inventory if no new items are purchased. This ratio reveals the buffer against out-of-stock inventory and is useful in evaluating how quickly inventory is being sold. It is defined in Exhibit 5.14. Days' sales in inventory uses *ending* inventory, whereas inventory turnover uses *average* inventory.

$$\text{Days' sales in inventory} = \frac{\text{Ending inventory}}{\text{Cost of goods sold}} \times 365$$

EXHIBIT 5.14

Days' Sales in Inventory

Analysis of Inventory Management

We apply the analysis tools in this section to **Costco** and **Walmart**, as shown in Exhibit 5.15. Costco's current year inventory turnover of 11.8 times means that it turns over its inventory 11.8 times per year. Costco's inventory turnover exceeded Walmart's turnover in each of the last three years. This is a positive for Costco, as we prefer inventory turnover to be high provided inventory is not out of stock

and the company is not losing customers. Days' sales in inventory of 31.3 days means that Costco is carrying 31.3 days of sales in inventory. This inventory buffer seems sufficient. As long as Costco is not at risk of running out of stock, it prefers its assets not be tied up in inventory.

Point: Take care when comparing turnover ratios across companies that use different costing methods (such as FIFO and LIFO).

Company	Figure ($ millions)	Current Year	1 Year Ago	2 Years Ago
Costco	Cost of goods sold	$132,886	$123,152	$111,882
	Ending inventory	$ 11,395	$ 11,040	$ 9,834
	Inventory turnover	11.8 times	11.8 times	11.9 times
	Days' sales in inventory	31.3 days	32.7 days	32.1 days
Walmart	Inventory turnover	8.8 times	8.6 times	8.3 times
	Days' sales in inventory	41.9 days	42.8 days	43.5 days

EXHIBIT 5.15

Inventory Turnover and Days' Sales in Inventory for Costco and Walmart

Decision Maker

Entrepreneur Your retail store has an inventory turnover of 5.0 and a days' sales in inventory of 73 days. The industry norm for inventory turnover is 4.4 and for days' sales in inventory is 74 days. What is your assessment of inventory management? ■ *Answer:* Your inventory turnover is higher than the norm, whereas days' sales in inventory approximates the norm. Because your turnover is already 14% better than average, you should probably direct attention to days' sales in inventory. You should see if you can reduce the level of inventory while maintaining service to customers. Given your higher turnover, you should be able to hold less inventory.

NEED-TO-KNOW 5-5

COMPREHENSIVE 1

Perpetual Method: Computing Inventory Using LIFO, FIFO, WA, and SI; Financial Statement Impacts; and Inventory Errors

Craig Company buys and sells one product. Its beginning inventory, purchases, and sales during the current year follow.

Date	Activity	Units Acquired at Cost	Units Sold at Retail	Unit Inventory
Jan. 1	Beg. inventory	400 units @ $14 = $ 5,600		400 units
Jan. 15	Sale		200 units @ $30	200 units
Mar. 10	Purchase	200 units @ $15 = $ 3,000		400 units
Apr. 1	Sale		200 units @ $30	200 units
May 9	Purchase	300 units @ $16 = $ 4,800		500 units
Sep. 22	Purchase	250 units @ $20 = $ 5,000		750 units
Nov. 1	Sale		300 units @ $35	450 units
Nov. 28	Purchase	100 units @ $21 = $ 2,100		550 units
	Totals	1,250 units $20,500	700 units	

Additional tracking data for specific identification: Sold 400 units costing $14 each, 200 units costing $15 each, and 100 units costing $20 each.

Required

1. Compute the cost of goods available for sale.
2. Apply FIFO, LIFO, weighted average, and specific identification to compute ending inventory and cost of goods sold under each method using the *perpetual system*.
3. Compute gross profit under each method. Also, report the inventory amount reported on the balance sheet for each method.
4. In preparing financial statements for the current year, the financial officer was instructed to use FIFO but failed to do so and instead computed cost of goods sold according to LIFO, which led to a $1,400 overstatement in cost of goods sold from using LIFO. Determine the impact on current year income from the error. Also determine the effect of this error on **next year's** income.

SOLUTION

1. Cost of goods available for sale (this amount is the same for all methods).

Date		Units	Unit Cost	Cost
Jan. 1	Beg. inventory	400	$14	$ 5,600
Mar. 10	Purchase	200	15	3,000
May 9	Purchase	300	16	4,800
Sep. 22	Purchase	250	20	5,000
Nov. 28	Purchase	100	21	2,100
Total goods available for sale		1,250		$20,500

2a. FIFO **perpetual** method.

Date	Goods Purchased	Cost of Goods Sold	Inventory Balance	
Jan. 1	Beginning balance		400 @ $14	= $ 5,600
Jan. 15		200 @ $14 = $2,800	200 @ $14	= $ 2,800
Mar. 10	200 @ $15 = $3,000		200 @ $14 200 @ $15	= $ 5,800
Apr. 1		200 @ $14 = $2,800	200 @ $15	= $ 3,000
May 9	300 @ $16 = $4,800		200 @ $15 300 @ $16	= $ 7,800
Sep. 22	250 @ $20 = $5,000		200 @ $15 300 @ $16 250 @ $20	= $ 12,800
Nov. 1		200 @ $15 = $3,000 100 @ $16 = $1,600	200 @ $16 250 @ $20	= $ 8,200
Nov. 28	100 @ $21 = $2,100		200 @ $16 250 @ $20 100 @ $21	= $10,300
Total cost of goods sold		$10,200		

2b. LIFO **perpetual** method.

Date	Goods Purchased	Cost of Goods Sold	Inventory Balance
Jan. 1	Beginning balance		400 @ $14 = $ 5,600
Jan. 15		200 @ $14 = $2,800	200 @ $14 = $ 2,800
Mar. 10	200 @ $15 = $3,000		200 @ $14 200 @ $15 } = $ 5,800
Apr. 1		200 @ $15 = $3,000	200 @ $14 = $ 2,800
May 9	300 @ $16 = $4,800		200 @ $14 300 @ $16 } = $ 7,600
Sep. 22	250 @ $20 = $5,000		200 @ $14 300 @ $16 250 @ $20 } = $ 12,600
Nov. 1		250 @ $20 = $5,000 50 @ $16 = $ 800	200 @ $14 250 @ $16 } = $ 6,800
Nov. 28	100 @ $21 = $2,100		200 @ $14 250 @ $16 100 @ $21 } = $ 8,900
Total cost of goods sold		$11,600	

2c. Weighted average **perpetual** method.

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Date	Goods Purchased	Cost of Goods Sold	Inventory Balance
Jan. 1	Beginning balance		400 @ $14.00 = $ 5,600 ($5,600/400 units = $14.00 avg. cost)
Jan. 15		200 @ $14.00 = $ 2,800	200 @ $14.00 = $ 2,800

Date	Goods Purchased	Cost of Goods Sold	Inventory Balance
Mar. 10	200 @ $15.00 = $3,000		200 @ $14.00 200 @ $15.00 } = $ 5,800 ($5,800/400 units = $14.50 avg. cost)
Apr. 1		200 @ $14.50 = $ 2,900	200 @ $14.50 = $ 2,900
May 9	300 @ $16.00 = $4,800		200 @ $14.50 300 @ $16.00 } = $ 7,700 ($7,700/500 units = $15.40 avg. cost)
Sep. 22	250 @ $20.00 = $5,000		500 @ $15.40 250 @ $20.00 } = $ 12,700 ($12,700/750 units = $16.93† avg. cost)
Nov. 1		300 @ $16.93 = $ 5,079	450 @ $16.93 = $ 7,618.50
Nov. 28	100 @ $21.00 = $2,100		450 @ $16.93 100 @ $21.00 } = $9,718.50 ($9,718.50/550 units = $17.67 avg. cost)
Total cost of goods sold*		$10,779	

*Cost of goods sold ($10,779) plus ending inventory ($9,718.50) is $2.50 less than the cost of goods available for sale ($20,500) due to rounding.

†Rounded to 2 decimal places.

2d. Specific identification method.

Date	Goods Purchased	Cost of Goods Sold	Inventory Balance
Mar. 10	200 @ $15.00 = $3,000		200 @ $14.00 200 @ $15.00 } = $ 5,800 ($5,800/400 units = $14.50 avg. cost)
Apr. 1		200 @ $14.50 = $ 2,900	200 @ $14.50 = $ 2,900
May 9	300 @ $16.00 = $4,800		200 @ $14.50 300 @ $16.00 } = $ 7,700 ($7,700/500 units = $15.40 avg. cost)
Sep. 22	250 @ $20.00 = $5,000		500 @ $15.40 250 @ $20.00 } = $ 12,700 ($12,700/750 units = $16.93† avg. cost)
Nov. 1		300 @ $16.93 = $ 5,079	450 @ $16.93 = $ 7,618.50
Nov. 28	100 @ $21.00 = $2,100		450 @ $16.93 100 @ $21.00 } = $9,718.50 ($9,718.50/550 units = $17.67 avg. cost)
Total cost of goods sold*		$10,779	

*Cost of goods sold ($10,779) plus ending inventory ($9,718.50) is $2.50 less than the cost of goods available for sale ($20,500) due to rounding.

†Rounded to 2 decimal places.

3.

	FIFO	LIFO	Weighted Average	Specific Identification
Income Statement				
Sales*	$ 22,500	$22,500	$ 22,500	$22,500
Cost of goods sold	10,200	11,600	10,779	10,600
Gross profit	$ 12,300	$10,900	$ 11,721	$11,900
Balance Sheet				
Inventory	$10,300	$ 8,900	$9,718.50	$ 9,900

*Sales = (200 units × $30) + (200 units × $30) + (300 units × $35) = $22,500.

4. Mistakenly using LIFO when FIFO should have been used overstates cost of goods sold in the current year by $1,400, which is the difference between the FIFO and LIFO amounts of ending inventory. It understates income in the current year by $1,400. In the next year, income is overstated by $1,400- because of the understatement in beginning inventory.

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NEED-TO-KNOW 5-6

page 217

COMPREHENSIVE 2

Periodic Method: Appendix—Computing Inventory Using LIFO, FIFO, WA, and SI; Financial Statement Impacts; and Inventory Errors

Craig Company buys and sells one product. Its beginning inventory, purchases, and sales during the current year follow.

Date	Activity	Units Acquired at Cost	Units Sold at Retail	Unit Inventory
Jan. 1	Beg. inventory	400 units @ $14 = $ 5,600		400 units
Jan. 15	Sale		200 units @ $30	200 units
Mar. 10	Purchase	200 units @ $15 = $ 3,000		400 units
Apr. 1	Sale		200 units @ $30	200 units
May 9	Purchase	300 units @ $16 = $ 4,800		500 units
Sep. 22	Purchase	250 units @ $20 = $ 5,000		750 units
Nov. 1	Sale		300 units @ $35	450 units
Nov. 28	Purchase	100 units @ $21 = $ 2,100		550 units
	Totals	1,250 units $20,500	700 units	

Additional tracking data for specific identification: Sold 400 units costing $14 each, 200 units costing $15 each, and 100 units costing $20 each.

Required

1. Compute the cost of goods available for sale.
2. Apply FIFO, LIFO, weighted average, and specific identification to compute ending inventory and cost of goods sold under each method using the *periodic system*.
3. Compute gross profit under each method. Also, report the inventory amount reported on the balance sheet for each method.
4. In preparing financial statements for the current year, the financial officer was instructed to use FIFO but failed to do so and instead computed cost of goods sold according to LIFO. Determine the impact of the error on current year income. Also determine the effect of this error on next year's income.

SOLUTION

1. Cost of goods available for sale (this amount is the same for all methods).

Date		Units	Unit Cost	Cost
Jan. 1	Beg. inventory	400	$14	$ 5,600
Mar. 10	Purchase	200	15	3,000
May 9	Purchase	300	16	4,800
Sep. 22	Purchase	250	20	5,000
Nov. 28	Purchase	100	21	2,100
Total goods available for sale		1,250		$20,500

2a. FIFO **periodic** method.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Jan. 1	400 @ $14 = $ 5,600	400 @ $14 = $ 5,600	
Mar. 10	200 @ $15 = $ 3,000	200 @ $15 = $ 3,000	
May 9	300 @ $16 = $ 4,800	100 @ $16 = $ 1,600	200 @ $16 = $ 3,200
Sep. 22	250 @ $20 = $ 5,000		250 @ $20 = $ 5,000
Nov. 28	100 @ $21 = $ 2,100		100 @ $21 = $ 2,100
	$20,500	700 $10,200	550 $10,300

2b. LIFO **periodic** method.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Jan. 1	400 @ $14 = $ 5,600		400 @ $14 = $5,600
Mar. 10	200 @ $15 = $ 3,000	50 @ $15 = $ 750	150 @ $15 = $2,250
May 9	300 @ $16 = $ 4,800	300 @ $16 = $ 4,800	
Sep. 22	250 @ $20 = $ 5,000	250 @ $20 = $ 5,000	
Nov. 28	100 @ $21 = $ 2,100	100 @ $21 = $ 2,100	
	$20,500	700 $12,650	550 $7,850

2c. Weighted average **periodic** method.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Jan. 1	400 @ $14 = $ 5,600		
Mar. 10	200 @ $15 = $ 3,000		
May 9	300 @ $16 = $ 4,800		
Sep. 22	250 @ $20 = $ 5,000		
Nov. 28	100 @ $21 = $ 2,100 1,250 units $20,500 = $16.40 ($20,500/1,250 units)	700 @ $16.40 = **$11,480**	**550** @ $16.40 = **$9,020**

2d. Specific identification method.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Jan. 1	400 @ $14 = $ 5,600	400 @ $14 = $ 5,600	
Mar. 10	200 @ $15 = $ 3,000	200 @ $15 = $ 3,000	
May 9	300 @ $16 = $ 4,800		300 @ $16 = $4,800
Sep. 22	250 @ $20 = $ 5,000	100 @ $20 = $ 2,000	150 @ $20 = $3,000
Nov. 28	100 @ $21 = $ 2,100		100 @ $21 = $2,100
	$20,500	700 $10,600	550 $9,900

3.

	FIFO	LIFO	Weighted Average	Specific Identification
Income Statement				
Sales*	$ 22,500	$22,500	$ 22,500	$22,500
Cost of goods sold	10,200	12,650	11,480	10,600
Gross profit	$ 12,300	$ 9,850	$ 11,020	$11,900
Balance Sheet				
Inventory	$10,300	$ 7,850	$ 9,020	$ 9,900

*Sales = (200 units × $30) + (200 units × $30) + (300 units × $35) = $22,500.

4. Mistakenly using LIFO, when FIFO should have been used, overstates cost of goods sold in the current year by $2,450, which is the difference between the FIFO and LIFO amounts of ending inventory. It understates income in the current year by $2,450. In the next year, income is overstated by $2,450- because of the understatement in beginning inventory.

APPENDIX

5A

P3

Compute inventory in a periodic system using the methods of specific identification, FIFO, LIFO, and weighted average.

Inventory Costing under a Periodic System

This section demonstrates inventory costing methods. We use information from Trekking, a sporting goods store. Among its many products, Trekking sells one type of mountain bike whose sales are directed at resorts that provide inexpensive bikes for guest use. We use Trekking's data from August. Its mountain bike (unit) inventory at the beginning of August and its purchases and sales during August are shown in Exhibit 5A.1. It ends August with 12 bikes remaining in inventory.

Date	Activity	Units Acquired at Cost	Units Sold at Retail	Unit Inventory
Aug. 1	Beginning inventory	10 units @ $ 91 = $ 910		10 units
Aug. 3	Purchases	15 units @ $106 = $ 1,590		25 units
Aug. 14	Sales		20 units @ $130	5 units
Aug. 17	Purchases	20 units @ $115 = $ 2,300		25 units
Aug. 28	Purchases	10 units @ $119 = $ 1,190		35 units
Aug. 30	Sales		23 units @ $150	12 units
	Totals	55 units	43 units	
		$5,990		

Units available for sale | Goods available for sale | Units sold | Units left

EXHIBIT 5A.1

Purchases and Sales of Goods

Warut Chinsai/Shutterstock

Trekking uses the **periodic inventory system**, which means that its Merchandise Inventory account is updated at the end of each period (monthly for Trekking) to reflect purchases and sales. (Many companies use the periodic system for tracking costs [not so much for sales]. Reasons include the use of standard costs by some companies and dollar-value LIFO by others. Also, inventory values are identical

under the periodic and perpetual methods when using Specific Identification and for FIFO.

Specific Identification

When each item in inventory can be matched with a specific purchase and invoice, we can use **specific identification** or **SI** to assign costs. The first two columns of Exhibit 5A.2 show Trekking's dates and amounts of each purchase. Total goods available for sale is **$5,990**.

We then need sales records that identify exactly which items were sold and when. Trekking's internal documents show goods sold consist of 10 from the August 1 purchase, 15 from the August 3 purchase, 15 from the August 17 purchase, and 3 from the August 28 purchase. These goods sold are entered in the third column of Exhibit 5.4 and total $4,582.

In the Ending Inventory column we enter the 12 units not sold. The $1,408 total is ending inventory.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Aug. 1	10 @ $ 91 = $ 910	10 @ $ 91 = $ 910	
Aug. 3	15 @ $106 = $1,590	15 @ $106 = $1,590	
Aug. 17	20 @ $115 = $2,300	15 @ $115 = $1,725	5 @ $115 = $ 575
Aug. 28	10 @ $119 = $1,190	3 @ $119 = $ 357	7 @ $119 = $ 833
	$5,990	43 $4,582	12 $1,408

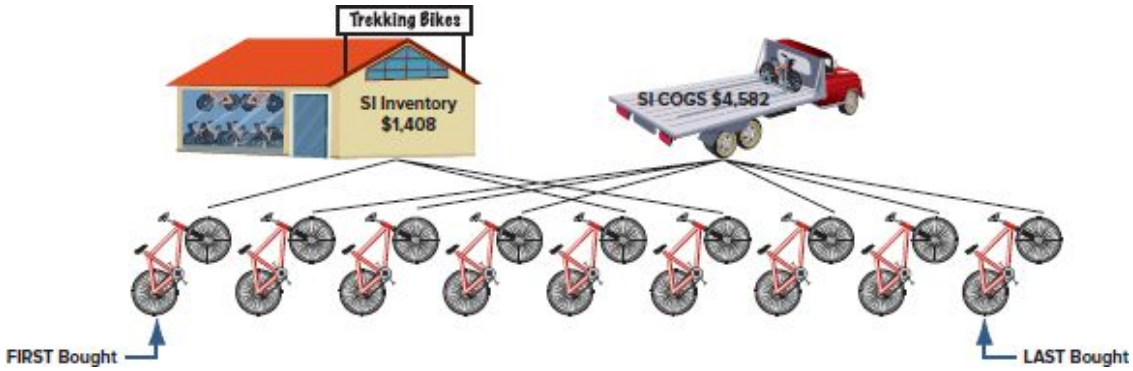
EXHIBIT 5A.2

Specific Identification

Point: Specific identification is common for custom-made inventory such as jewelry.

Trekking's cost of goods sold reported on the income statement is **$4,582**, and ending inventory reported on the balance sheet is **$1,408**. The following graphic shows these cost flows.

page 220



First-In, First-Out

First-in, first-out (FIFO) assumes that inventory items are sold in the order acquired. When sales occur, the costs of the earliest units acquired are charged to cost of goods sold. This leaves the costs from the most recent purchases in ending inventory.

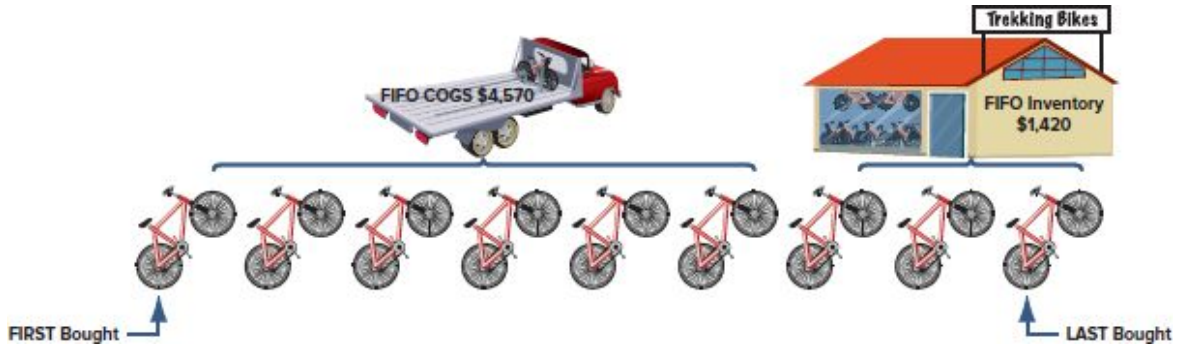
The Goods Available for Sale column in Exhibit 5A.3 shows the units and costs making up the $5,990 goods available for sale (from Exhibit 5A.1). In the Cost of Goods Sold column we enter the 43 units sold, *beginning with the **first** units purchased:* 10 from August 1, then 15 from August 3, and 18 from August 17. The $4,570 total is cost of goods sold. In the Ending Inventory column we enter the 12 units *not* sold. The $1,420 total is ending inventory.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Aug. 1	10 @ $ 91 = $ 910	10 @ $ 91 = $ 910	
Aug. 3	15 @ $106 = $1,590	15 @ $106 = $1,590	
Aug. 17	20 @ $115 = $2,300	18 @ $115 = $2,070	2 @ $115 = $ 230
Aug. 28	10 @ $119 = $1,190		10 @ $119 = $1,190
	$5,990	43 $4,570	12 = $1,420

EXHIBIT 5A.3

FIFO—Periodic

Trekking's ending inventory reported on the balance sheet is **$1,420**, and its cost of goods sold reported on the income statement is **$4,570**.



Last-In, First-Out

Last-in, first-out (LIFO) assumes that the most recent purchases are sold first. These more recent costs are charged to cost of goods sold, and the costs of the earliest purchases are assigned to inventory.

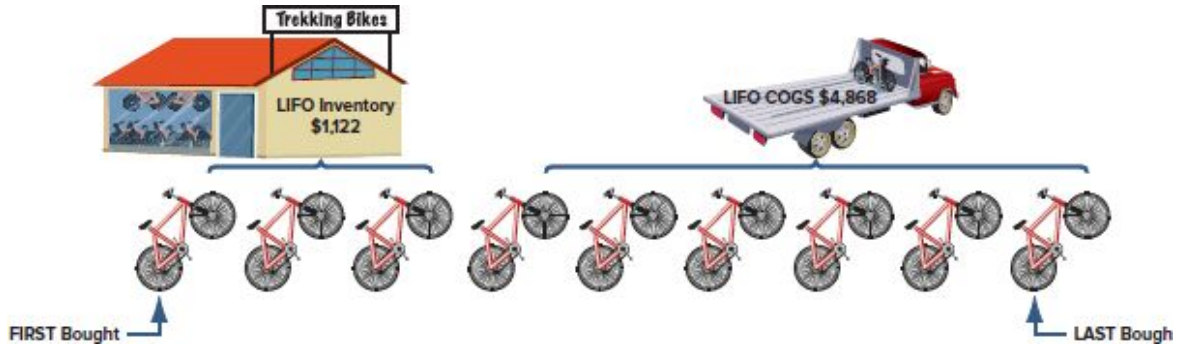
The Goods Available for Sale column in Exhibit 5A.4 shows page 221 the units and costs making up the $5,990 goods available for sale (from Exhibit 5A.1). In the Cost of Goods Sold column we enter the 43 units sold, *beginning with the **last** units purchased:* 10 from August 28, then 20 from August 17, and 13 from August 3. The $4,868 total is cost of goods sold. In the Ending Inventory column we enter the 12 units not sold. The $1,122 total is ending inventory.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Aug. 1	10 @ $ 91 = $ 910		10 @ $ 91 = $ 910
Aug. 3	15 @ $106 = $1,590	13 @ $106 = $1,378	2 @ $106 = $ 212
Aug. 17	20 @ $115 = $2,300	20 @ $115 = $2,300	
Aug. 28	10 @ $119 = $1,190	10 @ $119 = $1,190	
	$5,990	43 $4,868	12 = $1,122

EXHIBIT 5A.4

LIFO—Periodic

Trekking's ending inventory reported on the balance sheet page 222 is **$1,122**, and its cost of goods sold reported on the income statement is **$4,868**.



Weighted Average

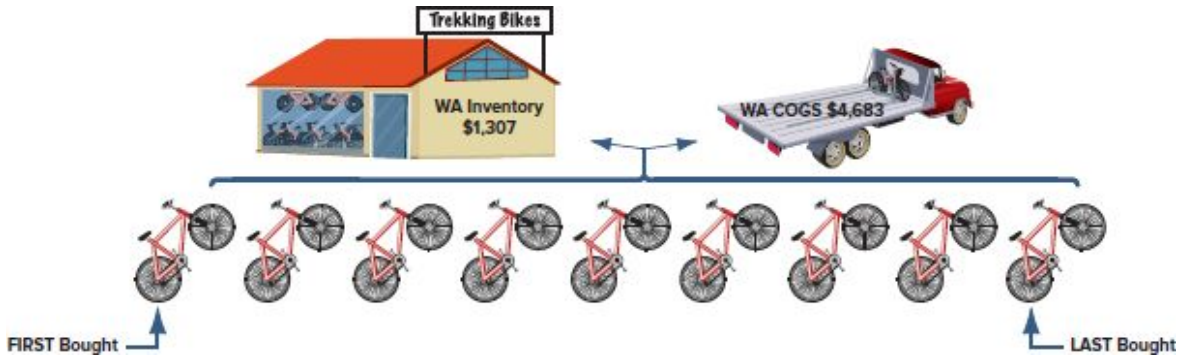
Weighted average or **WA** (also called **average cost**) requires that we use the average cost per unit of inventory at the end of the period. Weighted average cost per unit equals the cost of goods available for sale divided by the units available. The Goods Available for Sale column in Exhibit 5A.5 shows the 55 units and costs making up the $5,990 goods available for sale (from Exhibit 5A.1). At the bottom of that column we compute average cost per unit as $5,990/55 units = $108.91. In the Cost of Goods Sold column we enter the 43 units sold times the $108.91 average cost. The $4,683 total is cost of goods sold. In the Ending Inventory column we enter the 12 units not sold times the $108.91 average cost. The $1,307 total is ending inventory.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Aug. 1	10 @ $ 91 = $ 910		
Aug. 3	15 @ $106 = $1,590		
Aug. 17	20 @ $115 = $2,300		
Aug. 28	10 @ $119 = $1,190 55 units $5,990 = $108.91 ($5,990/55 units)	43 @ $108.91 = $4,683	12 @ $108.91 = $1,307

EXHIBIT 5A.5

Weighted Average—Periodic

Trekking's ending inventory reported on the balance sheet is **$1,307**, and its cost of goods sold reported on the income statement is **$4,683**.



Financial Statement Effects of Costing Methods

When purchase prices do not change, each inventory costing method assigns the same cost amounts to inventory and to cost of goods sold. When purchase prices are different, the methods assign different cost amounts. We show these differences in Exhibit 5A.6 using Trekking's data.

Trekking Company For Month Ended August 31	Specific Identification	FIFO	LIFO	Weighted Average
Income Statement				
Sales	$ 6,050	$ 6,050	$ 6,050	$ 6,050
Cost of goods sold	4,582	4,570	4,868	4,683
Gross profit	$ 1,468	$ 1,480	$ 1,182	$ 1,367
Balance Sheet				
Inventory	$1,408	$1,420	$1,122	$1,307

EXHIBIT 5A.6

Financial Statement Effects of Inventory Costing Methods

Rising Costs When purchase costs *regularly rise,* as in Trekking's case, the following occurs.

- FIFO reports the lowest cost of goods sold—yielding the highest gross profit and net income.
- LIFO reports the highest cost of goods sold—yielding the lowest gross profit and net income.
- Weighted average yields results between FIFO and LIFO.

Falling Costs When costs *regularly decline,* the reverse occurs for FIFO and LIFO. FIFO gives the highest cost of goods sold—yielding the lowest gross profit and net income. LIFO gives the lowest cost of goods sold—yielding the highest gross profit and net income.

Method Advantages Each method offers advantages.

- FIFO—inventory approximates its current cost; it also follows actual flow of goods for most businesses.
- LIFO—cost of goods sold approximates its current cost; it also better matches current costs with revenues.
- Weighted average—smooths out erratic changes in costs.
- Specific identification—matches the costs of items with the revenues they generate.
- LIFO inventory is often less than the inventory's replacement cost because LIFO inventory is valued using the oldest inventory purchase costs.

Point: LIFO inventory is often less than the inventory's replacement cost because LIFO inventory is valued using the oldest inventory purchase costs.

NEED-TO-KNOW 5-7

Periodic SI, FIFO, LIFO, and WA

P3 

A company reported the following December purchases and sales data for its only product. The company uses a *periodic inventory system.* Determine the cost assigned to ending inventory and to cost of goods sold using (a) specific identification, (b) FIFO, (c) LIFO, and (d) weighted average. For specific identification, ending inventory consists of 10 units, where 8 are from the December 30 purchase and 2 are from the December 8 purchase.

Date	Activities	Units Acquired at Cost	Units Sold at Retail
Dec. 1	Beginning inventory	5 units @ $3.00 = $ 15.00	
Dec. 8	Purchase	10 units @ $4.50 = 45.00	
Dec. 9	Sales.....		8 units @ $7.00
Dec. 19	Purchase	13 units @ $5.00 = 65.00	
Dec. 24	Sales.....		18 units @ $8.00
Dec. 30	Purchase	8 units @ $5.30 = 42.40	
Totals	.....	36 units $167.40	26 units

Solutions

a. Specific identification.

page 223

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Dec. 1	5 units @ $3.00 = $ 15.00	5 units @ $3.00 = $ 15.00	
Dec. 8	10 units @ $4.50 = $ 45.00	8 units @ $4.50 = $ 36.00	2 units @ $4.50 = $ 9.00
Dec. 19	13 units @ $5.00 = $ 65.00	13 units @ $5.00 = $ 65.00	
Dec. 30	8 units @ $5.30 = $ 42.40		8 units @ $5.30 = $42.40
	$167.40	26 $116.00	10 $51.40

b. FIFO—Periodic.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Dec. 1	5 @ $3.00 = $ 15.00	5 @ $3.00 = $ 15.00	
Dec. 8	10 @ $4.50 = $ 45.00	10 @ $4.50 = $ 45.00	
Dec. 19	13 @ $5.00 = $ 65.00	11 @ $5.00 = $ 55.00	2 @ $5.00 = $10.00
Dec. 30	8 @ $5.30 = $ 42.40		8 @ $5.30 = $42.40
	$167.40	26 $115.00	10 $52.40

c. LIFO—Periodic.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Dec. 1	5 @ $3.00 = $ 15.00		5 @ $3.00 = $15.00
Dec. 8	10 @ $4.50 = $ 45.00	5 @ $4.50 = $ 22.50	5 @ $4.50 = $22.50
Dec. 19	13 @ $5.00 = $ 65.00	13 @ $5.00 = $ 65.00	
Dec. 30	8 @ $5.30 = $ 42.40	8 @ $5.30 = $ 42.40	
	$167.40	26 $129.90	10 $37.50

d. WA—Periodic.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Dec. 1	5 @ $3.00 = $ 15.00		
Dec. 8	10 @ $4.50 = $ 45.00		
Dec. 19	13 @ $5.00 = $ 65.00		
Dec. 30	8 @ $5.30 = $ 42.40 36 units $167.40 = $4.65 ($167.40/36 units)	26 @ $4.65 = $120.90	10 @ $4.65 = $46.50

Do More: QS 5-8, QS 5-9, QS 5-10, QS 5-15, QS 5-16, QS 5-17, QS 5-18, E 5-6, E 5-7

APPENDIX 5B

P4

Apply both the retail inventory and gross profit methods to estimate inventory.

Inventory Estimation Methods

page 224

Inventory sometimes is estimated for two reasons. First, companies often report **interim financial statements** (financial statements prepared for periods of less than one year), but they only annually take a physical count of inventory. Second, companies may require an inventory estimate if some casualty such as fire or flood makes taking a physical count impossible. Estimates are usually only required for companies that use the periodic system. Companies using a perpetual system would presumably have updated inventory data.

This appendix describes two methods to estimate inventory.

Retail Inventory Method To avoid the time-consuming process of taking a physical inventory, some companies use the **retail inventory method** to estimate cost of goods sold and ending inventory.

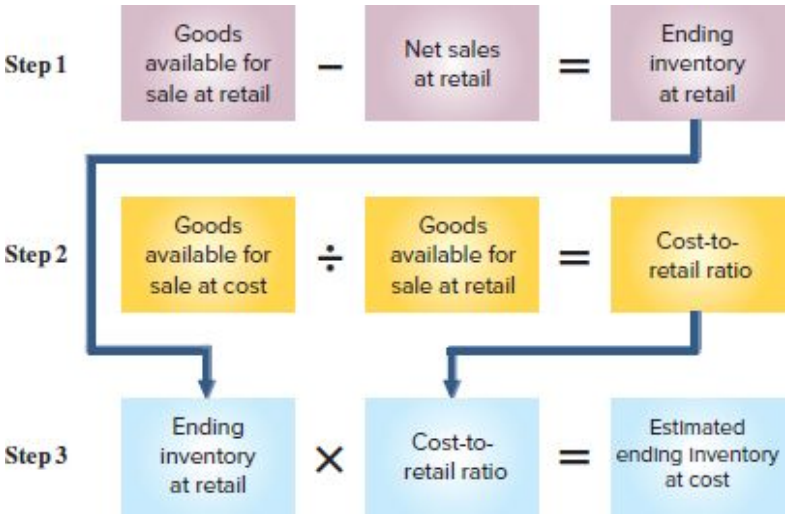


EXHIBIT 5A.1

Retail Inventory Method of Inventory Estimation

The retail inventory method uses a three-step process to estimate ending inventory. We need to know the amount of inventory a company had at the beginning of the period in both *cost* and *retail* amounts. We already explained how to compute the cost of inventory. The *retail amount of inventory* is measured using selling prices of inventory items. We also need to know the net amount of goods purchased (minus returns, allowances, and discounts) in the period, both at cost and at retail. The amount of net sales at retail also is needed. The process is shown in Exhibit 5B.1.

The reasoning behind the retail inventory method is that if we can get a good estimate of the cost-to-retail ratio, we can multiply ending inventory at retail by this ratio to estimate ending inventory at cost. Exhibit 5B.2 shows how these steps are applied to estimate ending inventory. First, we find that $100,000 of goods (at retail selling prices) were available for sale. A total of $70,000 of these goods were sold, leaving $30,000 (retail value) of merchandise in ending inventory. Second, the cost of these goods is 60% of the $100,000 retail value.

Third, because cost for these goods is 60% of retail, the estimated cost of ending inventory is $18,000.

		At Cost	At Retail
	Goods available for sale		
	Beginning inventory	$ 20,500	$ 34,500
	Cost of goods purchased	39,500	65,500
Step 1:	Goods available for sale	60,000	100,000
Step 1:	Deduct net sales at retail		70,000
Step 1:	Ending inventory at retail		$ 30,000
Step 2:	Cost-to-retail ratio: ($60,000 ÷ $100,000) = 60%		
Step 3:	Estimated ending inventory at cost ($30,000 × 60%)	$18,000	

EXHIBIT 5B.2

Estimated Inventory Using the Retail Inventory Method

Gross Profit Method The **gross profit method** estimates page 225 the cost of ending inventory by applying the gross profit ratio to net sales (at retail). This type of estimate often is used when inventory is destroyed, lost, or stolen. This method uses the historical relation between cost of goods sold and net sales to estimate the proportion of cost of goods sold making up current sales. This cost of goods sold estimate is then subtracted from cost of goods available for sale to estimate the ending inventory at cost. These two steps are shown in Exhibit 5B.3.

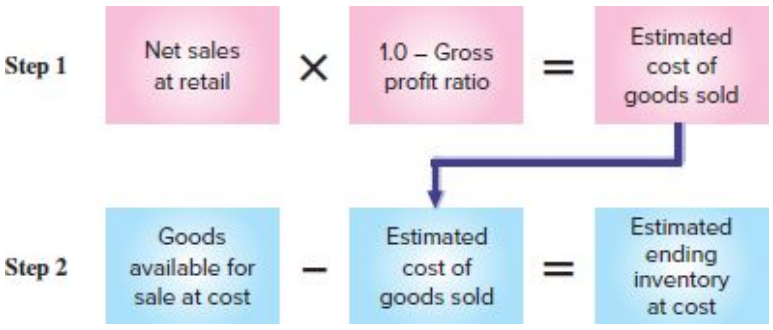


EXHIBIT 5B.3

Gross Profit Method of Inventory Estimation

To demonstrate, assume that a company's inventory is destroyed by fire in March. When the fire occurs, the company's accounts show the following balances for January through March: Net Sales, $30,000; Beginning Inventory, $12,000 (at January 1); and Cost of Goods Purchased, $20,500. If this company's gross profit ratio is 30%, then 30% of each net sales dollar is gross profit and 70% is cost of goods sold. We show in Exhibit 5B.4 how this 70% is used to estimate lost inventory of $11,500.

	Goods available for sale		
	Beginning inventory, January 1	$12,000	
	Cost of goods purchased	20,500	
	Goods available for sale (at cost)	32,500	
	Net sales at retail		$30,000
Step 1:	Estimated cost of goods sold ($30,000 × 70%)	(21,000)	← × 0.70
Step 2:	Estimated March inventory at cost	$11,500	

EXHIBIT 5B.4

Estimated Inventory Using the Gross Profit Method

NEED-TO-KNOW 5-8

Retail Inventory Estimation

P4

Using the retail method and the following data, estimate the cost of ending inventory.

	Cost	Retail
Beginning inventory	$324,000	$530,000
Cost of goods purchased	195,000	335,000
Net sales		320,000

Solution

Estimated ending inventory (at cost) is $327,000. It is computed as follows.

Step 1: $(\$530{,}000 + \$335{,}000) - \$320{,}000 = \$545{,}000$

Step 2: $\dfrac{\$324{,}000 + \$195{,}000}{\$530{,}000 + \$335{,}000} = 60\%$

Step 3: $\$545{,}000 \times 60\% = \$327{,}000$

Do More: QS 5-26, E 5-20, E 5-21, P 5-9

Summary: Cheat Sheet

INVENTORY BASICS

FOB shipping point: Goods are included in buyer's inventory once they are shipped.

FOB destination: Goods are included in buyer's inventory after arrival at their destination.

Consignee: Never reports consigned goods in inventory; stays in consignor's inventory until sold.

Merchandise inventory: Includes any *necessary* costs to make an item ready for sale. Examples—shipping, storage, import fees, and-insurance.

INVENTORY COSTING

FIFO: Earliest units purchased are the first to be reported as cost of goods sold.

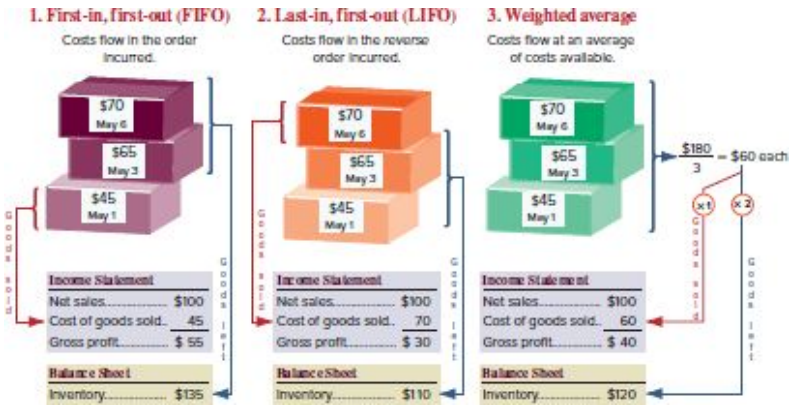
LIFO: Latest units purchased are the first to be reported as cost of goods sold.

Weighted average: The weighted average cost per unit (formula below) of inventory at the time of each sale is reported as cost of goods sold.

$$\frac{\text{Cost of goods available for sale (at each sale)}}{\text{Number of units available for sale (at each sale)}}$$

Specific identification: Each unit is assigned a cost, and when that unit is sold, its cost is reported as cost of goods sold.

Cost Flow Assumptions Example



Financial Statement Effects

Rising Costs—FIFO reports lowest cost of goods sold and highest net income. LIFO reports highest cost of goods sold and lowest income.

Weighted average reports results in between LIFO and FIFO.

Falling Costs—FIFO reports highest cost of goods sold and lowest net income. LIFO reports lowest cost of goods sold and highest income.

INVENTORY VALUATION, ERRORS & ANALYSIS

Lower of cost or market (LCM): When market value of inventory is lower than its cost, a loss is recorded. When market value is higher than cost of inventory, no adjustment is made.

LCM Example (applied to individual items separately)

Inventory Items	Units	Per Unit Cost	Per Unit Market	Total Cost	Total Market	LCM Applied to Items
Roadster	20	$8,500	$7,000	$170,000	$140,000	$ 140,000
Sprint	10	5,000	6,000	50,000	60,000	50,000
Totals				$220,000		$190,000

Roadster: $140,000 is the lower of the $170,000 cost and $140,000 market.

Sprint: $50,000 is the lower of the $50,000 cost and $60,000 market.

LCM: Results in a $190,000 reported inventory.

LCM Journal Entry: To get from $220,000 reported inventory to the $190,000 LCM inventory, make the following entry.

Cost of Goods Sold	30,000	
Merchandise Inventory		30,000

Effects of Overstated or Understated Inventory for Income Statement

	Year 1		Year 2	
Ending Inventory	Cost of Goods Sold	Net Income	Cost of Goods Sold	Net Income
Understated ↓	Overstated ↑	Understated ↓	Understated ↓	Overstated ↑
Overstated ↑	Understated ↓	Overstated ↑	Overstated ↑	Understated ↓

Effects of Overstated or Understated Inventory for Balance Sheet

Ending Inventory	Assets	Equity
Understated ↓	Understated ↓	Understated ↓
Overstated ↑	Overstated ↑	Overstated ↑

Key Terms

Average cost (206)

Consignee (201)

Consignor (201)

Days' sales in inventory (213)

First-in, first-out (FIFO) (205)

Gross profit method (225)

Interim financial statements (224)

Inventory turnover (213)

Last-in, first-out (LIFO) (205)

Lower of cost or market (LCM) (210)

Net realizable value (202)

Retail inventory method (224)

Specific identification (SI) (204)

Weighted average (WA) (206)

Multiple Choice Quiz

Use the following information from Marvel Company for the month of July to answer questions 1 through 4.

July 1	Beginning inventory	75 units @ $25 each
July 3	Purchase	348 units @ $27 each
July 8	Sale.....	300 units
July 15	Purchase	257 units @ $28 each
July 23	Sale.....	275 units

1. **Perpetual:** Assume that Marvel uses a *perpetual* FIFO inventory system. What is the dollar value of its ending inventory?

   a. $2,940

   b. $2,685

   c. $2,625

   d. $2,852

   e. $2,705

2. **Perpetual:** Assume that Marvel uses a *perpetual* LIFO inventory system. What is the dollar value of its ending inventory?

   a. $2,940

   b. $2,685

   c. $2,625

   e. $2,705

   d. $2,852

3. **Perpetual and Periodic:** Assume that Marvel uses a specific identification inventory system. Its ending inventory consists of 20

units from beginning inventory, 40 units from the July 3 purchase, and 45 units from the July 15 purchase. What is the dollar value of its ending inventory?

a. $2,940

b. $2,685

c. $2,625

d. $2,852

e. $2,840

4. Periodic: Assume that Marvel uses a *periodic* FIFO page 227 inventory system. What is the dollar value of its ending inventory?

a. $2,940

b. $2,685

c. $2,625

d. $2,852

e. $2,705

5 . Periodic: A company reports the following beginning inventory and purchases, and it ends the period with 30 units in inventory.

Beginning inventory . . .	100 units at $10 cost per unit
Purchase 1	40 units at $12 cost per unit
Purchase 2	20 units at $14 cost per unit

i) Compute ending inventory using the FIFO *periodic* system.

a. $400

b. $1,460

c. $1,360

d. $300

ii) Compute cost of goods sold using the LIFO *periodic* system.

a. $400

b. $1,460

c. $1,360

d. $300

6. A company has cost of goods sold of $85,000 and ending inventory of $18,000. Its days' sales in inventory equals

a. 49.32 days.

b. 0.21 day.

c. 4.72 days.

d. 77.29 days.

e. 1,723.61 days.

ANSWERS TO MULTIPLE CHOICE QUIZ

1. a; perpetual follows.

Date	Goods Purchased	Cost of Goods Sold	Inventory Balance
July 1			75 units @ $25 = $ 1,875
July 3	348 units @ $27 = $9,396		75 units @ $25 348 units @ $27 } = $11,271
July 8		75 units @ $25 225 units @ $27 } = $ 7,950	123 units @ $27 = $ 3,321
July 15	257 units @ $28 = $7,196		123 units @ $27 257 units @ $28 } = $10,517
July 23		123 units @ $27 152 units @ $28 } = $ 7,577	105 units @ $28 = $2,940
		575 $15,527	

2. b; LIFO perpetual follows.

Date	Goods Purchased	Cost of Goods Sold	Inventory Balance
July 1			75 units @ $25 = $ 1,875
July 3	348 units @ $27 = $9,396		75 units @ $25 348 units @ $27 } = $11,271
July 8		300 units @ $27 = $ 8,100	75 units @ $25 48 units @ $27 } = $ 3,171
July 15	257 units @ $28 = $7,196		75 units @ $25 48 units @ $27 257 units @ $28 } = $10,367
July 23		257 units @ $28 18 units @ $27 } = $ 7,682	75 units @ $25 30 units @ $27 } = $ 2,685
		575 $15,782	

3. e; Specific identification (perpetual and periodic are identical for specific identification)—Ending inventory computation follows.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
July 1	75 @ $25 = $ 1,875	55 @ $25 = $ 1,375	20 @ $25 = $ 500
July 3	348 @ $27 = $ 9,396	308 @ $27 = $ 8,316	40 @ $27 = $1,080
July 15	257 @ $28 = $ 7,196	212 @ $28 = $ 5,936	45 @ $28 = $1,260
	$18,467	575 $15,627	105 $2,840

4. a; FIFO periodic follows.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
July 1	75 @ $25 = $ 1,875	75 @ $25 = $ 1,875	
July 3	348 @ $27 = $ 9,396	348 @ $27 = $ 9,396	
July 15	257 @ $28 = $ 7,196	152 @ $28 = $ 4,256	105 @ $28 = $2,940
	$18,467	575 $15,527	105 $2,940

5. i) a; FIFO periodic follows.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Beg. Inv.	100 @ $10 = $1,000	100 @ $10 = $1,000	
Pur. 1	40 @ $12 = $ 480	30 @ $12 = $ 360	10 @ $12 = $120
Pur. 2	20 @ $14 = $ 280		20 @ $14 = $280
	$1,760	130 $1,360	30 $400

5. **ii)** b; LIFO periodic follows.

Date	Goods Available for Sale	Cost of Goods Sold	Ending Inventory
Beg. Inv.	100 @ $10 = $1,000	70 @ $10 = $ 700	30 @ $10 = $300
Pur. 1	40 @ $12 = $ 480	40 @ $12 = $ 480	
Pur. 2	20 @ $14 = $ 280	20 @ $14 = $ 280	
	$1,760	130 $1,460	30 $300

6. d; Days' sales in inventory = (Ending inventory/Cost of goods sold) × 365
= ($18,000/$85,000) × 365
= 77.29 days

Superscript letter A or B denotes assignments based on Appendix 5A or 5B.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

QUICK STUDY

QS 5-1

Inventory ownership

C1

Homestead Crafts, a distributor of handmade gifts, operates out of owner Emma Finn's house. At the end of the current period, Emma looks over her inventory and finds that she has the following.

- 1,300 units (products) in her basement, 20 of which were damaged by water and cannot be sold.
- 350 units in her van, ready to deliver per a customer order, terms FOB destination.
- 80 units out on consignment to a friend who owns a retail store.

How many total units should Emma include in her company's period-end inventory?

QS 5-2

Inventory costs

C1

A car dealer acquires a used car for $14,000, with terms FOB shipping point. Compute total inventory costs assigned to the used car if additional costs include the following.

- $250 for transportation-in.
- $150 for advertising.

- $300 for shipping insurance.
- $1,250 for sales staff salaries.
- $900 for car import duties.
- $180 for trimming shrubs.

QS 5-3

Inventory costs

C1

A solar panel dealer acquires a used panel for $9,000, with terms FOB shipping point. Compute total inventory costs assigned to the used panel if additional costs include the following.

- $1,500 for sales staff salaries.
- $135 for shipping insurance.
- $280 for transportation-in by train.
- $550 for used panel restoration.
- $110 for online advertising.
- $300 for lawn care.

QS 5-4

Computing goods available for sale **P1**

Wattan Company reports beginning inventory of 10 units at $60 each. Every week for four weeks it purchases an additional 10 units at respective costs of $61, $62, $65, and $70 per unit for weeks 1 through 4. Compute the cost of goods available for sale and the units available for sale for this four-week period. Assume that no sales occur during those four weeks.

QS 5-5

Perpetual: Inventory costing with FIFO **P1**

A company reports the following beginning inventory and two purchases for the month of January. On January 26, the company sells 350 units. Ending inventory at January 31 totals 150 units.

	Units	Unit Cost
Beginning inventory on January 1	320	$3.00
Purchase on January 9	80	3.20
Purchase on January 25	100	3.34

Required

page 229

Assume the perpetual inventory system is used. Determine the costs assigned to ending inventory when costs are assigned based on the FIFO method. (Round per unit costs and inventory amounts to cents.)

QS 5-6

Perpetual: Inventory costing with LIFO **P1**

Refer to the information in QS 5-5 and assume the perpetual inventory system is used. Determine the costs assigned to ending inventory when costs are assigned based on LIFO. (Round per unit costs and inventory amounts to cents.)

QS 5-7

Perpetual: Inventory costing with weighted average **P1**

Refer to the information in QS 5-5 and assume the perpetual inventory system is used. Determine the costs assigned to ending inventory when costs are assigned based on the weighted average method. (Round per unit costs and inventory amounts to cents.)

QS 5-8[A]

Periodic: Inventory costing with FIFO **P3**

Refer to the information in QS 5-5 and assume the periodic inventory system is used. Determine the costs assigned to ending inventory

when costs are assigned based on the FIFO method. (Round per unit costs and inventory amounts to cents.)

QS 5-9[A]

Periodic: Inventory costing with LIFO **P3**

Refer to the information in QS 5-5 and assume the periodic inventory system is used. Determine the costs assigned to ending inventory when costs are assigned based on the LIFO method. (Round per unit costs and inventory amounts to cents.)

QS 5-10[A]

Periodic: Inventory costing with weighted average **P3**

Refer to the information in QS 5-5 and assume the periodic inventory system is used. Determine the costs assigned to ending inventory when costs are assigned based on the weighted average method. (Round per unit costs and inventory amounts to cents.)

QS 5-11

Perpetual: Assigning costs with FIFO

P1

Trey Monson starts a merchandising business on December 1 and enters into the following three inventory purchases. Also, on December 15, Monson sells 15 units for $20 each.

Purchases on December 7.....	10 units @ $ 6 cost
Purchases on December 14.....	20 units @ $12 cost
Purchases on December 21.....	15 units @ $14 cost

Required

Monson uses a perpetual inventory system. Determine the costs assigned to the December 31 ending inventory based on the FIFO method.

QS 5-12

Perpetual: Inventory costing with LIFO **P1**

Refer to the information in QS 5-11 and assume the perpetual inventory system is used. Determine the costs assigned to ending inventory when costs are assigned based on the LIFO method.

QS 5-13

Perpetual: Inventory costing with weighted average **P1**

Refer to the information in QS 5-11 and assume the perpetual inventory system is used. Determine the costs assigned to ending inventory when costs are assigned based on the weighted average method. (Round per unit costs and inventory amounts to cents.)

QS 5-14

Perpetual: Inventory costing with specific identification **P1**

Refer to the information in QS 5-11 and assume the perpetual inventory system is used. Determine the costs assigned to ending inventory when costs are assigned based on specific identification. Of the units sold, eight are from the December 7 purchase and seven are from the December 14 purchase.

QS 5-15[A]

Periodic: Inventory costing with FIFO **P3**

Refer to the information in QS 5-11 and assume the periodic inventory system is used. Determine the costs assigned to ending inventory when costs are assigned based on the FIFO method.

QS 5-16[A]

Periodic: Inventory costing with LIFO **P3**

Refer to the information in QS 5-11 and assume the periodic inventory system is used. Determine the costs assigned to ending inventory when costs are assigned based on the LIFO method.

QS 5-17[A]

Periodic: Inventory costing with weighted average **P3**

Refer to the information in QS 5-11 and assume the periodic inventory system is used. Determine the costs assigned to ending inventory when costs are assigned based on the weighted average method. (Round per unit costs and inventory amounts to cents.)

QS 5-18[A]

Periodic: Inventory costing with specific identification **P3**

Refer to the information in QS 5-11 and assume the periodic inventory system is used. Determine the costs assigned to ending inventory when costs are assigned based on specific identification. Of the units sold, eight are from the December 7 purchase and seven are from the December 14 purchase.

QS 5-19

Contrasting inventory costing methods

A1

Identify the inventory costing method (SI, FIFO, LIFO, or WA) best described by each of the following separate statements. Assume a period of increasing costs.

1. Results in the highest cost of goods sold.
2. Yields the highest net income.
3. Has the lowest tax expense because of reporting the lowest net income.
4. Better matches current costs with revenues.

5. Precisely matches the costs of items with the revenues they generate.

QS 5-20

Using income statement relations to compute missing amounts **A1**

Compute the missing amounts in the separate income statements A, B, and C.

	A	B	C
Sales	$?	$20,000	$90,000
Cost of goods sold	40,000	?	30,000
Gross profit	35,000	11,500	?
Expenses	?	6,000	?
Net income	13,000	?	21,000

QS 5-21

Determining financial statement impact of FIFO vs. LIFO **A1**

Complete the following table by indicating whether FIFO or LIFO results in the *lower* reported amount for each of the three accounting measures.

	Lowest Ending Inventory	Lowest Cost of Goods Sold	Lowest Net Income
Rising costs			
Falling costs			

QS 5-22

Identifying income tax effect of FIFO vs. LIFO **A1**

Spade Co. is considering either FIFO or LIFO. Determine which method results in the lowest income tax expense in the current year when (*a*) inventory costs are rising and (*b*) inventory costs are falling. The income tax rate is 20% and is calculated as a percentage of net income.

QS 5-23

Applying LCM to inventories

P2

Ames Trading Co. has the following products in its ending inventory. Compute lower of cost or market for inventory applied separately to each product.

Product	Quantity	Cost per Unit	Market per Unit
Mountain bikes....	11	$600	$550
Skateboards.....	13	350	425
Gliders.....	26	800	700

QS 5-24

Inventory errors

A2

In taking a physical inventory at the end of Year 1, Grant Company forgot to count certain units and understated ending inventory by $10,000. Determine how this error affects each of the following.

a. Year 1 cost of goods sold *c.* Year 2 cost of goods sold

b. Year 1 net income *d.* Year 2 net income

QS 5-25

Analyzing inventory **A3**

Endor Company begins the year with $140,000 of goods in inventory. At year-end, the amount in inventory has increased to $180,000. Cost of goods sold for the year is $1,200,000. Compute Endor's inventory turnover and days' sales in inventory. Assume there are 365 days in the year.

QS 5-26[B]

Estimating inventories—gross profit method **P4**

Confucius Bookstore's inventory is destroyed by a fire on September 5. The following data for the current year are available from the

accounting records. Estimate the cost of the inventory destroyed.

Beginning inventory, Jan. 1	$190,000
Jan. 1 through Sept. 5 purchases (net)	$352,000
Jan. 1 through Sept. 5 sales (net)	$685,000
Current year's estimated gross profit rate	44%

EXERCISES

Exercise 5-1

Inventory ownership **C1**

1. At year-end, Barr Co. had shipped $12,500 of merchandise FOB destination to Lee Co. Which company should include the $12,500 of merchandise in transit as part of its year-end inventory?
2. Parris Company has shipped $20,000 of goods to Harlow Co., and Harlow Co. has arranged to sell the goods for Parris. Identify the consignor and the consignee. Which company should include any unsold goods as part of its inventory?

Exercise 5-2

Inventory costs

C1

Walberg Associates, antique dealers, purchased goods for $75,000. Terms of the purchase were FOB shipping point, and the cost of transporting the goods to Walberg Associates's warehouse was $2,400. Walberg Associates insured the shipment at a cost of $300. Prior to putting the goods up for sale, they cleaned and refurbished them at a cost of $980. Determine the cost of inventory.

Exercise 5-3

Perpetual: Inventory costing methods

P1

Laker Company reported the following January purchases and sales data for its only product.

Date	Activities	Units Acquired at Cost	Units Sold at Retail
Jan. 1	Beginning inventory	140 units @ $6.00 = $ 840	
Jan. 10	Sales		100 units @ $15
Jan. 20	Purchase	60 units @ $5.00 = 300	
Jan. 25	Sales		80 units @ $15
Jan. 30	Purchase	180 units @ $4.50 = 810	
	Totals	380 units $1,950	180 units

Required

The company uses a perpetual inventory system. Determine the cost assigned to ending inventory and to cost of goods sold using (*a*) specific identification, (*b*) weighted average, (*c*) FIFO, and (*d*) LIFO. (Round per unit costs and inventory amounts to cents.) For specific identification, ending inventory consists of 180 units from the January 30 purchase, 5 units from the January 20 purchase, and 15 units from beginning inventory.

Exercise 5-4

Perpetual: Journalizing transactions **P1**

Refer to sales and purchases data from Exercise 5-3 and record journal entries for Laker Company's sales and purchases transactions. Assume for this assignment that the company uses a perpetual inventory system and FIFO. All sales and purchases are made on account, and no discounts are offered.

Exercise 5-5

Perpetual: Gross profit effects of inventory methods

A1

Use the data in Exercise 5-3 to compute gross profit for the month of January for Laker Company similar to that in Exhibit 5.8 for the four

inventory methods.

1. Which method yields the highest gross profit?
2. Does gross profit using weighted average fall above, between, or below that using FIFO and LIFO?
3. If costs were rising instead of falling, which method would yield the highest gross profit?

Exercise 5-6^{A}

Periodic: Inventory costing

P3

Refer to the information in Exercise 5-3 and assume the periodic inventory system is used. Determine the costs assigned to ending inventory and to cost of goods sold using (*a*) specific identification, (*b*) weighted average, (*c*) FIFO, and (*d*) LIFO. (Round per unit costs and inventory amounts to cents.) For specific identification, ending inventory consists of 180 units from the January 30 purchase, 5 units from the January 20 purchase, and 15 units from beginning inventory.

Exercise 5-7^{A}

Periodic: Gross profit effects of inventory methods

P3 A1

Use the data and results from Exercise 5-6^{A} to compute gross profit for the month of January for the company similar to that in Exhibit 5.8 for the four inventory methods.

Required

1. Which method yields the highest gross profit?
2. Does gross profit using weighted average fall above, between, or below that using FIFO and LIFO?
3. If costs were rising instead of falling, which method would yield the highest gross profit?

Exercise 5-8

Perpetual: Inventory costing methods—FIFO and LIFO

P1

Hemming Co. reported the following current year purchases and sales for its only product.

Date	Activities	Units Acquired at Cost	Units Sold at Retail
Jan. 1	Beginning inventory. . . .	200 units @ $10 = $ 2,000	
Jan. 10	Sales.		150 units @ $40
Mar. 14	Purchase	350 units @ $15 = 5,250	
Mar. 15	Sales.		300 units @ $40
July 30	Purchase	450 units @ $20 = 9,000	
Oct. 5	Sales.		430 units @ $40
Oct. 26	Purchase	100 units @ $25 = 2,500	
	Totals	1,100 units $18,750	880 units

Required

Hemming uses a perpetual inventory system. Determine the costs assigned to ending inventory and to cost of goods sold using (*a*) FIFO and (*b*) LIFO. (*c*) Compute the gross profit for each method.

Exercise 5-9

Specific identification

P1

Refer to the information in Exercise 5-8. Ending inventory consists of 45 units from the March 14 purchase, 75 units from the July 30 purchase, and all 100 units from the October 26 purchase. Using the specific identification method, compute (*a*) the cost of goods sold and (*b*) the gross profit.

Exercise 5-10[A]

Periodic: Inventory costing

P3

Refer to the information in Exercise 5-8 and assume the periodic inventory system is used. Determine the costs assigned to ending inventory and to cost of goods sold using (*a*) FIFO and (*b*) LIFO. (*c*) Compute the gross profit for each method.

Exercise 5-11

Perpetual: Inventory costing methods—FIFO and LIFO

P1

Tree Seedlings has the following current year purchases and sales for its only product.

Date	Activities	Units Acquired at Cost	Units Sold at Retail
Jan. 1	Beginning inventory	40 units @ $2 = $ 80	
Jan. 3	Sales		30 units @ $8
Feb. 14	Purchase	70 units @ $3 = $210	
Feb. 15	Sales		60 units @ $8
June 30	Purchase	90 units @ $4 = $360	
Nov. 6	Sales		86 units @ $8
Nov. 19	Purchase	20 units @ $5 = $100	
	Totals	220 units $750	176 units

Required

The company uses a perpetual inventory system. Determine the costs assigned to ending inventory and to cost of goods sold using (*a*) FIFO and (*b*) LIFO. (*c*) Compute the gross profit for each method.

Exercise 5-12

Perpetual: Journalizing transactions **P1**

Refer to sales and purchases data from Exercise 5-11 and record journal entries for Tree Seedlings's sales and purchases transactions. Assume for this assignment that the company uses a perpetual inventory system and LIFO. All sales and purchases are made on account, and no discounts are offered.

Exercise 5-13[A]

Periodic: Inventory costing methods—FIFO and LIFO **P3**

Refer to the information in Exercise 5-11 and assume the periodic inventory system is used. Determine the costs assigned to ending inventory and to cost of goods sold using (*a*) FIFO and (*b*) LIFO. (*c*) Compute the gross profit for each method.

Exercise 5-14[A]

Periodic: Cost flow assumptions

P3

Lopez Company reported the following current year data for its only product. The company uses a periodic inventory system, and its ending inventory consists of 150 units—50 from each of the last three purchases. Determine the cost assigned to ending inventory and to cost of goods sold using (*a*) specific identification, (*b*) weighted average, (*c*) FIFO, and (*d*) LIFO. (Round per unit costs and inventory amounts to cents.) (*e*) Which method yields the highest net income?

Jan. 1	Beginning inventory	96 units @ $2.00 =	$ 192
Mar. 7	Purchase	220 units @ $2.25 =	495
July 28	Purchase	544 units @ $2.50 =	1,360
Oct. 3	Purchase	480 units @ $2.80 =	1,344
Dec. 19	Purchase	160 units @ $2.90 =	464
	Totals	1,500 units	$3,855

Check Inventory: LIFO, $313.50; FIFO, $435.00

Exercise 5-15[A]

Periodic: Cost flow assumptions

P3

Flora's Gifts reported the following current-month data for its only product. The company uses a periodic inventory system, and its ending inventory consists of 60 units—50 units from the January 6 purchase and 10 units from the January 25 purchase. Determine the cost assigned to ending inventory and to cost of goods sold using (*a*) specific identification, (*b*) weighted average, (*c*) FIFO, and (*d*) LIFO.

(Round per unit costs and inventory amounts to cents.) (*e*) Which method yields the lowest net income?

Jan. 1	Beginning inventory	138 units @ $3.00 =	$ 414
Jan. 6	Purchase	300 units @ $2.80 =	840
Jan. 17	Purchase	540 units @ $2.30 =	1,242
Jan. 25	Purchase	22 units @ $2.00 =	44
	Totals	1,000 units	$2,540

Check Inventory: LIFO, $180.00; FIFO, $131.40

Exercise 5-16

Lower of cost or market

P2

Martinez Company's ending inventory includes the following items. Compute the lower of cost or market for ending inventory applied separately to each product.

Product	Units	Cost per Unit	Market per Unit
Helmets	24	$50	$54
Bats	17	78	72
Shoes	38	95	91
Uniforms	42	36	36

Check LCM = $7,394

Exercise 5-17

Analyzing inventory errors

A2

Vibrant Company had $850,000 of sales in each of Year 1, Year 2, and Year 3, and it purchased merchandise costing $500,000 in each of those years. It also maintained a $250,000 physical inventory from the beginning to the end of that three-year period. In accounting for inventory, it made an error at the end of Year 1 that caused its Year 1 ending inventory to appear on its statements as $230,000 rather than the correct $250,000.

1. Determine the correct amount of the company's gross profit in eacl of Year 1, Year 2, and Year 3.
2. Prepare comparative income statements as in Exhibit 5.11 to show the effect of this error on the company's cost of goods sold and gross profit for each of Year 1, Year 2, and Year 3.

Exercise 5-18

Comparing LIFO numbers to FIFO numbers; ratio analysis

A3

Cruz Company uses LIFO for inventory costing and reports the following financial data. It also recomputed inventory and cost of goods sold using FIFO for comparison purposes.

	Year 2	Year 1
LIFO inventory	$160	$110
LIFO cost of goods sold	740	680
FIFO inventory	240	110
FIFO cost of goods sold	660	645
Current assets (using LIFO)	220	180
Current assets (using FIFO)	300	180
Current liabilities	200	170

1. Compute its current ratio, inventory turnover, and days' sales in inventory for Year 2 using (*a*) LIFO numbers and (*b*) FIFO numbers.
2. Comment on and interpret the results of part 1.

Check (1) FIFO: Current ratio, 1.5; Inventory turnover, 3.8 times

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Exercise 5-19

Inventory turnover and days' sales in inventory

A3

Use the following information for Palmer Co. to compute inventory turnover for Year 3 and Year 2, and its days' sales in inventory at

December 31, Year 3 and Year 2. From Year 2 to Year 3, did Palmer improve its (*a*) inventory turnover and (*b*) days' sales in inventory?

	Year 3	Year 2	Year 1
Cost of goods sold	$643,825	$426,650	$391,300
Ending inventory	97,400	87,750	92,500

Exercise 5-20[B]

Estimating ending inventory—retail method

P4

Dakota Company had net sales (at retail) of $260,000. The following additional information is available from its records. Use the retail inventory method to estimate Dakota's year-end inventory at cost.

	At Cost	At Retail
Beginning inventory	$ 63,800	$128,400
Cost of goods purchased	115,060	196,800

Check End. inventory at cost, $35,860

Exercise 5-21[B]

Estimating ending inventory—gross profit method **P4**

On January 1, JKR Shop had $225,000 of beginning inventory at cost. In the first quarter of the year, it purchased $795,000 of merchandise, returned $11,550, and paid freight charges of $18,800 on purchased merchandise, terms FOB shipping point. The company's gross profit averages 30%, and the store had $1,000,000 of net sales (at retail) in the first quarter of the year.

Use the gross profit method to estimate its cost of inventory at the end of the first quarter.

PROBLEM SET A

Problem 5-1A

Perpetual: Alternative cost flows

P1

Warnerwoods Company uses a perpetual inventory system. It entered into the following purchases and sales transactions for March. (For specific identification, units sold consist of 80 units from beginning inventory, 340 units from the March 5 purchase, 40 units from the March 18 purchase, and 120 units from the March 25 purchase.)

Date	Activities	Units Acquired at Cost	Units Sold at Retail
Mar. 1	Beginning inventory	100 units @ $50 per unit	
Mar. 5	Purchase	400 units @ $55 per unit	
Mar. 9	Sales		420 units @ $85 per unit
Mar. 18	Purchase	120 units @ $60 per unit	
Mar. 25	Purchase	200 units @ $62 per unit	
Mar. 29	Sales		160 units @ $95 per unit
	Totals	820 units	580 units

Required

1. Compute cost of goods available for sale and the number of units available for sale.
2. Compute the number of units in ending inventory.
3. Compute the cost assigned to ending inventory using (*a*) FIFO, (*b*) LIFO, (*c*) weighted average, and (*d*) specific identification. (Round all amounts to cents.)
4. Compute gross profit earned by the company for each of the four costing methods in part 3.

Problem 5-2A[A]

Periodic: Alternative cost flows

P3

Refer to the information in Problem 5-1A and assume the periodic inventory system is used.

Required

1. Compute cost of goods available for sale and the number of units available for sale.
2. Compute the number of units in ending inventory.
3. Compute the cost assigned to ending inventory using (*a*) FIFO, (*b*) LIFO, (*c*) weighted average, and (*d*) specific identification. (Round all amounts to cents.)
4. Compute gross profit earned by the company for each of the four costing methods in part 3.

Problem 5-3A

Perpetual: Alternative cost flows

P1

Montoure Company uses a perpetual inventory system. It entered into the following calendar-year purchases and sales transactions. (For specific identification, units sold consist of 600 units from beginning inventory, 300 from the February 10 purchase, 200 from the March 13 purchase, 50 from the August 21 purchase, and 250 from the September 5 purchase.)

Date	Activities	Units Acquired at Cost	Units Sold at Retail
Jan. 1	Beginning inventory	600 units @ $45 per unit	
Feb. 10	Purchase	400 units @ $42 per unit	
Mar. 13	Purchase	200 units @ $27 per unit	
Mar. 15	Sales		800 units @ $75 per unit
Aug. 21	Purchase	100 units @ $50 per unit	
Sep. 5	Purchase	500 units @ $46 per unit	
Sep. 10	Sales		600 units @ $75 per unit
	Totals	1,800 units	1,400 units

Required

1. Compute cost of goods available for sale and the number of units available for sale.
2. Compute the number of units in ending inventory.
3. Compute the cost assigned to ending inventory using (*a*) FIFO, (*b*) LIFO, (*c*) weighted average, and (*d*) specific identification. (Round

all amounts to cents.)

4. Compute gross profit earned by the company for each of the four costing methods in part 3.

Analysis Component

5. The company's manager earns a bonus based on a percent of gross profit. Which method of inventory costing produces the highest bonus for the manager?

Problem 5-4A[A]

Periodic: Alternative cost flows

P3

Refer to the information in Problem 5-3A and assume the periodic inventory system is used.

Required

1. Compute cost of goods available for sale and the number of units available for sale.
2. Compute the number of units in ending inventory.
3. Compute the cost assigned to ending inventory using (*a*) FIFO, (*b*) LIFO, (*c*) weighted average, and (*d*) specific identification. (Round all amounts to cents.)
4. Compute gross profit earned by the company for each of the four costing methods in part 3.

Analysis Component

5. The company's manager earns a bonus based on a percentage of gross profit. Which method of inventory costing produces the highest bonus for the manager?

Problem 5-5A

Lower of cost or market

P2

Item	Units	Cost per Unit	Market per Unit
Car audio equipment			
Speakers	345	$ 90	$ 98
Stereos	260	111	100
Amplifiers	326	86	95
Subwoofers	204	52	41
Security equipment			
Alarms	480	150	125
Locks	291	93	84
Cameras	212	310	322
Binocular equipment			
Tripods	185	70	84
Stabilizers	170	97	105

A physical inventory of Liverpool Company taken at December 31 reveals the following.

Required

1. Compute the lower of cost or market for the inventory applied separately to each item.
2. If the market amount is less than the recorded cost of the inventory, then record the LCM adjustment to the Merchandise Inventory account.

Check (1) $273,054

Problem 5-6A

Analysis of inventory errors

A2

Navajo Company's year-end financial statements show the following. The company recently discovered that in making physical counts of inventory, it had made the following errors: Year 1 ending inventory is understated by $56,000 and Year 2 ending inventory is overstated by $20,000.

For Year Ended December 31		Year 1	Year 2	Year 3
(a)	Cost of goods sold	$ 615,000	$ 957,000	$ 780,000
(b)	Net income	230,000	285,000	241,000
(c)	Total current assets . . .	1,255,000	1,365,000	1,200,000
(d)	Total equity	1,387,000	1,530,000	1,242,000

Required

1. For each key financial statement figure—(*a*), (*b*), (*c*), and (*d*) above—prepare a table similar to the following to show the adjustments necessary to correct the reported amounts.

Figure: _____	Year 1	Year 2	Year 3
Reported amount			
Adjustments for: Year 1 error.....			
Year 2 error.....			
Corrected amount			

2. What is the total error in combined net income for the three-year period resulting from the inventory errors? Explain.

Check (1) Corrected net income: Year 1, $286,000; Year 2, $209,000; Year 3, $261,000

Problem 5-7A[A]

Periodic: Alternative cost flows **P3**

Seminole Co. began the year with 23,000 units of product in its January 1 inventory costing $15 each. It made four purchases of its product during the year as follows. The company uses a periodic inventory system. On December 31, a physical count reveals that 40,000 units of its product remain in inventory.

Mar. 7	30,000 units @ $18 each	Aug. 1	23,000 units @ $25 each
May 25	39,000 units @ $20 each	Nov. 10	35,000 units @ $26 each

Required

1. Compute the number and total cost of the units available for sale during the year.
2. Compute the amounts assigned to ending inventory and the cost of goods sold using (*a*) FIFO, (*b*) LIFO, and (*c*) weighted average. (Round all amounts to cents.)

Check (2) Cost of goods sold: FIFO, $2,115,000; LIFO, $2,499,000; WA, $2,310,000

Problem 5-8A[A]

Periodic: Income comparisons and cost flows

A1 P3

QP Corp. sold 4,000 units of its product at $50 per unit during the year and incurred operating expenses of $5 per unit in selling the units. It began the year with 700 units in inventory and made successive purchases of its product as follows.

Jan. 1	Beginning inventory	700 units @ $18 per unit
Feb. 20	Purchase	1,700 units @ $19 per unit
May 16	Purchase	800 units @ $20 per unit
Oct. 3	Purchase	500 units @ $21 per unit
Dec. 11	Purchase	2,300 units @ $22 per unit
	Total	6,000 units

Required

1. Prepare comparative year-end income statements for the three inventory costing methods of FIFO, LIFO, and weighted average. (Round all amounts to cents.) Include a detailed cost of goods sold section as part of each statement. The company uses a periodic inventory system.
2. How would the financial results from using the three alternative inventory costing methods change if the company had been experiencing *declining* costs in its purchases of inventory?
3. What advantages and disadvantages are offered by using (*a*) LIFO and (*b*) FIFO? Assume the continuing trend of *increasing* costs.

Problem 5-9A[B]

Retail inventory method

P4

The records of Alaska Company provide the following information for the year ended December 31.

	At Cost	At Retail
Beginning inventory, January 1	$ 469,010	$ 928,950
Cost of goods purchased	3,376,050	6,381,050
Sales		5,595,800
Sales returns		42,800

Required

1. Use the retail inventory method to estimate the company's year-end inventory at cost.
2. A year-end physical inventory at retail prices yields a total inventory of $1,686,900. Prepare a calculation showing the company's loss from shrinkage at cost and at retail.

Check (1) Inventory, $924,182 cost

(2) Inventory shortage at cost, $36,873

Problem 5-10A[B]

Gross profit method **P4**

Wayward Company wants to prepare interim financial statements for the first quarter. The company wishes to avoid making a physical count of inventory. Wayward's gross profit rate averages 34%. The following information for the first quarter is available from its records.

Beginning inventory, January 1	$ 302,580
Cost of goods purchased	941,040
Sales	1,211,160
Sales returns	8,410

Required

Use the gross profit method to estimate the company's first-quarter ending inventory.

Check Estimated ending inventory, $449,805

PROBLEM SET B

Problem 5-1B

Perpetual: Alternative cost flows

P1

Ming Company uses a perpetual inventory system. It entered into the following purchases and sales transactions for April. (For specific identification, units sold consist of 20 units from beginning inventory, 30 units from the April 6 purchase, and 10 units from the April 25 purchase.)

Date	Activities	Units Acquired at Cost	Units Sold at Retail
Apr. 1	Beginning inventory	20 units @ $3,000 per unit	
Apr. 6	Purchase	30 units @ $3,500 per unit	
Apr. 9	Sales		35 units @ $12,000 per unit
Apr. 17	Purchase	5 units @ $4,500 per unit	
Apr. 25	Purchase	10 units @ $4,800 per unit	
Apr. 30	Sales		25 units @ $14,000 per unit
	Total	65 units	60 units

Required

1. Compute cost of goods available for sale and the number of units available for sale.
2. Compute the number of units in ending inventory.
3. Compute the cost assigned to ending inventory using (*a*) FIFO, (*b*) LIFO, (*c*) weighted average, and (*d*) specific identification. (Round all amounts to cents.)
4. Compute gross profit earned by the company for each of the four costing methods in part 3.

Problem 5-2B[A]

Periodic: Alternative cost flows

P3

Refer to the information in Problem 5-1B and assume the periodic inventory system is used.

Required

1. Compute cost of goods available for sale and the number of units available for sale.
2. Compute the number of units in ending inventory.
3. Compute the cost assigned to ending inventory using (*a*) FIFO, (*b*) LIFO, (*c*) weighted average, and (*d*) specific identification. (Round all amounts to cents.)
4. Compute gross profit earned by the company for each of the four costing methods in part 3.

Problem 5-3B

Perpetual: Alternative cost flows

P1

Aloha Company uses a perpetual inventory system. It entered into the following calendar-year purchases and sales transactions. (For specific identification, units sold consist of 80 units from beginning inventory, 300 units from the May 6 purchase, and 100 units from the May 25 purchase.)

Date	Activities	Units Acquired at Cost	Units Sold at Retail
May 1	Beginning inventory	150 units @ $300 per unit	
May 6	Purchase	350 units @ $350 per unit	
May 9	Sales		180 units @ $1,200 per unit
May 17	Purchase	80 units @ $450 per unit	
May 25	Purchase	100 units @ $458 per unit	
May 30	Sales		300 units @ $1,400 per unit
	Total	680 units	480 units

Required

1. Compute cost of goods available for sale and the number of units available for sale.
2. Compute the number of units in ending inventory.

3. Compute the cost assigned to ending inventory using (*a*) FIFO, (*b*) LIFO, (*c*) weighted average, and (*d*) specific identification. (Round all amounts to cents.)
4. Compute gross profit earned by the company for each of the four costing methods in part 3.

Analysis Component

5. If the company's manager earns a bonus based on a percent of gross profit, which method of inventory costing will the manager likely prefer?

Problem 5-4B[A]

Periodic: Alternative cost flows

P3

Refer to the information in Problem 5-3B and assume the periodic inventory system is used.

Required

1. Compute cost of goods available for sale and the number of units available for sale.
2. Compute the number of units in ending inventory.
3. Compute the cost assigned to ending inventory using (*a*) FIFO, (*b*) LIFO, (*c*) weighted average, and (*d*) specific identification. (Round all amounts to cents.)
4. Compute gross profit earned by the company for each of the four costing methods in part 3.

Analysis Component

5. If the company's manager earns a bonus based on a percentage of gross profit, which method of inventory costing will the manager likely prefer?

Problem 5-5B

Lower of cost or market

P2

A physical inventory of Office Necessities Company taken at December 31 reveals the following.

Item	Units	Cost per Unit	Market per Unit
Office furniture			
Desks	536	$261	$305
Chairs	395	227	256
Mats	687	49	43
Bookshelves	421	93	82
Filing cabinets			
Two-drawer	114	81	70
Four-drawer	298	135	122
Lateral	75	104	118
Office equipment			
Projectors	370	168	200
Copiers	475	317	288
Phones	302	125	117

Required

1. Compute the lower of cost or market for the inventory applied separately to each item.
2. If the market amount is less than the recorded cost of the inventory, then record the LCM adjustment to the Merchandise Inventory account.

Check (1) $580,054

Problem 5-6B

Analysis of inventory errors

A2

Hallam Company's year-end financial statements show the following. The company recently discovered that in making physical counts of inventory, it had made the following errors: Year 1 ending inventory is overstated by $18,000 and Year 2 ending inventory is understated by $26,000.

For Year Ended December 31		Year 1	Year 2	Year 3
(*a*)	Cost of goods sold	$207,200	$213,800	$197,030
(*b*)	Net income	175,800	212,270	184,910
(*c*)	Total current assets	276,000	277,500	272,950
(*d*)	Total equity	314,000	315,000	346,000

Required

1. For each key financial statement figure—(*a*), (*b*), (*c*), and (*d*) above—prepare a table similar to the following to show the adjustments necessary to correct the reported amounts.

Figure: _____	Year 1	Year 2	Year 3
Reported amount	_____	_____	_____
Adjustments for: Year 1 error	_____	_____	_____
Year 2 error	_____	_____	_____
Corrected amount	_____	_____	_____

Check (1) Corrected net income: Year 1, $286,000; Year 2, $209,000; Year 3, $261,000

2. What is the total error in combined net income for the three-year period resulting from the inventory errors? Explain.

Problem 5-7B[A]

Periodic: Alternative cost flows

P3

Seneca Co. began the year with 6,500 units of product in its January 1 inventory costing $35 each. It made four purchases of its product during the year as follows. The company uses a periodic inventory system. On December 31, a physical count reveals that 8,500 units of its product remain in inventory.

Jan. 4	11,500 units @ $33 each	July 9	11,000 units @ $29 each
May 18	13,400 units @ $32 each	Nov. 21	7,600 units @ $27 each

Required

1. Compute the number and total cost of the units available for sale during the year.
2. Compute the amounts assigned to ending inventory and the cost of goods sold using (*a*) FIFO, (*b*) LIFO, and (*c*) weighted average. (Round all amounts to cents.)

Check (2) Cost of goods sold: FIFO, $2,115,000; LIFO, $2,499,000; WA, $2,310,000

Problem 5-8B[A]

Periodic: Income comparisons and cost flows

A1 P3

Shepard Company sold 4,000 units of its product at $100 per unit during the year and incurred operating expenses of $15 per unit in selling the units. It began the year with 840 units in inventory and made successive purchases of its product as follows.

Jan.	1	Beginning inventory	840 units @ $58 per unit
Apr.	2	Purchase	600 units @ $59 per unit
June	14	Purchase	1,205 units @ $61 per unit
Aug.	29	Purchase	700 units @ $64 per unit
Nov.	18	Purchase	1,655 units @ $65 per unit
		Total	5,000 units

Required

1. Prepare comparative **year-end** income statements for the three inventory costing methods of FIFO, LIFO, and weighted average. (Round all amounts to cents.) Include a detailed cost of goods sold section as part of each statement. The company uses a periodic inventory system.
2. How would the financial results from using the three alternative inventory costing methods change if the company had been experiencing decreasing prices in its purchases of inventory?
3. What advantages and disadvantages are offered by using (*a*) LIFO and (*b*) FIFO? Assume the continuing trend of increasing costs.

Problem 5-9B[B]

Retail inventory method

P4

The records of Macklin Co. provide the following information for the year ended December 31.

	At Cost	At Retail
Beginning inventory, January 1	$ 90,022	$115,610
Cost of goods purchased	502,250	761,830
Sales		782,300
Sales returns		3,460

Required

1. Use the retail inventory method to estimate the company's year-end inventory.
2. A year-end physical inventory at retail prices yields a total inventory of $80,450. Prepare a calculation showing the company's loss from shrinkage at cost and at retail.

Check (1) Inventory, $66,555 cost

(2) Inventory shortage at cost, $12,251.25

Problem 5-10B[B]

Gross profit method

P4

Otingo Equipment Co. wants to prepare interim financial statements for the first quarter. The company wishes to avoid making a physical count of inventory. Otingo's gross profit rate averages 35%. The following information for the first quarter is available from its records.

Beginning inventory, January 1	$ 802,880
Cost of goods purchased	2,209,636
Sales	3,760,260
Sales returns	79,300

Required

Use the gross profit method to estimate the company's first-quarter ending inventory.

SERIAL PROBLEM

Business Solutions

A3 P2

Serial problem began in Chapter 1. If previous chapter segments were not completed, the serial problem can begin at this point. It is available in ***Connect*** *with an algorithmic option.*

Alexander Image/Shutterstock

SP 5

Part A

Santana Rey of **Business Solutions** is evaluating her inventory to determine whether it must be adjusted based on lower of cost or market rules. Business Solutions has three different types of software in its inventory, and the following information is available for each.

Inventory Items	Units	Cost per Unit	Market per Unit
Office productivity	3	$ 76	$ 74
Desktop publishing	2	103	100
Accounting	3	90	96

Required

Compute the lower of cost or market for ending inventory assuming Rey applies the lower of cost or market rule to each product in inventory. Must Rey adjust the reported inventory value? Explain.

Part B

Selected accounts and balances for the three months ended March 31, 2022, for Business Solutions follow.

Beginning inventory, January 1	$ 0
Cost of goods sold	14,052
Ending inventory, March 31	704

Required

1. Compute inventory turnover and days' sales in inventory for the three months ended March 31, 2022.
2. Assess the company's performance if competitors average 15 times for inventory turnover and 25 days for days' sales in inventory.

TABLEAU DASHBOARD ACTIVITIES

page 241

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA 5-1 Quick Study, Computing goods available for sale and assigning costs using specific identification, **P1**—similar to QS 5-14

Tableau DA 5-2 Exercise, Perpetual inventory costing methods, **P1**, **A1**—similar to Exercise 5-3

Tableau DA 5-3 Mini-Case, Perpetual inventory costing methods, **P1**, **A1**—similar to Exercise 5-5

Tableau DA 5-4A Exercise, Periodic income effects of LIFO and FIFO, **P3**—similar to Exercise 5-6

Tableau DA 5-5A Mini-Case, Periodic income effects of LIFO and FIFO, **P3**—similar to Exercise 5-7

Accounting Analysis

COMPANY ANALYSIS

C1 A3

AA 5-1 Use **Apple**'s financial statements in Appendix A to answer the following.

Required

1. What amount of inventories did Apple report as a current asset (*a*) on September 28, 2019? (*b*) On September 29, 2018?
2. Inventories make up what percent of total assets (*a*) on September **28, 2019**? (*b*) On September **29, 2018**?
3. Assuming Apple has enough inventory to meet demand, does Apple prefer inventory to be a lower or higher percentage of total assets?
4. Compute (*a*) inventory turnover for fiscal year ended September 28, 2019, and (*b*) days' sales in inventory as of September 28, 2019.

COMPARATIVE ANALYSIS

A3

AA 5-2 Comparative figures for **Apple** and **Google** follow.

$ millions	Apple			Google		
	Current Year	One Year Prior	Two Years Prior	Current Year	One Year Prior	Two Years Prior
Inventory	$ 4,106	$ 3,956	$ 4,855	$ 999	$ 1,107	$ 749
Cost of sales	161,782	163,756	141,048	71,896	59,549	45,583

Required

1. Compute inventory turnover for each company for the most recent two years shown.
2. Compute days' sales in inventory for each company for the three years shown.
3. Did the current year inventory turnover underperform or outperform the industry's average turnover of 15 in the case of (*a*) Apple and (*b*) Google?

EXTENDED ANALYSIS

A3

AA 5-3 Key figures for **Samsung** follow.

$ millions	Current Year	One Year Prior	Two Years Prior
Inventory	$ 22,966	$ 24,870	$ 22,708
Cost of sales	126,336	113,598	117,515

Required

1. For the most recent two years, compute Samsung's (*a*) inventory turnover and (*b*) days' sales in inventory.
2. Is the change in Samsung's inventory turnover favorable or unfavorable?
3. Did the current year inventory turnover for Samsung underperform or outperform the industry's average turnover of 15?

Discussion Questions

1. Describe how costs flow from inventory to cost of goods sold for the following methods: (*a*) FIFO and (*b*) LIFO.
2. Where is the amount of merchandise inventory disclosed in the financial statements?
3. If costs are declining, will the LIFO or FIFO method of inventory valuation yield the lower cost of goods sold? Why?
4. If inventory errors are said to correct themselves, why are accounting users concerned when such errors are made?
5. Explain the following statement: "Inventory errors correct themselves."
6. What is the meaning of *market* as it is used in determining the lower of cost or market for inventory?
7. What factors contribute to (or cause) inventory shrinkage?
8. [B] When preparing interim financial statements, what two methods can companies utilize to estimate cost of goods sold and ending inventory?

Beyond the Numbers

ETHICS CHALLENGE

A1

BTN 5-1 Golf Challenge Corp. is a retail sports store carrying golf apparel and equipment. The store is at the end of its second year of operation and is struggling. A major problem is that its cost of inventory has continually increased in the past two years. In the first year of operations, the store assigned inventory costs using LIFO. A loan agreement the store has with its bank, its prime source of financing, requires the store to maintain a certain profit margin and current ratio. The store's owner is currently looking over Golf Challenge's preliminary financial statements for its second year. The numbers are not favorable. The only way the store can meet the financial ratios agreed on with the bank is to change from LIFO to FIFO. The store originally decided on LIFO because of its tax

advantages. The owner recalculates ending inventory using FIFO and submits those numbers and statements to the loan officer for the required bank review. The owner thankfully reflects on the available latitude in choosing the inventory costing method.

Required

1. How does Golf Challenge's use of FIFO improve its net profit margin and current ratio?
2. Is the action by Golf Challenge's owner ethical? Explain.

COMMUNICATING IN PRACTICE

A1

BTN 5-2 You are a financial adviser with a client in the wholesale produce business that just completed its first year of operations. Due to weather conditions, the cost of acquiring produce to resell has escalated during the latter part of this period. Your client, Javonte Gish, mentions that because her business sells perishable goods, she has striven to maintain a FIFO flow of goods. Although sales are good, the increasing cost of inventory has put the business in a tight cash position. Gish has expressed concern regarding the ability of the business to meet income tax obligations.

Required

Prepare a memorandum that identifies, explains, and justifies the inventory method you recommend that Ms. Gish adopt.

TAKING IT TO THE NET

A3

BTN 5-3 Access the September 29, 2018, 10-K report for **Apple, Inc.** (ticker: AAPL), filed on November 5, 2018, from the EDGAR filings at **SEC.gov**.

Required

1. What products are manufactured by Apple?

2. What inventory method does Apple use? *Hint:* See Note 1 to its financial statements.

3. Compute its gross profit and gross profit ratio for the 2018 fiscal year. Comment on your computations—assume an industry average of 40% for the gross profit ratio.

4. Compute its inventory turnover and days' sales in inventory for the year ended September 29, 2018. Comment on your computations—assume an industry average of 15 for inventory turnover and 9 for days' sales in inventory.

TEAMWORK IN ACTION

A1 P1

BTN 5-4 Each team member has the responsibility to become an expert on an inventory method. This expertise will be used to facilitate teammates' understanding of the concepts relevant to that method.

1. Each learning team member should select an area for expertise by choosing one of the following inventory methods: specific identification, LIFO, FIFO, or weighted average.

2. Form expert teams made up of students who have selected the same area of expertise. The instructor will identify where each expert team will meet.

3. Using the following data, each expert team must collaborate to develop a presentation that illustrates the relevant concepts and procedures for its inventory method. Each team member must write the presentation in a format that can be shown to the learning team.

Point: Step 1 allows four choices or areas for expertise. Larger teams will have some duplication of choice, but the specific identification method should not be duplicated.

Data: The company uses a **perpetual** inventory system. It had the following beginning inventory and current year purchases of its product.

Jan. 1	Beginning inventory	50 units @ $100 = $ 5,000
Jan. 14	Purchase	150 units @ $120 = 18,000
Apr. 30	Purchase	200 units @ $150 = 30,000
Sep. 26	Purchase	300 units @ $200 = 60,000

The company transacted sales on the following dates at a $350 per unit sales price.

Jan. 10	30 units	specific cost: 30 @ $100
Feb. 15	100 units	specific cost: 100 @ $120
Oct. 5	350 units	specific cost: 100 @ $150 and 250 @ $200

Concepts and Procedures to Illustrate in Expert Presentation

a. Identify and compute the costs to assign to the units sold. (Round per unit costs to three decimals.)

b. Identify and compute the costs to assign to the units in ending inventory. (Round inventory balances to the dollar.)

c. How likely is it that this inventory costing method will reflect the actual physical flow of goods? How relevant is that factor in determining whether this is an acceptable method to use?

d. What is the impact of this method versus others in determining net income and income taxes?

e. How closely does the ending inventory amount reflect replacement cost?

4. Re-form learning teams. In rotation, each expert is to present to the team the presentation developed in part 3. Experts are to encourage and respond to questions.

ENTREPRENEURIAL DECISION

A3

BTN 5-5 Review the chapter's opening feature highlighting Jeff Bezos and **Whole Foods**. Assume that the business consistently maintains an inventory level of $30,000, meaning that its average and ending inventory levels are the same. Also assume its annual cost of sales

is $120,000. To cut costs, the business proposes to slash inventory to a constant level of $15,000 with no impact on cost of sales. The business plans to work with suppliers to get quicker deliveries and to order smaller quantities more often.

Required

1. Compute the company's inventory turnover and its days' sales in inventory under (*a*) current conditions and (*b*) proposed conditions.
2. Evaluate and comment on the merits of the proposal given your analysis for part 1. Identify any concerns you might have about the proposal.

6 Cash, Fraud, and Internal Control

page 244

Chapter Preview

FRAUD AND INTERNAL CONTROL

C1 Purpose and principles of controls

Technology and controls

Limitations of controls

NTK 6-1

CONTROL OF CASH

C2 Definition and reporting of cash

P1 Control of cash receipts

Control of cash payments

NTK 6-2

TOOLS OF CONTROL AND ANALYSIS

P2 Control of petty cash

P3 Bank reconciliation as a control tool

A1 Assessing liquidity

NTK 6-3, 6-4

Learning Objectives

CONCEPTUAL

C1 Define internal control and identify its purpose and principles.

C2 Define cash and cash equivalents and explain how to report them.

ANALYTICAL

A1 Compute the days' sales uncollected ratio and use it to assess liquidity.

PROCEDURAL

P1 Apply internal control to cash receipts and payments.

P2 Explain and record petty cash fund transactions.

P3 Prepare a bank reconciliation.

P4 *Appendix 6A*—Describe use of documentation and verification to control cash payments.

Driving Force

"Believe in yourself"—**JEAN LIU**

BEIJING—Most of us are familiar with **Uber** and **Lyft**. However, Jean Liu and **Didi Chuxing**, or **DiDi** for short, are quietly building the world's largest ride-sharing service.

Often referred to as the "Uber of China," DiDi already facilitates twice as many rides as Uber, Lyft, and all other ride-sharing services combined. Jean, DiDi's president, is viewed as a keen businesswoman and is listed among *Forbes*'s most influential women.

Jean's (and DiDi's) success has not been achieved without setbacks. The company had to strengthen its internal controls to ensure rider safety, including adding a feature to alert law enforcement in case of an emergency. Jean also deals with complaints about the enormous amounts of cash DiDi uses. Jean insists cash is necessary to expand operations and says, "we wouldn't be where we are today without burning cash."

DiDi already facilitates over 20 million rides per day, yet Jean is thinking of the future. That future includes using accounting data for use in predictive analytics: "If 100 people go downstairs and try to get a car, that wouldn't work," explains Jean. "But what if the network knows [using accounting data] that at this moment, there will always be 100 people coming out of this building? . . . Then we can match perfectly."

"The key to a successful business is understanding the customers' expectations," insists Jean, "and half the customers are women!"

Brendan Smialowski/AFP/Getty Images

Sources: *DiDi Chuxing website,* January 2021; *FT.com,* December 2016

FRAUD AND INTERNAL CONTROL

Purpose of Internal Control

C1

Define internal control and identify its purpose and principles.

Managers or owners of small businesses often control the entire operation. They know if the business is actually receiving the assets and services it paid for. Most companies, however, cannot maintain personal supervision and must rely on internal controls.

Internal Control System Managers use an internal control system to monitor and control business activities . An **internal control system** is policies and procedures used to

- Protect assets.
- Promote efficient operations.
- Ensure reliable accounting.

- Uphold company policies.

Deepadesigns/Shutterstock

Managers use internal control systems to prevent avoidable losses, plan operations, and monitor company and employee performance. For example, internal controls for **UnitedHealth Group** protect patient records and privacy.

Sarbanes-Oxley Act (SOX) **Sarbanes-Oxley Act (SOX)** requires managers and auditors of companies whose stock is traded on an exchange (called *public companies*) to document and verify internal controls. Following are some of the requirements.

- The company must have effective internal controls.
- Auditors must evaluate internal controls.
- Violators receive harsh penalties—up to 25 years in prison with fines.
- Auditors' work is overseen by the *Public Company Accounting Oversight Board* (PCAOB).

Committee of Sponsoring Organizations (COSO) **Committee of Sponsoring Organizations (COSO)** lists five ingredients of internal control that add to the quality of accounting information.

- **Control environment**—company structure, ethics, and integrity for internal control.
- **Risk assessment**—identify, analyze, and manage risk factors.
- **Control activities**—policies and procedures to reduce risk of loss.
- **Information & communication**—reports to internal and external parties.
- **Monitoring**—regular review of internal control effectiveness.

Principles of Internal Control

Internal control varies from company to company, but internal control principles apply to all companies. The **principles of internal control** are to

1. Establish responsibilities.
2. Maintain adequate records.
3. Insure assets and bond key employees.
4. Separate recordkeeping from custody of assets.
5. Divide responsibility for related transactions.
6. Apply technological controls.
7. Perform regular and independent reviews.

Point: Many companies have a mandatory vacation policy for employees who handle cash. When another employee must cover for the one on vacation, it is more difficult to hide cash frauds.

Establish Responsibilities Responsibility for a task should be clearly established and assigned to one person. When a problem

occurs in a company where responsibility is not established, determining who is at fault is difficult. For example, if two salesclerks share the same cash register and cash is missing, neither clerk can be held accountable. To prevent this problem, a company can use separate cash drawers for each clerk.

Maintain Adequate Records Good recordkeeping helps protect assets and helps managers monitor company activities. When there are detailed records of equipment, for example, items are unlikely to be lost or stolen without detection. Similarly, transactions are less likely to be entered in wrong accounts if a chart of accounts is used. Preprinted forms are also part of good internal control. When sales slips are properly designed, employees can record information efficiently with fewer errors. When sales slips are prenumbered, each slip is the responsibility of one salesperson, preventing the salesperson from stealing cash by making a sale and destroying the sales slip. Computerized point-of-sale systems achieve the same control results.

Insure Assets and Bond Key Employees Assets should be insured against losses, and employees handling lots of cash and easily transferable assets should be bonded. An employee is *bonded* when a company purchases an insurance policy, or a bond, against theft by that employee. Bonding discourages theft because bonded employees know the bonding company will pursue reported theft.

Separate Recordkeeping from Custody of Assets A person who controls or has access to an asset must not have access to that asset's accounting records. This principle reduces the risk of theft or waste of an asset because the person with control over it knows that another person keeps its records. Also, a recordkeeper who does not have access to the asset has no reason to falsify records. This means that to steal an asset and hide the theft from the records, two or more people must *collude*—or agree in secret to commit the fraud.

Point: ACFE estimates that employee fraud costs more than $150,000 per incident.

Divide Responsibility for Related Transactions Responsibility for a transaction should be divided between two or more individuals or departments. This ensures the work of one person acts as a check on

the other to prevent fraud and errors. This principle, called *separation of duties,* does not mean duplication of work. For example, when a company orders inventory, the task should be split among several employees. One employee submits a request to purchase inventory, a second employee approves the request, a third employee makes the payment, and a fourth employee records the transaction.

Apply Technological Controls Cash registers, time clocks, and ID scanners are examples of devices that can improve internal control. A cash register with a locked-in tape or electronic file makes a record of each cash sale. A time clock records the exact hours worked by an employee. ID scanners limit access to authorized individuals.

Perform Regular and Independent Reviews Regular reviews of internal controls help ensure that procedures are followed. These reviews are preferably done by auditors not directly involved in the activities. Auditors evaluate the efficiency and effectiveness of internal controls. Many companies pay for audits by independent auditors. These auditors test the company's financial records and evaluate the effectiveness of internal controls.

Technology, Fraud, and Internal Control

Principles of internal control are relevant no matter what the technological state of the accounting system, from manual to fully automated. Technology allows us quicker access to information and improves managers' abilities to monitor and control business activities. This section describes technological impacts we must be alert to.

Reduced Processing Errors Technology reduces, but does not eliminate, errors in processing information. Less human involvement can cause data entry errors to go undiscovered. Also, errors in software can produce consistent but inaccurate processing of transactions.

More Extensive Testing of Records When accounting records are kept manually, only small samples of data are usually checked for accuracy. When data are accessible using technology, large samples or even the entire database can be tested quickly.

New Evidence of Processing Technology makes it possible to record additional transaction details not possible with manual systems. For example, a system can record who made the entry, the date and time, the source of the entry, and so on. This means that internal control depends more on the design and operation of the information system and less on the analysis of its resulting documents.

Separation of Duties A company with few employees risks losing separation of duties. For example, the person who designs the information system should not operate it. The company also must separate control over programs and files from the activities related to cash receipts and payments. For example, a computer operator should not control check-writing activities.

Increased E-Commerce **Amazon** and **eBay** are examples of successful e-commerce companies. All e-commerce transactions involve at least three risks: (1) credit card number theft, (2) computer viruses, and (3) impersonation or identity theft. Companies use technological internal controls to combat these risks.

Blockchain as a Control

Blockchain is viewed as a new, more secure type of accounting ledger. A blockchain ledger is continuously and simultaneously updated and verified. Blockchain technology makes it difficult for the ledger to be modified without a detailed record of changes. Records cannot be destroyed or hidden as the record is shared and stored by multiple users.

Valery Bandarchyk/Valery Bondjangobeat/jangobeat/123RF

While blockchain is commonly known as the technology that verifies and facilitates **Bitcoin** transactions, accounting and consulting firms are investing heavily in this technology. **Deloitte** built a blockchain software platform to assist businesses in implementing the technology.

PWC offers auditing services that verify the effectiveness of a company's blockchain technologies.

Blockchain technology has implications for auditors who test internal controls. Auditors focus more on testing the effectiveness of a company's blockchain processes and technology than on verifying the accuracy of its output. Advanced courses cover the details.

Limitations of Internal Control

Internal controls have limitations from (1) human error or fraud and (2) the cost-benefit constraint.

Human error occurs from carelessness, misjudgment, or confusion. *Human fraud* is intentionally defeating internal controls, such as management override, for personal gain. The **fraud triangle** shows three factors that push a person to commit fraud.

- **Opportunity.** A person must be able to commit fraud with a low risk of getting caught.
- **Pressure,** or incentive. A person must feel pressure or have incentive to commit fraud.
- **Rationalization,** or attitude. A person justifies fraud or does not see its criminal nature.

The *cost-benefit constraint* says that the costs of internal controls must not exceed their benefits. Analysis of costs and benefits considers all factors, including morale. For example, most companies have a legal right to read employees' e-mails but rarely do unless there is evidence of potential harm.

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Hacker's Guide to Cyberspace

Pharming Viruses attached to e-mails and websites monitor keystrokes; when you sign on to financial websites, it steals your passwords.

Phishing Hackers send e-mails to you posing as banks; you are asked for information using fake websites where they steal your passwords and personal data.

Wi-Phishing Cybercrooks set up wireless networks hoping you will use them to connect to the web; passwords and data are stolen when you connect.

Bot-Networking Hackers send out spam and viruses from your PC.

Typo-Squatting Hackers set up websites with addresses similar to legit businesses; when you make a typo and hit their sites, they infect your PC.

nd3000/Shutterstock

Decision Insight

All Thumbs Internal control failures can cost a company and its customers millions. **Amazon** learned the hard way when its web services failed. This failure led hundreds of websites to slow down. Reports say this failure cost companies in the S&P 500 index $150 million. The culprit? A typo in Amazon's code. ■

NEED-TO-KNOW 6-1

Internal Controls

C1

Identify each procedure below as an internal control strength or weakness.

1. The cash drawer is accessible to any worker with an employee ID card.
2. The same employee requests, approves, and pays for inventory to streamline processes.

3. The recordkeeper for inventory does not have access to that inventory.
4. Employees who handle cash are bonded through an insurance policy.
5. To save on auditing costs, company *employees now audit their own records.*
6. Detailed records are kept of suppliers and accounts payable.

Solution

1. Weakness **2.** Weakness **3.** Strength **4.** Strength **5.** Weakness **6.** Strength

Do More: QS 6-1, QS 6-2, QS 6-3, E 6-1, E 6-2, E 6-3, P 6-1

CONTROL OF CASH

C2

Define cash and cash equivalents and explain how to report them.

Cash is easily hidden and moved. Internal controls protect cash and meet three guidelines.

1. Handling cash is separate from recordkeeping of cash.
2. Cash receipts are promptly deposited in a bank.
3. Cash payments are made by check or electronic funds transfer (EFT).

The first guideline applies separation of duties to minimize errors and fraud. When duties are separated, two or more people must collude to steal cash and hide this action. The second guideline uses immediate deposits of all cash receipts to produce an independent record of the cash received. It also reduces the chance of cash theft (or loss). The third guideline uses payments by check to develop an independent

record of cash payments. It also reduces the risk of cash theft (or loss).

Cash, Cash Equivalents, and Liquidity

Liquidity refers to a company's ability to pay for its current liabilities. Cash and similar assets are called **liquid assets** because they can be readily used to pay for liabilities. The most liquid assets are usually reported first on a balance sheet; the least liquid assets are reported last.

Cash includes currency, coins, and deposits in bank accounts. Cash also includes items that can be deposited in these accounts such as customer checks, cashier's checks, certified checks, and money orders. **Cash equivalents** are short-term, highly liquid investment assets meeting two criteria: (1) readily convertible to a known cash amount and (2) close enough to their due date so that their market value will not greatly change. Only investments within three months of their due date usually meet these criteria. Cash equivalents are short-term investments such as U.S. Treasury bills. Most companies combine cash equivalents with cash on the balance sheet.

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Point: Companies invest idle cash in cash equivalents to increase income.

Cash Management

A common reason companies fail is inability to manage cash. Companies must plan both cash receipts and cash payments. Goals of cash management are to

1. Plan cash receipts to meet cash payments when due.
2. Keep a minimum level of cash necessary to operate.

The *treasurer* is responsible for cash management. Effective cash management involves applying the following cash management strategies.

- **Encourage collection of receivables.** The quicker customers and others pay the company, the quicker it can use the money. Some companies offer discounts for quicker payments.
- **Delay payment of liabilities.** The more delayed a company is in paying others, the more time it has to use the money. Companies regularly wait to pay bills until the last day allowed.
- **Keep only necessary assets.** Acquiring expensive and rarely used assets can cause cash shortages. Some companies lease warehouses or rent equipment to avoid large up-front payments.
- **Plan expenditures.** Companies must look at seasonal and business cycles to plan expenditures when money is available.
- **Invest excess cash.** Excess cash earns no return and should be invested in productive assets like factories. Excess cash from seasonal cycles can be placed in a short-term investment for interest.

Control of Cash Receipts

P1

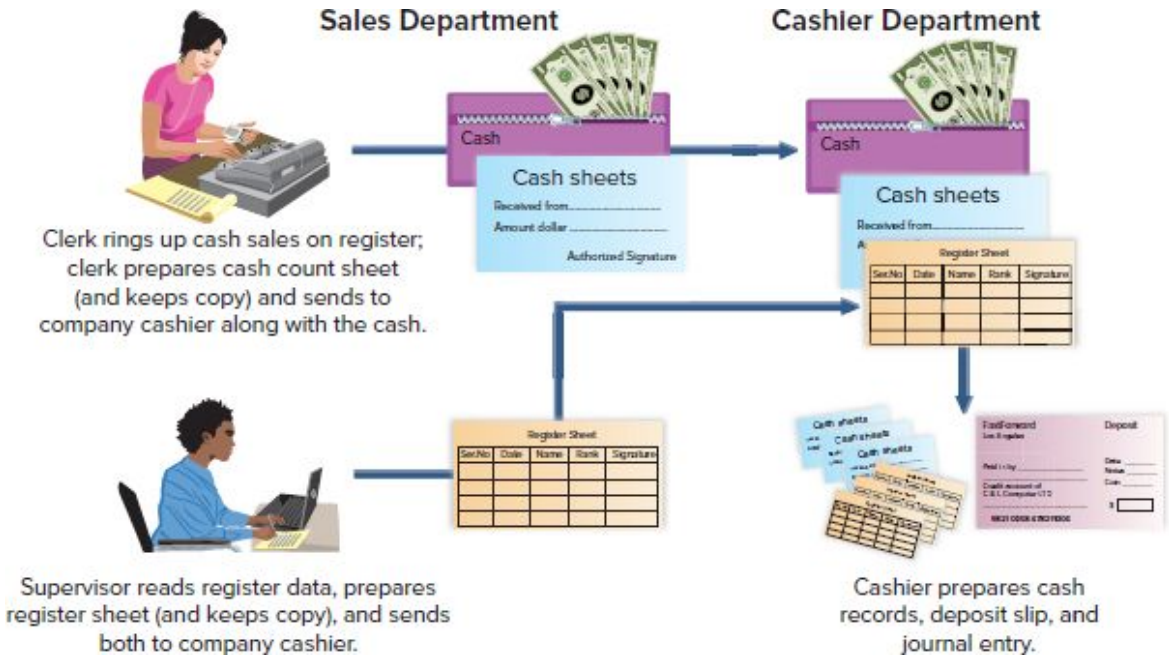
Apply internal control to cash receipts and payments.

Internal control of cash receipts ensures that cash received is properly recorded and deposited. Cash receipts commonly arise from transactions such as cash sales and collections of customer accounts. This section explains internal control over two types of cash receipts: over-the-counter and by mail.

Over-the-Counter Cash Receipts Over-the-counter cash sales should be recorded on a cash register after each sale, and customers should get a receipt. Cash registers should hold a permanent, locked-in record of each transaction. The register is often linked with the accounting system. Less advanced registers record each transaction on a paper tape or electronic file locked inside the register.

Point: Many businesses have signs that read: If you receive no receipt, your purchase is free! This helps ensure that clerks ring up all transactions on registers.

Custody over cash should be separate from recordkeeping. The clerk who has access to cash in the register should not have access to its record. At the end of the clerk's work period, the clerk should count the cash in the register, record the amount, and turn over the cash and record to the company cashier. The cashier, like the clerk, has access to the cash but should not have access to accounting records (or the register tape or file). A third employee, often a supervisor, compares the record of total register transactions with the cash receipts reported by the cashier. This record is used for a journal entry recording over-the-counter cash receipts. The third employee has access to the records for cash but not to the actual cash. The clerk and the cashier have access to cash but not to the accounting records. None of them can make a mistake or steal cash without the difference being noticed (see the following diagram).



Cash Over and Short One or more customers can be given too much or too little change. This means that at the end of a work period, the cash in a cash register might not equal the record of cash receipts. This difference is reported in the **Cash Over and Short**

page 250

account, also called *Cash Short and Over,* which is an income statement account recording the income effects of cash overages and cash shortages. If a cash register's record shows $550 but the count of cash in the register is $555, the entry to record cash sales and its overage is

Assets = Liabilities + Equity
+555 + 5
+550

Cash	555	
Cash Over and Short		5
Sales		550
Record cash sales and a cash overage.		

Alternatively, if a cash register's record shows $625 but the count of cash in the register is $621, the entry to record cash sales and its shortage is

Assets = Liabilities + Equity
+621 − 4
+625

Cash	621	
Cash Over and Short	4	
Sales		625
Record cash sales and a cash shortage.		

Because customers are more likely to dispute being shortchanged than being given too much change, the Cash Over and Short account usually has a debit balance. A debit balance reflects an expense. It is reported on the income statement as part of selling, general, and administrative expenses. (Because the amount is usually small, it is often reported as part of *miscellaneous expenses*—or as part of *miscellaneous revenues* if it has a credit balance.)

Cash Receipts by Mail Two people are assigned the task of opening the mail. In this case, theft of cash receipts by mail requires collusion between these two employees. The person(s) opening the mail enters a list (in triplicate) of money received. This list has each sender's name, the amount, and an explanation of why the money was sent. The first copy is sent with the money to the cashier. A second copy is sent to the recordkeeper. A third copy is kept by the person(s) who opened the mail. The cashier deposits the money in a bank, and the recordkeeper records the amounts received.

This process is good internal control because the bank's record of cash deposited must agree with the records from each of the three. If the mail person(s) does not report all receipts correctly, customers will question their account balances. If the cashier

does not deposit all the cash, the bank balance does not agree with the recordkeeper's cash balance. The recordkeeper does not have access to cash and has no opportunity to steal cash. This system makes errors and fraud highly unlikely. The exception is employee collusion.

Control of Cash Payments

Control of cash payments is important as most large thefts occur from payment of fake invoices. One key to controlling cash payments is to require all payments to be made by check. The only exception is small payments made from petty cash. Another key is to deny access to accounting records to anyone other than the owner who has the authority to sign checks. A small-business owner often signs checks and knows that the items being paid for are actually received. Large businesses cannot maintain personal supervision and must rely on internal controls described here, including the voucher system and petty cash system.

Cash Budget Projected cash receipts and cash payments are summarized in a *cash budget.* If there is enough cash for operations, companies wish to minimize the cash they hold because of its risk of theft and its low return versus other assets.

Voucher System of Control A **voucher system** is a set of procedures and approvals designed to control cash payments and the acceptance of liabilities that consist of

- Verifying, approving, and recording liabilities for cash payment.
- Issuing checks for payment of verified, approved, and recorded liabilities.

A voucher system's control over cash payments begins when a company incurs a liability that will result in cash payment. The system only allows authorized departments and individuals to incur liabilities and limits the type of liabilities. In a large retail store, for example, only a purchasing department is authorized to incur liabilities for inventory. Purchasing, receiving, and paying for merchandise are divided among several departments (or individuals). These departments include the

one requesting the purchase, the purchasing department, the receiving department, and the accounting department.

To coordinate and control responsibilities of these departments, a company uses several different business documents. Exhibit 6.1 shows how documents are accumulated in a **voucher,** which is an internal document (or file) used to collect information to control cash payments and to ensure that a transaction is properly recorded. This specific example begins with a *purchase requisition* (a request to purchase merchandise) and ends with issuing a *check*.

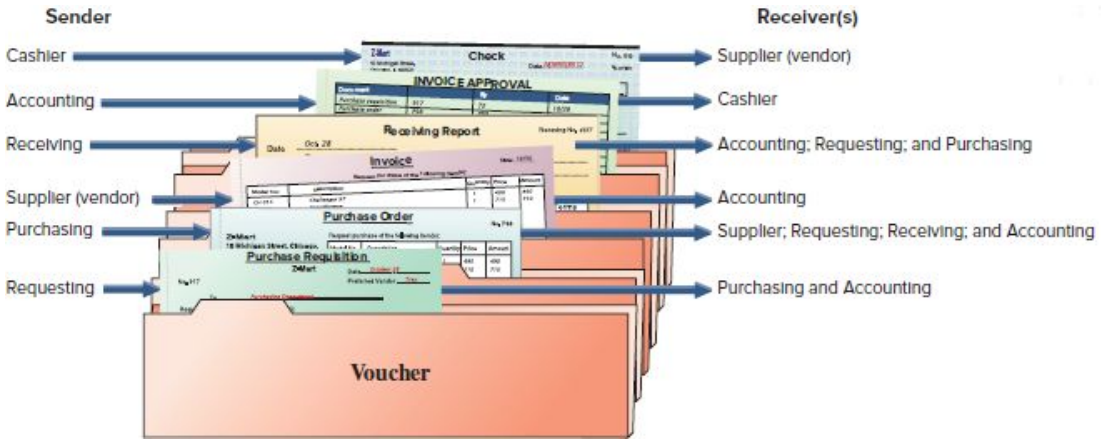


EXHIBIT 6.1

Document Flow in a Voucher System

A voucher system should be applied to all payments (except those using petty cash). When a company receives a monthly telephone bill, it should review the charges, prepare a voucher (file), and insert the bill. This transaction is then recorded. If the amount is due, a check is issued. If not, the voucher is filed for payment on its due date. Without records, an employee could collude with a supplier to get more than one payment, payment for excessive amounts, or payment for goods and services not received. A voucher system helps prevent such frauds.

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J.R. Bale/Alamy Stock Photo

Ethical Risk

Steal Away The Association of Certified Fraud Examiners (ACFE) reports that 87% of fraud is from asset theft. Of those asset thefts, a few stand out—in both frequency and median loss. Namely, cash is most frequently stolen through billing (22%) and theft (20%), followed by expense reimbursements (14%), skimming (12%), check tampering (11%), and payroll (9%). Interestingly, the average loss per incident is greatest for check tampering ($158,000) and billing ($100,000). *Source:* "Report to the Nations," ACFE. ■

NEED-TO-KNOW 6-2

Control of Cash Receipts and Payments

P1 C2

Which of the following statements are true regarding the control of cash receipts and cash payments?

1. Over-the-counter cash sales should be recorded on a cash register after each sale.
2. Custody over cash should be separate from the recordkeeping of cash.
3. For control of cash receipts that arrive through the mail, two people should be present for opening that mail.
4. One key to controlling cash payments is to require that no expenditures be made by check; instead, all expenditures should be made from petty cash.
5. A voucher system of control should be applied only to purchases of inventory and never to other expenditures.

Solution

1. True **2.** True **3.** True **4.** False **5.** False

Do More: QS 6-4, QS 6-7, QS 6-8, E 6-4, E 6-5, E 6-6, E 6-7

P2

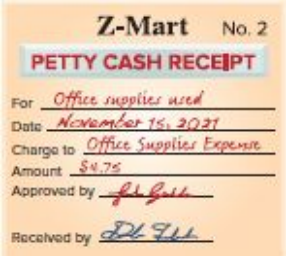
Explain and record petty cash fund transactions.

Petty Cash System of Control To avoid writing checks for small amounts, a company sets up a **petty cash** system. ***Petty cash payments*** are small payments for items such as shipping fees, minor repairs, and low-cost supplies.

Operating a Petty Cash Fund A petty cash fund requires estimating the amount of small payments to be made during a short period such as a week or month. A check is then drawn by the company cashier for an amount slightly in excess of this estimate. The check is cashed and given to an employee called the *petty cashier* or *petty cash custodian*. The petty cashier keeps this cash safe, makes payments from the fund, and keeps records of it in a secure *petty cashbox*.

When a cash payment is made, the person receiving payment signs a prenumbered *petty cash receipt,* also called *petty cash ticket*—see Exhibit 6.2. The petty cash receipt is then placed in the petty cashbox with the remaining money. Under this system, the total of all receipts plus the remaining cash equals the total fund amount. A $100 petty cash fund, for example, contains any combination of cash and petty cash receipts that totals $100 (examples are $80 cash plus $20 in receipts, or $10 cash plus $90 in receipts).

The petty cash fund is reimbursed when it is nearing zero and at the end of an accounting period. The petty cashier sorts the paid receipts by the type of expense or account and then totals the receipts. The petty cashier gives all paid receipts to the company cashier, who stamps all receipts *paid* so they cannot be reused, files them for recordkeeping, and gives the petty cashier a check. When this check is cashed and the money placed in the petty cashbox, the total money in the petty cashbox is restored to its original amount. The fund is now ready for a new cycle of petty cash payments.



Z-Mart No. 2

PETTY CASH RECEIPT

For Office supplies used

Date November 15, 2021

Charge to Office Supplies Expense

Amount $4.75

Approved by

Received by

EXHIBIT 6.2

Petty Cash Receipt

Point: Companies use surprise petty cash counts for verification.

Illustrating a Petty Cash Fund Assume Z-Mart sets up a petty cash fund on November 1. A $75 check is drawn and cashed, and the proceeds given to the petty cashier. The entry to record the setup of this petty cash fund is

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Nov. 1	Petty Cash	75	
	Cash		75
	Establish a petty cash fund.		

Assets = Liabilities + Equity
+75
−75

After the petty cash fund is established, the Petty Cash account is not debited or credited again unless the amount of the fund is changed.

Next, assume that Z-Mart's petty cashier makes several November payments from petty cash. On November 27, after making a $46.50 cash payment for tile cleaning, only $3.70 cash remains in the fund. The petty cashier then summarizes and totals the petty cash receipts as shown in Exhibit 6.3.

Petty Cash Payments Report

Merchandise Inventory (transportation-in)		
Nov. 5	Transport of merchandise purchased	$ 15.05
Office Supplies Expense		
Nov. 15	Purchase of office supplies immediately used	4.75
Delivery Expense		
Nov. 18	Customer's package delivered	5.00
Miscellaneous Expense		
Nov. 27	Tile cleaning	46.50
Total		**$71.30**

EXHIBIT 6.3

Petty Cash Payments Report

Point: This report also can include receipt number and names of those who approved and received cash payment (see **Need-to-Know 6-3**).

The petty cash payments report and all receipts are given to the company cashier in exchange for a $71.30 check to reimburse the fund. The petty cashier cashes the check and puts the $71.30 cash in the petty cashbox. The company records this reimbursement as follows. A petty cash fund is usually reimbursed at the end of an accounting period so that expenses are recorded in the proper period, even if the fund is not low on money.

Nov. 27	Merchandise Inventory	15.05	
	Office Supplies Expense	4.75	
	Delivery Expense	5.00	
	Miscellaneous Expenses	46.50	
	Cash*		71.30
	Reimburse petty cash.		
	**$75 fund bal. – $3.70 cash remaining.*		

Assets	= Liabilities	+ Equity
−71.30		−46.50
+15.05		− 5.00
		− 4.75

Increasing or Decreasing a Petty Cash Fund A decision to increase or decrease a petty cash fund is often made when reimbursing it. Assume Z-Mart decides to *increase* its petty cash fund from $75 to $100 on November 27 when it reimburses the fund. The entries required are to (1) reimburse the fund as usual (see the preceding November 27 entry) and (2) increase the fund amount as follows.

Nov. 27	Petty Cash	25	
	Cash		25
	Increase petty cash fund from $75 to $100.		

Instead, if it *decreases* the petty cash fund from $75 to $55 on November 27, the entry is

Nov. 27	Cash	20	
	Petty Cash		20
	Decrease petty cash fund from $75 to $55.		

Summary of Petty Cash Accounting

Event	Petty Cash	Cash	Expenses
Set up fund	Debit	Credit	—
Reimburse fund	—	Credit	Debit
Increase fund	Debit	Credit	—
Decrease fund	Credit	Debit	—

Cash Over and Short Sometimes a petty cashier fails to get page 254 a receipt for payment or overpays for the amount due. When this occurs and the fund is later reimbursed, the petty cash payments report plus the cash remaining will not equal the fund balance. This mistake causes the fund to be *short*. This shortage is recorded as an expense in the reimbursing entry with a debit to the Cash Over and Short account. (An overage in the petty cash fund is recorded with a credit to Cash Over and Short in the reimbursing entry.)

Following is the June 1 entry to reimburse a $200 petty cash fund when its payments report shows $178 in miscellaneous expenses and only $15 cash remains.

June 1	Miscellaneous Expenses	178	
	Cash Over and Short	7	
	Cash*		185
	Reimburse petty cash.		
	**$200 fund bal. – $15 cash remaining.*		

Ethical Risk

Take a Hint There are clues to fraudulent activities. Clues from accounting include (1) an increase in customer refunds—could be fake, (2) missing documents—could be used for fraud, (3) differences between bank deposits and cash receipts—could be cash embezzled, and (4) delayed recording—could reflect fraudulent records. Clues from employees include (1) lifestyle change—could be embezzlement, (2) too close with suppliers—could signal fraudulent transactions, and (3) refusal to leave job, even for vacations—could conceal fraudulent activities. ■

NEED-TO-KNOW 6-3

Petty Cash System

P2

Bacardi Company established a $150 petty cash fund with Eminem as the petty cashier. When the fund balance reached $19 cash, Eminem prepared a petty cash payments report, which follows.

Petty Cash Payments Report

Receipt No.	Account Charged		Approved by	Received by
12	Delivery Expense	$ 29	Eminem	A. Smirnoff
13	Merchandise Inventory	18	Eminem	J. Daniels
15	(Omitted)	32	Eminem	C. Carlsberg
16	Miscellaneous Expense	41	(Omitted)	J. Walker
	Total	$120		

Required

1. Identify four internal control weaknesses from the petty cash payments report.
2. Prepare general journal entries to record
   - **a.** Establishment of the petty cash fund.
   - **b.** Reimbursement of the fund. (Assume for this part only that petty cash Receipt No. 15 was issued for miscellaneous expenses.)
3. What is the Petty Cash account balance immediately before reimbursement? After reimbursement?

Solution

1. Four internal control weaknesses that are apparent from the payments report include
   - **a.** Petty cash Receipt No. 14 is missing. This raises questions about the petty cashier's management of the fund.

b. The $19 cash balance means that $131 has been withdrawn ($150 − $19 = $131). However, the total amount of the petty cash receipts is only $120 ($29 + $18 + $32 + $41). The fund is $11 short of cash ($131 − $120 = $11). Management should investigate.

c. The petty cashier (Eminem) did not sign petty cash Receipt No. 16. This could have been a mistake on his part or he might not have authorized the payment.

d. Petty cash Receipt No. 15 does not say which account to charge. Management should check with C. Carlsberg and the petty cashier (Eminem) about the transaction. Without further information, debit Miscellaneous Expense.

2. Petty cash general journal entries.

a. Entry to establish the petty cash fund.

page 255

b. Entry to reimburse the fund.

Petty Cash	150	
Cash		150

Delivery Expense	29	
Merchandise Inventory	18	
Miscellaneous Expense ($41 + $32)	73	
Cash Over and Short	11	
Cash ($150 fund bal. – $19 cash rem.)		131

3. The Petty Cash account balance *always* equals its fund balance, in this case $150. This account balance does not change unless the fund is increased or decreased.

Do More: QS 6-9, E 6-8, E 6-9, E 6-10, P 6-2, P 6-3

BANKING ACTIVITIES AS CONTROLS

Basic Bank Services

Banks safeguard cash and provide detailed records of cash transactions. They provide services and documents that help control

cash, which is the focus of this section.

Bank Account, Deposit, and Check A *bank account* is used to deposit money for safekeeping and helps control withdrawals. Persons authorized to write checks on the account must sign a **signature card,** which the bank uses to verify signatures.

Point: Firms often have multiple bank accounts for different needs and for specific transactions such as payroll.

Each bank deposit has a **deposit ticket,** which lists items such as currency, coins, and checks deposited along with amounts. The bank gives the customer a receipt as proof of the deposit. Exhibit 6.4 shows a deposit ticket.

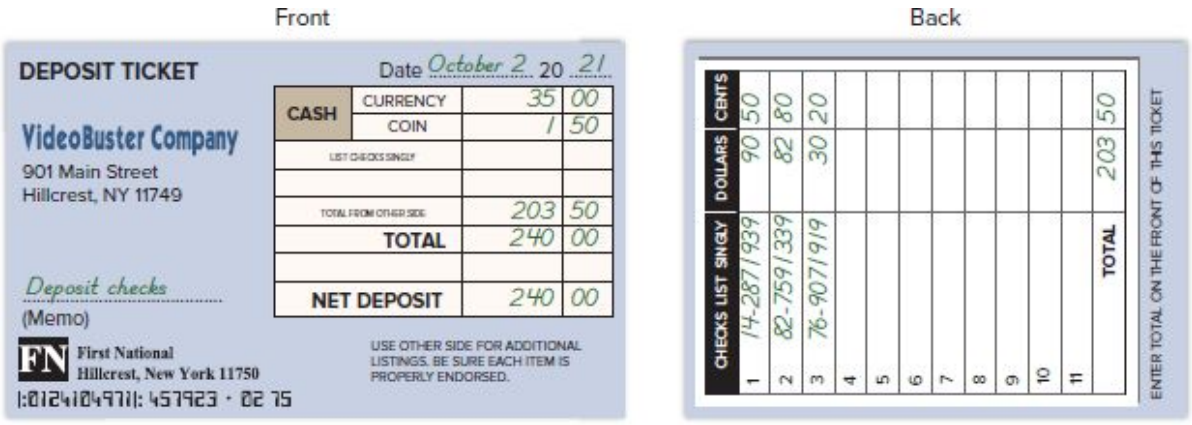


EXHIBIT 6.4

Deposit Ticket

To withdraw money, the depositor can use a **check,** which is a document telling the bank to pay a specified amount to a designated recipient. A check involves three parties: a *maker* who signs the check, a *payee* who is the recipient, and a *bank* (or *payer*) on which the check is drawn. The bank provides the depositor the checks. Exhibit 6.5 shows one type of check. It has an optional *remittance advice* explaining the payment. The *memo* line is used for an explanation.

Electronic Funds Transfer **Electronic funds transfer (EFT)** is the electronic transfer of cash from one party to another. Companies are increasingly using EFT because of its convenience and low cost. Payroll, rent, utilities, insurance, and interest payments are usually

done by EFT. The bank statement lists cash withdrawals by EFT with the checks and other deductions. Cash receipts by EFT are listed with deposits and other additions.

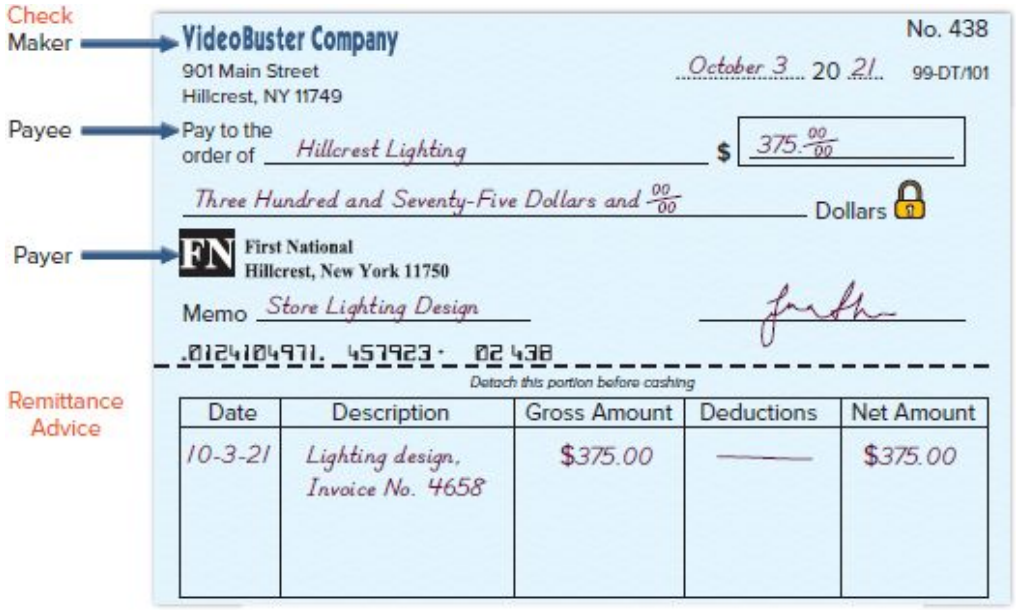


EXHIBIT 6.5

Check with Remittance Advice

Point: Good control is to send a copy of the bank statement directly to a party without access to cash or recordkeeping.

Bank Statement

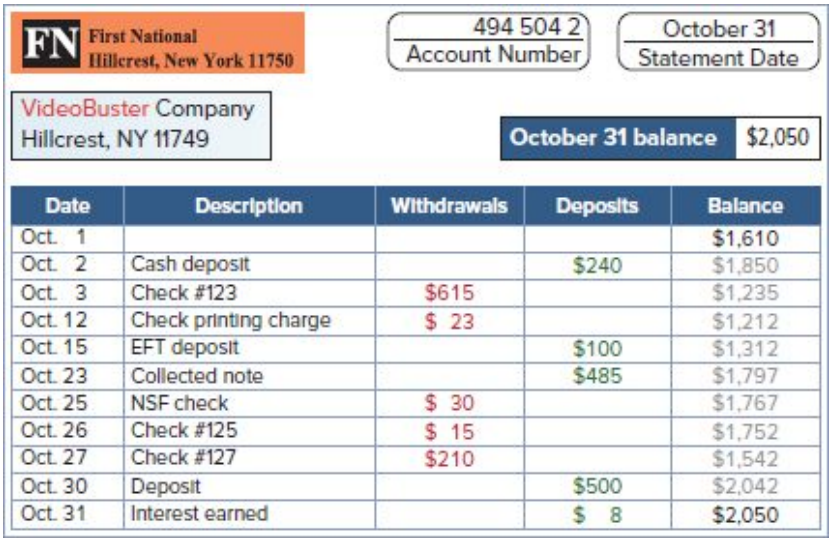
Usually once a month, the bank sends a **bank statement** showing the account activity. Different banks use different formats for their bank statements, but all of them include the following.

1. Beginning-of-period account balance.
2. Withdrawals and other decreases to the account during the period.
3. Deposits and other increases to the account during the period.
4. End-of-period account balance.

Exhibit 6.6 shows one type of bank statement.

Canceled checks are checks the bank has paid and deducted from the customer's account. We say such checks *cleared the bank.* Other usual deductions on a bank statement include (1) bank service fees, (2) checks deposited that are uncollectible, (3) corrections of previous errors, (4) withdrawals through automated teller machines (ATMs), and (5) payments arranged in advance by a depositor.

Increases to the depositor's account include amounts the bank collects on behalf of the depositor and the corrections of previous errors. Banks that pay interest on checking accounts credit interest earned to the depositor's account each period. In Exhibit 6.6, the bank credits $8 of interest to the account.



FN First National
Hillcrest, New York 11750

494 504 2
Account Number

October 31
Statement Date

VideoBuster Company
Hillcrest, NY 11749

October 31 balance $2,050

Date	Description	Withdrawals	Deposits	Balance
Oct. 1				$1,610
Oct. 2	Cash deposit		$240	$1,850
Oct. 3	Check #123	$615		$1,235
Oct. 12	Check printing charge	$ 23		$1,212
Oct. 15	EFT deposit		$100	$1,312
Oct. 23	Collected note		$485	$1,797
Oct. 25	NSF check	$ 30		$1,767
Oct. 26	Check #125	$ 15		$1,752
Oct. 27	Check #127	$210		$1,542
Oct. 30	Deposit		$500	$2,042
Oct. 31	Interest earned		$ 8	$2,050

EXHIBIT 6.6

Bank Statement

Bank Reconciliation

P3

Prepare a bank reconciliation.

The balance of a checking account on the bank statement rarely equals the depositor's book balance (from its records). This is due to information that one party has that the other does not. We must therefore verify the accuracy of both the depositor's records and the bank's records. To do this, we prepare a **bank reconciliation** to

explain differences between the checking account balance in the depositor's records and the balance on the bank statement. The person preparing the bank reconciliation should not be responsible for processing cash receipts, managing checks, or maintaining cash records. The following explains bank and book adjustments.

Point: Books refer to accounting records.

Bank Balance Adjustments

+ Deposits in transit. **Deposits in transit** are deposits made and recorded in the depositor's books but not yet listed on the bank statement. For example, companies can make deposits (in the night depository) after the bank is closed. If such a deposit occurred on a bank statement date, it would not appear on this period's statement. The bank would record such a deposit on the next business day, and it would appear on the next period's bank statement. Deposits mailed to the bank near the end of a period also can be in transit and not listed on the bank statement.

− Outstanding checks. **Outstanding checks** are checks written by the depositor, subtracted on the depositor's books, and sent to the payees but not yet turned in for payment at the bank statement date.

± Bank errors. Any errors made by the bank are accounted for in the reconciliation. To find errors, we (a) compare deposits on the bank statement with deposits in the accounting records and (b) compare canceled checks on the bank statement with checks recorded in the accounting records.

Book Balance Adjustments

+ Interest earned and unrecorded cash receipts. Banks sometimes collect notes for depositors. Banks also receive electronic funds transfers to the depositor's account. When a bank collects an item, it is added to the depositor's account, less any service fee. The bank statement also includes any interest earned.

− Bank fees and NSF checks. A company sometimes deposits another party's check that is uncollectible. This check is called a *nonsufficient funds (NSF)* check. The bank initially increases the depositor's account for the check. When the check is uncollectible, the bank reduces the depositor's account for that check. The bank may

charge the depositor a fee for processing an uncollectible check. Other bank charges include printing new checks and service fees.

± Book errors. Any errors made by the depositor in the company books are accounted for in the reconciliation. To find errors, we use the same procedures described in the "Bank errors" section above.

Adjustments Summary Following is a summary of bank and book adjustments. Each of these items has already been recorded by either the bank or the company, but not both.

Bank Balance Adjustments	Book Balance Adjustments
Add deposits in transit.	Add interest earned and unrecorded cash receipts.
Subtract outstanding checks.	Subtract bank fees and NSF checks.
Add or subtract corrections of bank errors.	Add or subtract corrections of book errors.

Bank Reconciliation Demonstration In preparing the bank reconciliation, refer to Exhibit 6.7 and steps ❶❽.

❶ Enter VideoBuster's bank balance of $2,050 taken from the October 31 bank statement.

❷ Add any unrecorded deposits and bank errors that understate the bank balance to the bank balance. VideoBuster's $145 deposit in the bank's night depository on October 31 is not listed on its bank statement.

page 258

❸ Subtract any outstanding checks and bank errors that overstate the bank balance from the bank balance. VideoBuster's comparison of canceled checks with its books shows two checks outstanding: No. 124 for $150 and No. 126 for $200.

Point: Outstanding checks are identified by comparing canceled checks on the bank statement with checks recorded. This includes identifying any outstanding checks listed on the *previous* period's bank reconciliation.

❹ Compute the *adjusted bank balance*.

❺ Enter VideoBuster's cash account book balance of $1,405 from its Oct. 31 accounting records.

❻ Add any unrecorded cash receipts, interest earned, and errors understating the book balance to the book balance. VideoBuster's

bank statement shows the bank collected a note receivable and increased VideoBuster's account for $485. The bank statement also shows $8 for interest earned that was not yet recorded on the books.

7. Subtract any unrecorded bank fees, NSF checks, and errors overstating the book balance from the book balance. Deductions on VideoBuster's bank statement that are not yet recorded include (a) a $23 charge for check printing and (b) an NSF check for $30. (The NSF check is dated October 16 and was in the book balance.)

8. Compute the *adjusted book balance.*

Verify that the two adjusted balances from steps 4 and 8 are equal (reconciled).

VIDEOBUSTER
Bank Reconciliation
October 31

①	Bank statement balance		$ 2,050	⑤	Book balance		$ 1,405
②	Add			⑥	Add		
	Deposit of Oct. 31 in transit		145		Collected note	$485	
			2,195		Interest earned	8	493
③	Deduct						1,898
	Outstanding checks			⑦	Deduct		
	No. 124	$150			Check printing charge	23	
	No. 126	200	350		NSF check	30	53
④	**Adjusted bank balance**		$1,845	⑧	**Adjusted book balance**		$1,845

Balances are equal (reconciled)

EXHIBIT 6.7

Bank Reconciliation

Entries from a Bank Reconciliation A bank reconciliation often finds unrecorded items that need recording by the company. In VideoBuster's reconciliation, the adjusted balance of $1,845 is the correct balance as of October 31. But the company's accounting records show a $1,405 balance. We make journal entries so that the book balance equals the adjusted balance. **Only items impacting the *book balance* need entries.** Exhibit 6.7 shows that four entries are required.

Collection of Note The first entry is to record collection of a note receivable by the bank.

Assets = Liabilities + Equity
+485
−485

Oct. 31	Cash	485	
	Notes Receivable		485
	Record note collected by bank.		

Interest Earned The second entry records interest earned.

Assets = Liabilities + Equity
+8 +8

Oct. 31	Cash	8	
	Interest Revenue		8
	Record interest earned in checking account.		

Check Printing The third entry records expenses for the check printing charge.

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Oct. 31	Miscellaneous Expenses	23	
	Cash		23
	Check printing charge.		

Assets = Liabilities + Equity
−23 −23

NSF Check The fourth entry records the NSF check that is returned as uncollectible. The check was from T. Woods in payment of his account. The bank deducted $30 total from VideoBuster's account. This means the entry must reverse the effects of the original entry when the check was received.

Oct. 31	Accounts Receivable—T. Woods	30	
	Cash		30
	Charge Woods's account for $30 NSF check.		

Assets = Liabilities + Equity
+30
−30

After these four entries are recorded, the book balance of cash is adjusted to the correct amount of $1,845 (the adjusted book balance). The Cash T-account to the side shows the computation, where entries match the steps in Exhibit 6.7.

Cash			
Unadj. bal.	1,405		
⑥	485	⑦	23
⑥	8	⑦	30
Adj. bal.	1,845		

Point: Need-to-Know 6-4 shows an entry for an error correction.

Ethical Risk

Steal Away The Association of Certified Fraud Examiners (ACFE) reports that 87% of fraud is from asset theft. Of those asset thefts, a few stand out—in both frequency and median loss. Namely, cash is most frequently stolen through billing (22%) and theft (20%), followed by expense reimbursements (14%), skimming (12%), check tampering (11%), and payroll (9%). Interestingly, the average loss per incident is greatest for check tampering ($158,000) and billing ($100,000). *Source:* "Report to the Nations," ACFE. ■

3D_creation/Shutterstock

NEED-TO-KNOW 6-4

Bank Reconciliation

P3

The following information is available to reconcile Gucci's book balance of cash with its bank statement cash balance as of December 31.

a. The December 31 cash balance according to the accounting records is $1,610, and the bank statement cash balance for that date is $1,900.

b. Gucci's December 31 daily cash receipts of $800 were placed in the bank's night depository on December 31 but do not appear on the December 31 bank statement.

c. Gucci's comparison of canceled checks with its books shows three checks outstanding: No. 6242 for $200, No. 6273 for $400, and No. 6282 for $100.

d. When the December checks are compared with entries in the accounting records, it is found that Check No. 6267 had been correctly drawn (*subtracted* from the bank *balance*) for $340 to pay for office supplies but was erroneously entered in the accounting records as $430.

e. The bank statement shows the bank collected a note receivable and increased Gucci's account for $470. Gucci had not recorded this transaction before receiving the statement.

f. The bank statement included an NSF check for $150 received from Prada Inc. in payment of its account. It also included a $20 charge for check printing. Gucci had not recorded these transactions before receiving the statement.

Required

1. Prepare the bank reconciliation for this company as of December 31.

2. Prepare the journal entries to make Gucci's book balance of cash equal to the reconciled cash balance as of December 31.

Solutions

Part 1

GUCCI
Bank Reconciliation
December 31

Bank statement balance		$1,900	Book balance		$1,610
Add			Add		
Deposit of Dec. 31		800	Error (Ck. 6267)	$ 90	
		2,700	Collected note	470	560
					2,170
Deduct			Deduct		
Outstanding Checks No. 6242	$200		NSF check	150	
6273	400		Printing fee	20	
6282	100	700			170
Adjusted bank balance		$2,000	Adjusted book balance		$2,000

Do More:: QS 6-10, QS 6-11, QS 6-12, E 6-11, E 6-12, E 6-13, E 6-14

Part 2

Dec. 31	Cash	90	
	Office Supplies		90
	Correct an entry error.		
Dec. 31	Cash	470	
	Notes Receivable		470
	Record note collection.		

Dec. 31	Accounts Receivable—Prada Inc.	150	
	Cash		150
	Charge account for NSF check.		
Dec. 31	Miscellaneous Expenses	20	
	Cash		20
	Record check printing charge.		

Decision Analysis | Days' Sales Uncollected

A1

One measure of how quickly a company can convert its accounts receivable into cash is the **days' sales uncollected,** also called *days' sales in receivables,* which is defined in Exhibit 6.8. We use days' sales uncollected to estimate how much time is likely to pass before the current amount of accounts receivable is received in cash. It is used to determine if cash is being collected quickly enough to pay upcoming obligations.

page 260

$$\text{Days' sales uncollected} = \frac{\text{Accounts receivable}}{\text{Net sales}} \times 365$$

EXHIBIT 6.8

Document Flow in a Voucher System

Days' sales uncollected are shown for **Starbucks** and **Jack in the Box** in Exhibit 6.9. Days' sales uncollected for Starbucks is 12.1 days for the current year, computed as ($879/$26,509) × 365 days. This means it takes 12.1 days to collect cash from ending accounts receivable. This number reflects one or more of the following factors: a company's ability to collect receivables, customer financial health, customer payment strategies, and discount terms. To further assess Starbucks, we compare it to Jack in the Box. We see that Starbucks's 12.1 days' sales uncollected is better than Jack in the Box's 17.3 days' sales uncollected for the current year. Starbucks

took less time to collect its receivables. The less time money is tied up in receivables, the better.

Company	Figure ($ millions)	Current Year	1 Year Ago	2 Years Ago
Starbucks	Accounts receivable	$ 879	$ 693	$ 870
	Net sales	$26,509	$24,720	$22,387
	Days' sales uncollected	12.1 days	10.2 days	14.2 days
Jack in the Box	Accounts receivable	$ 45	$ 57	$ 60
	Net sales	$ 950	$ 870	$ 1,097
	Days' sales uncollected	17.3 days	23.9 days	20.0 days

EXHIBIT 6.9

Analysis Using Days' Sales Uncollected

Decision Maker

Sales Representative The sales staff are told to help reduce days' sales uncollected for cash management purposes. What can you, a salesperson, do to reduce days' sales uncollected? ■ *Answer:* A salesperson can (1) push cash sales over credit, (2) identify customers most delayed in their payments and require earlier payments or cash sales, and (3) eliminate credit sales to customers that never pay.

NEED-TO-KNOW 6-5

COMPREHENSIVE

Preparing Bank Reconciliation and Entries

Prepare a bank reconciliation for Jamboree Enterprises for page 261 the month ended November 30 and make any necessary entries to the book balance of cash. The following information is available as of November 30.

a. On November 30, the company's book balance of cash is $16,380, but its bank statement shows a $38,520 *cash* balance.

b. Checks No. 2024 for $4,810 and No. 2026 for $5,000 are outstanding.

c. In comparing the canceled checks on the bank statement with the entries in the accounting records, it is found that Check No. 2025 in payment of rent is correctly drawn (*subtracted* from the

bank *balance*) for $1,000 but is erroneously entered in the accounting records as $880.

d. The November 30 deposit of $17,150 was placed in the night depository after banking hours on that date, and this *deposit* amount does not appear on the bank statement.

e. In reviewing the bank statement, a check written by Jumbo Enterprises in the amount of $160 was erroneously drawn against Jamboree's account.

f. The bank statement says that the bank collected a $30,000 note and $900 of interest was earned. These transactions were not recorded by Jamboree prior to receiving the statement.

g. The bank statement lists a $1,100 NSF check received from a customer, Marilyn Welch. Jamboree had not recorded the return of this check before receiving the statement.

h. Bank service charges for November total $40. These charges were not recorded by Jamboree before receiving the statement.

SOLUTION

JAMBOREE ENTERPRISES
Bank Reconciliation
November 30

Bank statement balance		$ 38,520	Book balance		$ 16,380
Add			Add		
Deposit of Nov. 30	$17,150		Collection of note	$30,000	
Bank error (Jumbo)	160	17,310	Interest earned	900	30,900
		55,830			47,280
Deduct			Deduct		
Outstanding checks			NSF check (M. Welch)	1,100	
No. 2024	4,810		Recording error (No. 2025)	120	
No. 2026	5,000	9,810	Service charge	40	1,260
Adjusted bank balance		**$46,020**	**Adjusted book balance**		**$46,020**

Required Entries for Jamboree

Nov. 30	Cash	30,000	
	Notes Receivable		30,000
	Record collection of note.		
Nov. 30	Cash	900	
	Interest Revenue		900
	Record collection of revenue.		
Nov. 30	Accounts Receivable—M. Welch	1,100	
	Cash		1,100
	Reinstate account due from an NSF check.		

Nov. 30	Rent Expense	120	
	Cash		120
	Correct recording error on Check No. 2025.		
Nov. 30	Miscellaneous Expenses	40	
	Cash		40
	Record bank service charges.		

APPENDIX

6A

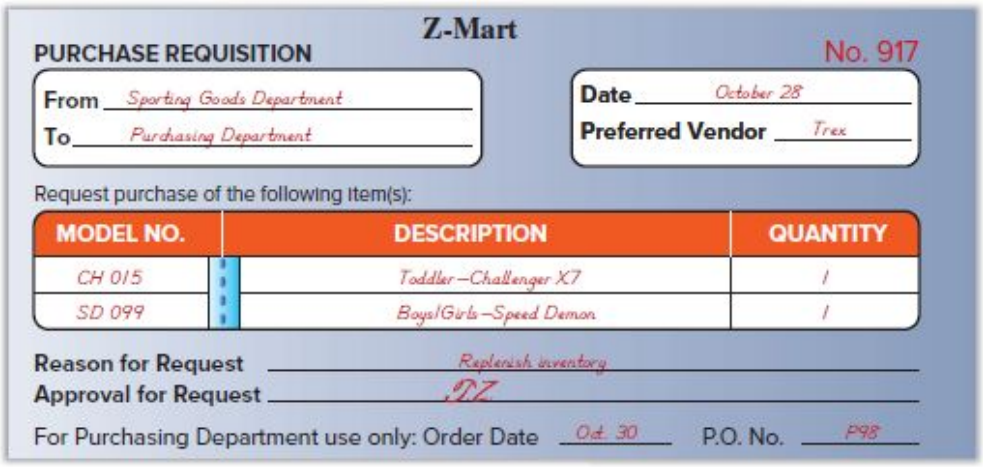
P4

Describe use of documentation and verification to control cash payments. page 262

Documentation and Verification

This appendix covers the documents of a typical voucher system of control.

Purchase Requisition Department managers are usually not allowed to place orders directly with suppliers for control purposes. Instead, a department manager must inform the purchasing department of its needs by preparing and signing a **purchase requisition**, which lists the merchandise requested to be purchased—see Exhibit 6A.1. Two copies of the purchase requisition are sent to the purchasing department, which then sends one copy to the accounting department. When the accounting department receives a purchase requisition, it creates and maintains a voucher for this transaction. The requesting department keeps a third copy.



Z-Mart

PURCHASE REQUISITION No. 917

From Sporting Goods Department
To Purchasing Department

Date October 28
Preferred Vendor Trex

Request purchase of the following item(s):

MODEL NO.	DESCRIPTION	QUANTITY
CH 015	Toddler–Challenger X7	1
SD 099	Boys/Girls–Speed Demon	1

Reason for Request Replenish inventory
Approval for Request DZ

For Purchasing Department use only: Order Date Oct 30 P.O. No. P98

EXHIBIT 6A.1

Purchase Requisition

Purchase Order A **purchase order** is a document the purchasing department uses to place an order with a **vendor** (seller or supplier). A purchase order authorizes a vendor to ship merchandise at the stated price and terms—see Exhibit 6A.2. When the purchasing department receives a purchase requisition, it prepares at least five copies of a purchase order. The copies are distributed as follows: *copy 1* to the vendor as a purchase request to ship merchandise; *copy 2,* along with a copy of the purchase requisition, to the accounting department, where it is entered in the voucher and used in approving payment of the invoice; *copy 3* to the requesting department to inform its manager of the purchase; *copy 4* to the receiving department without order quantity so it can compare with goods received and provide an independent count of goods received; and *copy 5* kept on file by the purchasing department.

Z-Mart
10 Michigan Street
Chicago, Illinois 60521

PURCHASE ORDER
No. P98

To: Trex
W9797 Cherry Road
Antigo, Wisconsin 54409

Date	October 30
FOB	Destination
Ship by	As soon as possible
Terms	2/15, n/30

Request shipment of the following item(s):

Model No.	Description	Quantity	Price	Amount
CH 015	Toddler–Challenger X7	1	150	150
SD 099	Boys/Girls–Speed Demon	1	350	350

All shipments and invoices must include purchase order number.

J.W.
ORDERED BY

EXHIBIT 6A.2

Purchase Order

Invoice An **invoice** is an itemized statement of goods page 263 prepared by the vendor listing the customer's name, items sold, sales prices, and terms of sale. An invoice is also a bill sent to the buyer from the supplier. From the vendor's point of view, it is a *sales invoice*. The buyer, or **vendee,** treats it as a *purchase invoice*. The invoice is sent to the buyer's accounting department, where it is placed in the voucher. (Refer back to Exhibit 5.6, which shows Z-Mart's purchase invoice.)

Receiving Report Many companies have a receiving department to receive all merchandise and purchased assets. When each shipment arrives, this receiving department counts the goods and checks them for damage and agreement with the purchase order. It then prepares four or more copies of a **receiving report,** which is used within the company to notify that ordered goods have been received and to describe the quantities and condition of the goods. One copy is sent to accounting and placed in the voucher. Copies also are sent to the requesting department and the purchasing department to notify them that the goods have arrived. The receiving department keeps a copy in its files.

Invoice Approval When a receiving report arrives, the accounting department should have copies of the following documents in the voucher: purchase requisition, purchase order, and invoice. With the

information in these documents, the accounting department can record the purchase and approve its payment. In approving an invoice for payment, it checks and compares information across all documents. To verify this information and to ensure that no step is missing, it often uses an **invoice approval**, also called *check authorization*—see Exhibit 6A.3. An invoice approval is a checklist of steps necessary for approving an invoice for recording and payment. It is a separate document either filed in the voucher or preprinted (or stamped) on the voucher.

INVOICE APPROVAL

DOCUMENT		BY	DATE
Purchase requisition	917	TZ	Oct. 28
Purchase order	P98	JW	Oct. 30
Receiving report	R85	SK	Nov. 3
Invoice:	4657		Nov. 12
Price		JK	Nov. 12
Calculations		JK	Nov. 12
Terms		JK	Nov. 12
Approved for payment		BC	

EXHIBIT 6A.3

Invoice Approval

As each step in the checklist is approved, the person initials the invoice approval and records the current date. Final approval means the following steps have occurred.

Point: Recording a purchase is initiated by an invoice approval, not an invoice. An invoice approval verifies that the amount is consistent with that requested, ordered, and received. This controls and verifies purchases and related liabilities.

Point: Auditors, when auditing inventory, check a sampling of purchases by reviewing the purchase order, receiving report, and invoice.

1. **Requisition check:** Items on invoice are requested per purchase requisition.
2. **Purchase order check:** Items on invoice are ordered per purchase order.

3. **Receiving report check:** Items on invoice are received per receiving report.
4. **Invoice check: Price:** Invoice prices are as agreed with the vendor.

   Calculations: Invoice has no mathematical errors.

   Terms: Terms are as agreed with the vendor.

Voucher Once an invoice has been checked and approved, the voucher is complete. A complete voucher is a record summarizing a transaction. Once the voucher certifies a transaction, it authorizes recording an obligation. A voucher also contains approval for paying the obligation on an appropriate date.

Completion of a voucher usually requires a person to enter certain information on both the inside and outside of the voucher. Typical information required on the inside of a voucher is on the left-hand side of Exhibit 6A.4, and that for the outside is on the right-hand side. This information is taken from the invoice and the supporting documents filed in the voucher. A complete voucher is sent to an authorized individual (often called an *auditor*). This person performs a final review, approves the accounts and amounts for debiting (called the *accounting distribution*), and authorizes recording of the voucher.

After a voucher is approved and recorded (in a journal called a **voucher register**), it is filed by its due date. A check is then sent on the payment date from the cashier, the voucher is marked “paid,” and the voucher is sent to the accounting department and recorded (in a journal called the **check register**). The person issuing checks relies on the approved voucher and its signed supporting documents as proof that an obligation has been incurred and must be paid. The purchase requisition and purchase order confirm the purchase was authorized. The receiving report shows that items have been received, and the invoice approval form verifies that the invoice has been checked for errors. There is little chance for error and even less chance for fraud without collusion unless all the documents and signatures are forged.

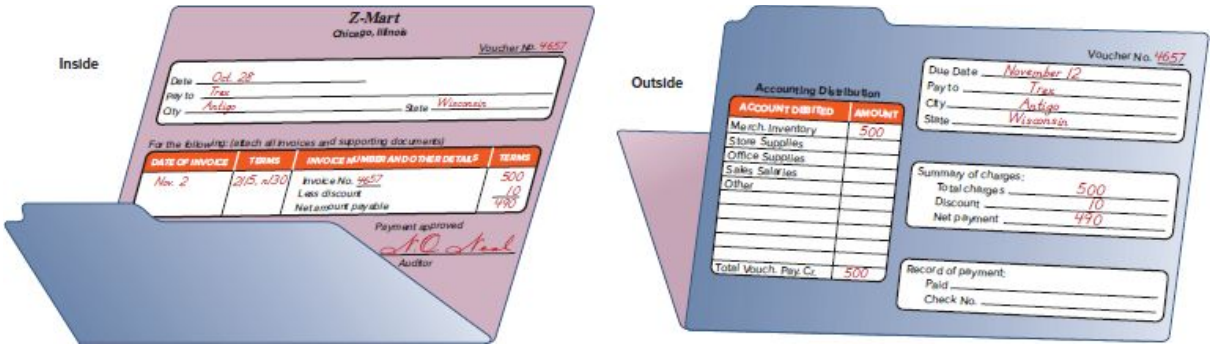


EXHIBIT 6A.4

A Voucher

Summary: Cheat Sheet

FRAUD AND INTERNAL CONTROL

Principles of Internal Control

Establish responsibilities: Responsibility for a task should be assigned to one person. If responsibility is not established, determining who is at fault is difficult.

Maintain adequate records: Good recordkeeping helps protect assets and helps managers monitor company activities.

Insure assets and bond key employees: Assets should be insured, and employees handling cash and easily transferable assets should be bonded.

Separate recordkeeping from custody of assets: An employee who has access to an asset must not have access to that asset's accounting records.

Divide responsibility for related transactions: Responsibility for a transaction should be divided between two or more individuals or departments. One person's work is a check on the others to prevent errors. This is *not* duplication of work.

Apply technological controls: Use technology such as ID scanners to protect assets and improve control.

Perform regular and independent reviews: Regular reviews of internal controls should be performed by outside reviewers, preferably auditors.

CONTROL OF CASH

Cash account: Includes currency, coins, checks, and deposits in bank accounts.

Cash equivalents: Short-term, liquid investment assets meeting two criteria: (1) convertible to a known cash amount and (2) close to their due date, usually within 3 months. An example is a U.S. Treasury bill.

Cash management strategies: (a) Encourage early collection of receivables, (b) delay payment of liabilities, (c) keep only necessary assets, (d) plan expenditures, and (e) invest excess cash.

Over-the-Counter Cash Receipt Control Procedures

- Sales are recorded on a cash register after each sale, and customers are given a receipt.
- Cash registers hold a locked-in record of each transaction and often are linked with the accounting system.
- Custody over cash is separate from recordkeeping. The clerk who has access to cash in the register cannot access accounting records. The recordkeeper cannot access the cash.

Cash Over and Short Journal Entries

If cash received is *more* than recorded cash sales:

Cash	555	
Cash Over and Short		5
Sales		550

If cash received is *less* than recorded cash sales:

Cash	621	
Cash Over and Short	4	
Sales		625

Cash Receipts by Mail Control Procedures

- Two people are tasked with opening mail. Theft of cash would require collusion between these two employees.
- A list (in triplicate) is kept of each sender's name, the amount, and an explanation of why money was sent. The first copy is sent with the money to the cashier. A second copy is sent to the recordkeeper. The employees who opened the mail keep the third copy. The cashier deposits the money in a bank, and the recordkeeper records amounts received.
- No employee has access to both accounting records and cash.

Cash Payment Control Procedures

- Require all payments to be made by check or EFT. The only exception is small payments made from petty cash.
- Deny access to records to employees who can sign checks (other than the owner).

Voucher system: Set of procedures to control cash payments. Applied to all payments.

TOOLS OF CONTROL AND ANALYSIS

Petty cash: System of control used for small payments.

Entry to set up a petty cash fund:

Petty Cash	75	
Cash		75

Reimburse and record expenses for petty cash:

Merchandise Inventory	15.05	
Office Supplies Expense	4.75	
Delivery Expense	5.00	
Miscellaneous Expenses	46.50	
Cash		71.30

Increasing a petty cash fund (after reimbursement):

Petty Cash	25	
Cash		25

Decreasing a petty cash fund (after reimbursement):

Cash	20	
Petty Cash		20

Petty cash fund has unexplained shortage:

Miscellaneous Expenses	178	
Cash Over and Short	7	
Cash		185

Canceled checks: Checks the bank has paid and deducted from the customer's account.

Bank reconciliation adjustments:

Bank Balance Adjustments	Book Balance Adjustments
Add deposits in transit.	Add interest earned and unrecorded cash receipts.
Subtract outstanding checks.	Subtract bank fees and NSF checks.
Add or subtract corrections of bank errors.	Add or subtract corrections of book errors.

Entries from Bank Reconciliation—Examples

Collection of note:

Cash	485	
Notes Receivable		485

Interest earned:

Cash	8	
Interest Revenue		8

Bank fees:

Miscellaneous Expenses	23	
Cash		23

NSF checks:

Accounts Receivable—Name	30	
Cash		30

Key Terms

page 265

Bank reconciliation (257)

Bank statement (256)

Blockchain (247)

Canceled checks (256)

Cash (249)

Cash equivalents (249)

Cash Over and Short (250)

Check (255)

Check register (263)

Committee of Sponsoring Organizations (COSO) (245)

Days' sales uncollected (260)

Deposit ticket (255)

Deposits in transit (257)

Electronic funds transfer (EFT) (255)

Fraud triangle (247)

Internal control system (245)

Invoice (263)

Invoice approval (263)

Liquid assets (248)

Liquidity (248)

Outstanding checks (257)

Petty cash (252)

Principles of internal control (246)

Purchase order (262)

Purchase requisition (262)

Receiving report (263)

Sarbanes-Oxley Act (SOX) (245)

Signature card (255)

Vendee (263)

Vendor (262)

Voucher (251)

Voucher register (263)

Voucher system (251)

Multiple Choice Quiz

1. The following information is available for Hapley Co.

- November 30 bank statement shows a $1,895 balance.
- General ledger shows a $1,742 balance at November 30.
- A $795 deposit in the bank's night depository on November 30 does not appear on the November 30 bank statement.
- Outstanding checks amount to $638 at November 30.
- A customer's $320 note was collected by the bank and deposited in Hapley's account in November.
- A bank service charge of $10 is deducted by the bank and appears on the November 30 bank statement.

How will the customer's note appear on Hapley's November 30 bank reconciliation?

a. $320 is an addition to the book balance of cash.

b. $320 is a deduction from the book balance of cash.

c. $320 is an addition to the bank balance of cash.

d. $320 is a deduction from the bank balance of cash.

e. $335 is an addition to the bank balance of cash.

2. Using the information from question 1, what is the reconciled balance on Hapley's November 30 bank reconciliation?

a. $2,052

b. $1,895

c. $1,742

d. $2,201

e. $1,184

3. A company replenishes its $500 petty cash fund. Its petty cashbox has $75 cash and petty cash receipts of $420 *in repairs expense*. The entry to replenish the fund includes

a. A debit to Cash for $75.

b. A credit to Cash for $75.

c. A credit to Petty Cash for $420.

d. A credit to Cash Over and Short for $5.

e. A debit to Cash Over and Short for $5.

4. A company had net sales of $84,000 and accounts receivable of $6,720. Its days' sales uncollected is

a. 3.2 days

b. 18.4 days

c. 230.0 days

d. 29.2 days

e. 12.5 days

ANSWERS TO MULTIPLE CHOICE QUIZ

page 266

1. a; recognizes cash collection of note by bank.

2. a; the bank reconciliation follows.

Bank Reconciliation November 30			
Balance per bank statement	$1,895	Balance per books	$1,742
Add: Deposit in transit	795	Add: Note collected	320
Deduct: Outstanding checks	(638)	Deduct: Service charge	(10)
Reconciled balance	$2,052	Reconciled balance	$2,052

3. e; The entry follows.

Repairs expense	420	
Cash Over and Short	5	
Cash		425

4. d; ($6,720/$84,000) × 365 = 29.2 days

Superscript letter A denotes assignments based on Appendix 6A.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

QUICK STUDY

QS 6-1

Internal control objectives

C1

Indicate which statements are true and which are false.

1. Separation of recordkeeping for assets from the custody over assets helps reduce fraud.
2. The primary objective of internal control procedures is to safeguard the business against theft from government agencies.

3. Internal control procedures should be designed to protect assets from waste and theft.
4. Separating the responsibility for a transaction between two or more individuals or departments will not help prevent someone from creating a fictitious invoice and paying the money to himself.

QS 6-2

COSO internal control components

C1

COSO lists five components of internal control: control environment, risk assessment, control activities, information and communication, and monitoring. Indicate the COSO component that matches with each of the following internal control activities.

a. Independent review of controls

b. Executives' strong ethics

c. Reporting of control effectiveness

d. Analyses of fraud risk factors

QS 6-3

Applying fraud triangle

C1

Identify the fraud triangle risk factor (opportunity, pressure, or rationalization) in each situation.

1. Employees are told to report increased income or be fired.
2. Several salesclerks share the same cash drawer.
3. A worker did not receive a bonus this year and now feels it's okay to use the company credit card for personal expenses.
4. Doors safeguarding valuable merchandise are not locked with a passcode.

5. An employee feels underpaid and believes stealing inventory is justified.

QS 6-4

Cash and equivalents

C2

Choose from the following list of terms and phrases to best complete the following statements. page 267

a. Cash

b. Cash equivalents

c. Outstanding check

d. Liquidity

e. Cash over and short

f. Voucher system

1. The _____ category includes currency, coins, and deposits in bank accounts.
2. The term _____ refers to a company's ability to pay for its current liabilities.
3. The _____ category includes short-term, highly liquid investment assets that are readily convertible to a known cash amount and sufficiently close to their due dates so that their market value will not greatly change.

QS 6-5

Reporting cash and cash equivalents

C2

Anna's Cookies combines cash and cash equivalents on the balance sheet. Using the following information, determine the amount reported for cash and cash equivalents.

- $100 in coins held in store registers

- $600 in accounts payable to suppliers
- $1,000 cash in a safe at the store
- $4,000 cash in checking accounts
- $1,700 worth of equipment
- $5,000 note receivable due in 10 years

QS 6-6

Control of cash

C2

Determine whether each procedure described below is an internal control strength or weakness.

1. The same employee is in charge of recordkeeping and depositing cash receipts.

2. All large payments are made by electronic funds transfer (EFT).

3. Cash receipts of large amounts are kept in an office drawer and deposited every six months.

QS 6-7

Internal control for cash

P1

Identify each of the following statements as either true or false.

a. A guideline for safeguarding cash is that all cash receipts be deposited monthly or yearly.

b. A voucher system of control is a control system exclusively for cash receipts.

c. A guideline for safeguarding cash is to separate the duties of those who have custody of cash from those who keep cash records.

d. Separation of duties eliminates the possibility of collusion to steal an asset and hide the theft from the records.

QS 6-8

Cash Over and Short

P1

Record the journal entry for Sales and for Cash Over and Short for each of the following separate situations.

a. The cash register's record shows $420 of cash sales, but the count of cash in the register is $430.

b. The cash register's record shows $980 of cash sales, but the count of cash in the register is $972.

QS 6-9

Petty cash ac counting

P2

1. Brooks Agency set up a petty cash fund for $150. At the end of the current period, the fund contained $28 and had the following receipts: entertainment, $70; postage, $30; and printing, $22. Prepare journal entries to record (*a*) establishment of the fund and (*b*) reimbursement of the fund at the end of the current period.

2. Identify the two events from the following that cause a Petty Cash account to be credited in a journal entry.

a. Fund amount is being reduced.

c. Fund is being eliminated.

b. Fund amount is being increased.

d. Fund is being established.

QS 6-10

Bank reconciliation

P3

For *a* through *g*, indicate whether its amount (1) affects the bank or book side of a bank reconciliation, (2) is an addition or a subtraction in a bank reconciliation, and (3) requires a journal entry.

	Bank or Book Side	Add or Subtract	Entry or Not
a. Interest on cash balance	_____	_____	_____
b. Bank service charges	_____	_____	_____
c. Minimum balance bank fee	_____	_____	_____
d. Outstanding checks	_____	_____	_____
e. Collection of note by bank	_____	_____	_____
f. NSF checks	_____	_____	_____
g. Deposits in transit	_____	_____	_____

QS 6-11

Bank reconciliation

P3

Nolan Company's Cash account shows a $22,352 debit balance and its bank statement shows $21,332 on deposit at the close of business on June 30. Prepare a bank reconciliation using the following information.

a. Outstanding checks as of June 30 total $3,713. page 268

b. The June 30 bank statement lists $41 in bank service charges; the company has not yet recorded the cost of these services.

c. In reviewing the bank statement, a $90 check written by the company was mistakenly recorded in the company's books as $99.

d. June 30 cash receipts of $4,724 were placed in the bank's night depository after banking hours and were not recorded on the June 30 bank statement.

e. The bank statement included a $23 credit for interest earned on the company's cash in the bank. The company has not yet recorded interest earned.

QS 6-12

Bank reconciliation

P3

Organic Food Co.'s Cash account shows a $5,500 debit balance and its bank statement shows $5,160 on deposit at the close of business on August 31. Prepare a bank reconciliation using the following information.

a. August 31 cash receipts of $1,240 were placed in the bank's night depository after banking hours and were not recorded on the August 31 bank statement.

b. The bank statement shows a $120 NSF check from a customer; the company has not yet recorded this NSF check.

c. Outstanding checks as of August 31 total $1,120.

d. In reviewing the bank statement, an $80 check written by Organic Fruits was mistakenly drawn against Organic Food's account.

e. The August 31 bank statement lists $20 in bank service charges; the company has not yet recorded the cost of these services.

QS 6-13

Entries from bank reconciliation **P3**

Using the information in QS 6-12, prepare any necessary journal entries that Organic Food Co. must record as a result of preparing the bank reconciliation.

QS 6-14

Preparing current assets section of balance sheet

C2

Use the following information to prepare the current assets section of Lima Company's classified balance sheet as of December 31.

Adjusted Trial Balance	Debit	Credit
Cash and equivalents	$ 4,000	
Accounts receivable	2,000	
Merchandise inventory	5,000	
Prepaid insurance	1,000	
Land	20,000	
Accounts payable		$ 3,000
Common stock		10,000
Retained earnings		16,000
Sales		17,000
Cost of goods sold	8,000	
Wages expense	6,000	
Totals	46,000	46,000

QS 6-15

Days' sales uncollected

A1

The following annual account balances are from Armour Sports at December 31.

	Year 2	Year 1
Accounts receivable	$ 100,000	$ 85,000
Net sales	2,500,000	2,000,000

a. What is the change in the number of days' sales uncollected between Year 1 and Year 2?

b. From the analysis in part *a*, is the company's collection of receivables improving?

QS 6-16[A]

Documents in a voucher system **P4**

Management uses a voucher system to help control and monitor cash payments. Which one or more of the four documents listed below are prepared as part of a voucher system of control?

a. Purchase order

b. Outstanding check

c. Invoice

d. Voucher

connect

EXERCISES

Exercise 6-1

Identifying internal control failures

C1

Identify the internal control principle that was violated in each of the following separate situations. page 269

a. The recordkeeper left town after the owner discovered a large sum of money had disappeared. An audit found that the recordkeeper had written and signed several checks made payable to his fiancée and recorded the checks as salaries expense.

b. An employee was put in charge of handling cash. That employee later stole cash from the business. The company incurred an *uninsured* loss of $184,000.

c. There is $500 in cash missing from a cash register drawer. Three salesclerks shared the cash register drawer, so the owner cannot determine who is at fault.

Exercise 6-2

Identifying internal control principles

C1

Whole Fruits Market took the following actions to improve internal controls. For each of the following actions, identify the internal control principle the company followed.

a. The recordkeeper is prohibited from having control over cash.

b. An insurance (bonding) policy is purchased against losses from theft by a cashier.

c. Each cashier is designated a specific cash drawer and is solely responsible for cash in that drawer.

d. Detailed records of inventory are kept to ensure items lost or stolen do not go unnoticed.

e. Digital time clocks are used to register which employees are at work at what times.

f. External auditors are regularly hired to evaluate internal controls.

Exercise 6-3

Internal control strengths and weaknesses

C1

Determine whether each procedure described below is an internal control strength or weakness; then identify the internal control principle violated or followed for each procedure.

1. The same employee requests, records, and makes payment for purchases of inventory.

2. The company saves money by having employees involved in operations perform the only review of internal controls.

3. Time is saved by not updating records for use of supplies.

4. The recordkeeper is not allowed to write checks or initiate EFTs.

5. Each salesclerk is in charge of her own cash drawer.

Exercise 6-4

Cash management strategies

C2

Determine whether each policy below is good or bad cash management; then identify the cash management strategy violated or followed for each policy.

1. Bills are paid as soon as they are received.

2. Cash receipts and cash payments are regularly planned and reviewed.
3. Excess cash is put in checking accounts, earning no interest income.
4. Customers are regularly allowed to pay after due dates without concern.
5. Rarely used equipment is rented rather than purchased.

Exercise 6-5

Cash and cash equivalents

C2

Specter Co. combines cash and cash equivalents on the balance sheet. Using the following information, determine the amount reported on the year-end balance sheet for cash and cash equivalents.

- $3,000 cash deposit in checking account.
- $200, 3-year loan to an employee.
- $20,000 bond investment due in 20 years.
- $1,000 of currency and coins.
- $5,000 U.S. Treasury bill due in 1 month.
- $500 of accounts receivable.

Exercise 6-6

Control of cash receipts

P1

Determine whether each cash receipts procedure is an internal control strength or weakness.

1. If a salesclerk makes an error in recording a cash sale, she can access the register's electronic record to correct the transaction.

2. All sales transactions, even those for less than $1, are recorded on a cash register.
3. Two employees are tasked with opening mail that contains cash receipts.
4. One of the two employees tasked with opening mail is also the recordkeeper for the business.
5. The supervisor has access to both cash and the accounting records.
6. Receipts are given to customers only for sales that are above $20.

Exercise 6-7

Voucher system and control of cash payments

P1

Determine whether each cash payment procedure is an internal control strength or weakness. page 270

1. A voucher system is used for all payments of liabilities.
2. The owner of a small business has authority to write and sign checks.
3. When the owner is out of town, the recordkeeper is in charge of signing checks.
4. To save time, all departments are allowed to incur liabilities.
5. Payments over $100 are made by check.
6. Requesting and receiving merchandise are handled by the same department.

Exercise 6-8

Petty cash fund with a shortage **P2**

Waupaca Company establishes a $350 petty cash fund on September 9. On September 30, the fund shows $104 in cash along with receipts for the following expenditures: transportation-in, $40; postage

expenses, $123; and miscellaneous expenses, $80. The petty cashier could not account for a $3 shortage in the fund.

The company uses the perpetual system in accounting for merchandise inventory. Prepare (1) the September 9 entry to establish the fund, (2) the September 30 entry to reimburse the fund, and (3) an October 1 entry to increase the fund to $400.

Check (2) Cr. Cash, $246 and (3) Cr. Cash, $50

Exercise 6-9

Petty cash fund with an overage

P2

EcoMart establishes a $1,050 petty cash fund on May 2. On May 30, the fund shows $326 in cash along with receipts for the following expenditures: transportation-in, $120; postage expenses, $369; and miscellaneous expenses, $240. The petty cashier could not account for a $5 overage in the fund. The company uses the perpetual system in accounting for merchandise inventory.

Prepare the (1) May 2 entry to establish the fund, (2) May 30 entry to reimburse the fund [*Hint*: Credit Cash Over and Short for $5 and credit Cash for $724], and (3) June 1 entry to increase the fund to $1,200.

Exercise 6-10

Petty cash fund accounting

P2

Palmona Co. establishes a $200 petty cash fund on January 1. On January 8, the fund shows $38 in cash along with receipts for the following expenditures: postage, $74; transportation-in, $29; delivery expenses, $16; and miscellaneous expenses, $43. Palmona uses the perpetual system in accounting for merchandise inventory.

1. Prepare the entry to establish the fund on January 1.

2. Prepare the entry to reimburse the fund on January 8 under two *separate* situations.

a. To reimburse the fund.

b. To reimburse the fund and increase it to $450. Hint: Make two entries.

Exercise 6-11

Bank reconciliation and journal entries

P3

Prepare a table with the following headings for a monthly bank reconciliation dated September 30. Indicate whether each item should be added to or subtracted from the book or bank balance and whether it should or should not appear on the September 30 reconciliation. For items that add or subtract from the book balance column, place a *Dr.* or *Cr.* after the "Add" or "Subtract" to show the accounting impact on Cash.

Item	Bank Balance	Book Balance		Shown or Not Shown on Reconciliation
	Add or Subtract	Add or Subtract	Dr. or Cr.	Shown or Not Shown

1. NSF check from a customer is shown on the bank statement but not yet recorded by the company.

2. Interest earned on the September cash balance in the bank is not yet recorded by the company.

3. Deposit made on September 5 and processed by the bank on September 6.

4. Checks written by another depositor but *mistakenly* charged against this company's account.

5. Bank service charge for September is not yet recorded by the company.

6. Checks outstanding on August 31 that cleared the bank in September.

7. Check written against the company's account and cleared by the bank; erroneously not recorded by the company's recordkeeper.

8. A note receivable is collected by the bank for the company, but it is not yet recorded by the company.

9. Checks written and mailed to payees on October 2.

10. Checks written by the company and mailed to payees on September 30.

11. Night deposit made on September 30 after the bank closed.

12. Bank fees for check printing are not yet recorded by the company.

Exercise 6-12

Bank reconciliation

P3

Del Gato Clinic's Cash account shows an $11,589 debit balance and its bank statement shows $10,555 on deposit at the close of business on June 30. Prepare its bank reconciliation using the following information.

a. Outstanding checks as of June 30 total $1,829.

b. The June 30 bank statement lists a $16 bank service charge.

c. Check No. 919, listed with the canceled checks, was correctly drawn for $467 in payment of a utility bill on June 15. Del Gato Clinic mistakenly recorded it with a debit to Utilities Expense and a credit to Cash in the amount of $476.

d. The June 30 cash receipts of $2,856 were placed in the bank's night depository after banking hours and were not recorded on the June 30 bank statement.

Check Reconciled bal., $11,582

Exercise 6-13

Entries from bank reconciliation **P3**

page 271

Using the information in Exercise 6-12, prepare any necessary journal entries that Del Gato Clinic must record as a result of preparing the

bank reconciliation.

Exercise 6-14

Bank reconciliation

P3

Wright Company's Cash account shows a $27,500 debit balance and its bank statement shows $25,800 on deposit at the close of business on May 31. Prepare its bank reconciliation using the following information.

a. The May 31 bank statement lists $100 in bank service charges; the company has not yet recorded the cost of these services.

b. Outstanding checks as of May 31 total $5,600.

c. May 31 cash receipts of $6,200 were placed in the bank's night depository after banking hours and were not recorded on the May 31 bank statement.

d. In reviewing the bank statement, a $400 check written by Smith Company was mistakenly drawn against Wright's account.

e. The bank statement shows a $600 NSF check from a customer; the company has not yet recorded this NSF check.

Check Reconciled bal., $26,800

Exercise 6-15

Preparing a balance sheet

C2

Use the following accounts with normal balances to prepare Bosco Company's classified balance sheet as of December 31.

Merchandise inventory	$ 3,000	Land	$24,000
Accounts receivable	5,000	Buildings	40,000
Cash and equivalents	7,000	Accounts payable	10,000
Notes payable (due in 8 years)	15,000	Wages payable	2,000
Accumulated depreciation—Buildings	22,000	Common stock	1,000
		Retained earnings	29,000

Exercise 6-16

Computing and analyzing days' sales uncollected **A1**

Barga Co.'s net sales for Year 1 and Year 2 are $730,000 and $1,095,000, respectively. Its year-end balances of accounts receivable follow: Year 1, $65,000; and Year 2, $123,000.

a. Compute its days' sales uncollected at the end of each year.

b. Did days' sales uncollected improve or worsen in Year 2 versus Year 1?

Exercise 6-17[A]

Documents in a voucher system

P4

Match each document in a voucher system with its description.

Document

1. Purchase requisition

2. Purchase order

3. Invoice

4. Receiving report

5. Invoice approval

6. Voucher

Description

A. An itemized statement of goods prepared by the vendor listing the customer's name, items sold, sales prices, and terms of sale.

B. An internal file used to store documents and information to control cash payments and to ensure that a transaction is properly authorized and recorded.

C. A document used to place an order with a vendor that authorizes the vendor to ship ordered merchandise at the stated price and terms.

D. A checklist of steps necessary for the approval of an invoice for recording and payment; also known as a check authorization.

E. A document used by department managers to inform the purchasing department to place an order with a vendor.

F. A document used to notify the appropriate persons that ordered goods have arrived, including a description of the quantities and condition of goods.

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PROBLEM SET A

page 272

Problem 6-1A

Analyzing internal control

C1

Following are five separate cases involving internal control issues.

a. Chi Han receives all incoming customer cash receipts for her employer and posts the customer payments to their respective accounts.

b. At Tico Company, Julia and Trevor alternate lunch hours. Julia is the petty cash custodian, but if someone needs petty cash when she is at lunch, Trevor fills in as custodian.

c. Nori Nozumi posts all patient charges and payments at the Hopeville Medical Clinic. Each night Nori backs up the computerized accounting system but does not password lock her computer.

d. Ben Shales prides himself on hiring quality workers who require little supervision. As office manager, Ben gives his employees full discretion over their tasks and for years has seen no reason to perform independent reviews of their work.

e. Carla Farah's manager has told her to reduce costs. Carla decides to raise the deductible on the plant's property insurance from $5,000 to $10,000. This cuts the property insurance premium in half. In a related move, she decides that bonding the plant's employees is a waste of money because the company has not experienced any losses due to employee theft. Carla saves the entire amount of the bonding insurance premium by dropping the bonding insurance.

Required

1. For each case, identify the principle(s) of internal control that is violated.
2. Recommend what should be done to adhere to principles of internal control in each case.

Problem 6-2A

Establishing, reimbursing, and adjusting petty cash

P2

Kiona Co. set up a petty cash fund for payments of small amounts. The following transactions involving the petty cash fund occurred in May (the last month of the company's fiscal year).

May 1 Prepared a company check for $300 to establish the petty cash fund.

15. Prepared a company check to replenish the fund for the following expenditures made since May 1.

a. Paid $88 for janitorial expenses.

b. Paid $53.68 for miscellaneous expenses.

c. Paid postage expenses of $53.50.

d. Paid $47.15 to Facebook for advertising expense.

e. Counted $62.15 remaining in the petty cashbox.

16. Prepared a company check for $200 to increase the fund to $500.

31. The petty cashier reports that $288.20 cash remains in the fund. A company check is drawn to replenish the fund for the following expenditures made since May 15.

f. Paid postage expenses of $147.36.

g. Reimbursed the office manager for mileage expense, $23.50.

h. Paid $34.75 in delivery expense for products to a customer, terms FOB destination.

31 The company decides that the May 16 increase in the fund was too large. It reduces the fund by $100, leaving a total of $400.

Required

Check Cr. to Cash: May 15, $237.85; May 16, $200.00

Prepare journal entries to establish the fund on May 1, to replenish it on May 15 and on May 31, and to reflect any increase or decrease in the fund balance on May 16 and May 31.

Problem 6-3A

Establishing, reimbursing, and increasing petty cash

P2

Nakashima Gallery had the following petty cash transactions in February of the current year. Nakashima uses the perpetual system to account for merchandise inventory.

Feb. 2 Wrote a $400 check to establish a petty cash fund.

5 Purchased paper for the copier for $14.15 that is immediately used.

9. Paid $32.50 shipping charges (transportation-in) on merchandise purchased for resale, terms FOB shipping point.

These costs are added to merchandise inventory.

12. Paid $7.95 postage to deliver a contract to a client.

14. Reimbursed Adina Sharon, the manager, $68 for mileage on her car.

20. Purchased office paper for $67.77 that is immediately used.

23. Paid a courier $20 to deliver merchandise sold to a customer, terms FOB destination.

25. Paid $13.10 shipping charges (transportation-in) on merchandise purchased for resale, terms FOB shipping point. These costs are added to merchandise inventory.

27. Paid $54 for postage expenses.

28. The fund had $120.42 remaining in the petty cashbox. Sorted the petty cash receipts by accounts affected and exchanged them for a check to reimburse the fund for expenditures.

28. The petty cash fund amount is increased by $100 to a total of $500.

Required

1. Prepare the journal entry to establish the petty cash fund.

2. Prepare a petty cash payments report for February with these categories: delivery expense, mileage expense, postage expense, merchandise inventory (for transportation-in), and office supplies expense.

3. Prepare the journal entries for part 2 to both (*a*) reimburse and (*b*) increase the fund amount.

Check Cash credit: (3*a*) $279.58; (3*b*) $100.00

Problem 6-4A

page 273

Preparing a bank reconciliation and recording entries

P3

The following information is available to reconcile Branch Company's book balance of cash with its bank statement cash balance as of July 31.

a. On July 31, the company's Cash account has a $27,497 debit balance, but its July bank statement shows a $27,233 cash balance.

b. Check No. 3031 for $1,482, Check No. 3065 for $382, and Check No. 3069 for $2,281 are outstanding checks as of July 31.

c. Check No. 3056 for July rent expense was correctly written and drawn for $1,270 but was erroneously entered in the accounting records as $1,250.

d. The July bank statement shows the bank collected $7,955 cash on a note for Branch. Branch had not recorded this event before receiving the statement.

e. The bank statement shows an $805 NSF check. The check had been received from a customer, Evan Shaw. Branch has not yet recorded this check as NSF.

f. The July statement shows a $25 bank service charge. It has not yet been recorded in miscellaneous expenses because no previous notification had been received.

g. Branch's July 31 daily cash receipts of $11,514 were placed in the bank's night depository on that date but do not appear on the July 31 bank statement.

Required

1. Prepare the bank reconciliation for this company as of July 31.

2. Prepare the journal entries necessary to make the company's book balance of cash equal to the reconciled cash balance as of July 31.

Check (1) Reconciled balance, $34,602; (2) Cr. Notes Receivable, $8,000

Problem 6-5A

Preparing a bank reconciliation and recording entries

P3

Chavez Company most recently reconciled its bank statement and book balances of cash on August 31 and it reported two checks outstanding, No. 5888 for $1,028 and No. 5893 for $494. Check No. 5893 was still outstanding as of September 30. The following information is available for its September 30 reconciliation.

Date	Description	Withdrawals	Deposits	Balance
Sep. 1				$16,800
Sep. 3	Check #5888	$1,028		$15,772
Sep. 4	Check #5902	$ 719		$15,053
Sep. 5	Cash deposit		$1,103	$16,156
Sep. 7	Check #5901	$1,824		$14,332
Sep. 12	Cash deposit		$2,226	$16,558
Sep. 17	NSF check	$ 600		$15,958
Sep. 20	Check #5905	$ 937		$15,021
Sep. 21	Cash deposit		$4,093	$19,114
Sep. 22	Check #5903	$ 399		$18,715
Sep. 22	Check #5904	$2,090		$16,625
Sep. 25	Cash deposit		$2,351	$18,976
Sep. 28	Check #5907	$ 213		$18,763
Sep. 29	Check #5909	$1,807		$16,956
Sep. 30	Collected note		$1,485	$18,441
Sep. 30	Interest earned		$ 12	$18,453

From Chavez Company's Accounting Records

Cash Receipts Deposited	
Date	Cash Debit
Sep. 5	1,103
12	2,226
21	4,093
25	2,351
30	1,682
	11,455

Cash Payments	
Check No.	Cash Credit
5901	1,824
5902	719
5903	399
5904	2,060
5905	937
5906	982
5907	213
5908	388
5909	1,807
	9,329

Cash					Acct. No. 101
Date	Explanation	PR	Debit	Credit	Balance
Aug. 31	Balance				15,278
Sep. 30	Total receipts	R12	11,455		26,733
30	Total payments	D23		9,329	17,404

Additional Information (a) Check No. 5904 is correctly drawn for $2,090 to pay for computer equipment; however, the recordkeeper misread the amount and entered it in the accounting records with a debit to Computer Equipment and a credit to Cash of $2,060. (b) The NSF check shown in the statement was originally received from a

customer, S. Nilson, in payment of her account. Its return has not yet been recorded by the company. (c) The collection of the note on September 30 is not yet recorded by the company.

Required

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1. Prepare the September 30 bank reconciliation for this company.

Check (1) Reconciled balance, $18,271; (2) Cr. Notes Receivable, $1,485

2. Prepare journal entries to adjust the book balance of cash to the reconciled balance.

PROBLEM SET B

Problem 6-1B

Analyzing internal control

C1

Following are five separate cases involving internal control issues.

a. Tywin Company keeps very poor records of its equipment. Instead, the company asserts its employees are honest and would never steal from the company.

b. Marker Theater has a computerized order-taking system for its tickets. The system is backed up once a year.

c. Sutton Company has two employees handling acquisitions of inventory. One employee places purchase orders and pays vendors. The second employee receives the merchandise.

d. The owner of Super Pharmacy uses a check software/printer to prepare checks, making it difficult for anyone to alter the amount of a check. The check software/printer, which is not password protected, is on the owner's desk in an office that contains company checks and is normally unlocked.

e. To ensure the company retreat would not be cut, the manager of Lavina Company decided to save money by canceling the external audit of internal controls.

Required

1. For each case, identify the principle(s) of internal control that is violated.
2. Recommend what should be done to adhere to principles of internal control in each case.

Problem 6-2B

Establishing, reimbursing, and adjusting petty cash

P2

Moya Co. establishes a petty cash fund for payments of small amounts. The following transactions involving the petty cash fund occurred in January (the last month of the company's fiscal year).

Jan. 3 A company check for $150 is written and made payable to the petty cashier to establish the petty cash fund.

14 A company check is written to replenish the fund for the following expenditures made since January 3.

a. Purchased office supplies for $14.29 that are immediately used.

b. Paid $19.60 COD shipping charges on merchandise purchased for resale, terms FOB shipping point. Moya uses the perpetual system to account for inventory.

c. Paid $38.57 to All-Tech for repairs expense to a computer.

d. Paid $12.82 for items classified as miscellaneous expenses.

e. Counted $62.28 remaining in the petty cashbox.

15 Prepared a company check for $50 to increase the fund to $200.

31 The petty cashier reports that $17.35 remains in the fund. A company check is written to replenish the fund for the following expenditures made since January 14.

f. Paid $50 to *The Smart Shopper* in advertising expense for January's newsletter.

g. Paid $48.19 for postage expenses.

h. Paid $78 to Smooth Delivery for delivery expense of merchandise, terms FOB destination.

31 The company decides that the January 15 increase in the fund was too little. It increases the fund by another $50.

Required

Prepare journal entries (in dollars and cents) to establish the fund on January 3, to replenish it on January 14 and January 31, and to reflect any increase or decrease in the fund balance on January 15 and 31.

Check Cr. to Cash: Jan. 14, $87.72; Jan. 31 (total), $232.65

Problem 6-3B

Establishing, reimbursing, and increasing petty cash

P2

Blues Music Center had the following petty cash transactions in March of the current year. Blues uses the perpetual system to account for merchandise inventory.

Mar. 5 Wrote a $250 check to establish a petty cash fund.

6 Paid $12.50 shipping charges (transportation-in) on merchandise purchased for resale, terms FOB shipping point. These costs are added to merchandise inventory.

11 Paid $10.75 in delivery expense on merchandise sold to a customer, terms FOB destination.

12 Purchased office file folders for $14.13 that are immediately used.

14 Reimbursed Bob Geldof, the manager, $11.65 for office supplies purchased and used.

18 Purchased office printer paper for $20.54 that is immediately used.

27 Paid $45.10 shipping charges (transportation-in) on merchandise purchased for resale, terms FOB shipping point. These costs are added to merchandise inventory.

28 Paid postage expense of $18.

30 Reimbursed Geldof $56.80 for mileage expense.

31 Cash of $61.53 remained in the fund. Sorted the petty cash receipts by accounts affected and exchanged them for a check to reimburse the fund for expenditures.

31 The petty cash fund amount is increased by $50 to a total of $300.

Required

1. Prepare the journal entry to establish the petty cash fund.

Check (2) Total expenses, $189.47

(3*a* & 3*b*) Total Cr. to Cash, $238.47

2. Prepare a petty cash payments report for March with these categories: delivery expense, mileage expense, postage expense, merchandise inventory (for transportation-in), and office supplies-expense.

3. Prepare the journal entries for part 2 to both (*a*) reimburse and (*b*) increase the fund amount.

Problem 6-4B

Preparing a bank reconciliation and recording entries

P3

The following information is available to reconcile Severino Co.'s book balance of cash with its bank statement cash balance as of December 31.

a. The December 31 cash balance according to the accounting records is $32,878.30, and the bank statement cash balance for that date is $46,822.40.

b. Check No. 1242 for $410.40, Check No. 1273 for $4,589.30, and Check No. 1282 for $400 are outstanding checks as of December 31.

c. Check No. 1267 had been correctly drawn for $3,456 to pay for office supplies but was erroneously entered in the accounting records as $3,465.

d. The bank statement shows a $762.50 NSF check received from a customer, Titus Industries, in payment of its account. The statement also shows a $99 bank fee in miscellaneous expenses for check printing. Severino had not yet recorded these transactions.

e. The bank statement shows that the bank collected $18,980 cash on a note receivable for the company. Severino did not record this transaction before receiving the statement.

f. Severino's December 31 daily cash receipts of $9,583.10 were placed in the bank's night depository on that date but do not appear on the December 31 bank statement.

Required

1. Prepare the bank reconciliation for this company as of December 31.
2. Prepare the journal entries necessary to make the company's book balance of cash equal to the reconciled cash balance as of December 31.

Check (1) Reconciled balance, $51,005.80; (2) Cr. Notes Receivable, $18,980.00

Problem 6-5B

Preparing a bank reconciliation and recording entries

P3

Shamara Systems most recently reconciled its bank balance page 276 on April 30 and reported two checks outstanding at that time, No. 1771 for $781 and No. 1780 for $1,425.90. Check No. 1780 was still

outstanding as of May 31. The following information is available for its May 31 reconciliation.

Date	Description	Withdrawals	Deposits	Balance
May 1				$18,290.70
May 1	Check #1771	$ 781.00		$17,509.70
May 2	Check #1783	$ 382.50		$17,127.20
May 4	Check #1782	$1,285.50		$15,841.70
May 4	Cash deposit		$2,438.00	$18,279.70
May 11	Check #1784	$1,449.60		$16,830.10
May 14	Cash deposit		$2,898.00	$19,728.10
May 18	NSF check	$ 431.80		$19,296.30
May 22	Cash deposit		$1,801.80	$21,098.10
May 25	Collected note		$7,350.00	$28,448.10
May 25	Check #1787	$8,032.50		$20,415.60
May 26	Check #1785	$ 63.90		$20,351.70
May 26	Cash deposit		$2,079.00	$22,430.70
May 29	Check #1788	$ 654.00		$21,776.70
May 31	Bank service charge	$ 14.00		$21,762.70

From Shamara Systems's Accounting Records

Cash Receipts Deposited	
Date	Cash Debit
May 4	2,438.00
14	2,898.00
22	1,801.80
26	2,079.00
31	2,727.30
	11,944.10

Cash Payments	
Check No.	Cash Credit
1782	1,285.50
1783	382.50
1784	1,449.60
1785	63.90
1786	353.10
1787	8,032.50
1788	644.00
1789	639.50
	12,850.60

Cash					Acct. No. 101
Date	Explanation	PR	Debit	Credit	Balance
Apr. 30	Balance				16,083.80
May 31	Total receipts	R7	11,944.10		28,027.90
31	Total payments	D8		12,850.60	15,177.30

Additional Information (a) Check No. 1788 is correctly drawn for $654 to pay for May utilities; however, the recordkeeper misread the amount and entered it in the accounting records with a debit to Utilities Expense and a credit to Cash for $644. The bank paid and deducted the correct amount. (b) The NSF check shown in the statement was originally received from a customer, W. Sox, in payment of her account. The company has not yet recorded its return. (c) The collection of the note on May 25 has not yet been recorded by the company.

Required

1. Prepare the May 31 bank reconciliation for Shamara Systems.

Check (1) Reconciled balance, $22,071.50; (2) Cr. Notes Receivable, $7,350.00

2. Prepare journal entries to adjust the book balance of cash to the reconciled balance.

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connect

SERIAL PROBLEM

Business Solutions

P3

Serial problem began in Chapter 1. If previous chapter segments were not completed, the serial problem can begin at this point. It is available in Connect with an algorithmic option.

Alexander Image/Shutterstock

SP 6 Santana Rey receives the March bank statement for **Business Solutions** on April 11, 2022. The March 31 bank statement shows an ending cash balance of $67,566. The general ledger Cash account, No. 101, shows an ending cash balance per books of $68,057 as of March 31 (prior to any reconciliation). A comparison of the bank statement with the general ledger Cash account, No. 101, reveals the following.

a. The bank erroneously cleared a $500 check against the company account in March that S. Rey did not issue. The check was actually

issued by Business Systems.

b. On March 25, the bank statement lists a $50 charge for a safety deposit box. Santana has not yet recorded this expense.

c. On March 26, the bank statement lists a $102 charge for printed checks that Business Solutions ordered from the bank. Santana has not yet recorded this expense.

d. On March 31, the bank statement lists $33 interest earned on Business Solutions's checking account for the month of March. Santana has not yet recorded this revenue.

e. S. Rey notices that the check she issued for $128 on March 31, 2022, has not yet cleared the bank.

f. S. Rey verifies that all deposits made in March do appear on the March bank statement.

Required

1. Prepare a bank reconciliation for Business Solutions for the month ended March 31, 2022. page 277

Check (1) Adj. bank bal., $67,938

2. Prepare any necessary entries. Use Miscellaneous Expenses, No. 677, for any bank charges. Use Interest Revenue, No. 404, for any interest earned on the checking account for March.

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TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA 6-1 Quick Study, Identifying components of a bank reconciliation, **P3**—similar to QS 6-10

Tableau DA 6-2 Exercise, Preparing a bank reconciliation, **P3**—similar to Exercise 6-12

Tableau DA 6-3 Mini-Case, Entries from a bank reconciliation, **P3** —similar to Exercises 6-11 and 6-13

GENERAL LEDGER

General Ledger (GL) Assignments expose students to general ledger software similar to that in practice. **GL** is part of Connect.

GL 6-1 prepare journal entries related to petty cash and assess the impact of each transaction on net income.

connect

Accounting Analysis

connect

COMPANY ANALYSIS

C2 A1

AA 6-1 Use **Apple**'s financial statements in Appendix A to answer the following.

1. Identify the total amount of cash and cash equivalents for fiscal years ended (*a*) September 28, 2019, and (*b*) September 29, 2018.
2. Compute cash and cash equivalents as a percent page 278 (rounded to one decimal) of total current assets, total current liabilities, total shareholders' equity, and total assets at fiscal year-end for both 2019 and 2018.

3. Compute the percent change (rounded to one decimal) between the beginning and ending year amounts of cash and cash equivalents for fiscal years ended (*a*) September *28,* 2019, and (*b*) September *29,* 2018. *The* beginning balance of cash and cash equivalents is $20,289 (millions) for fiscal year 2018.

4. Compute the days' sales uncollected (rounded to one decimal) as of (*a*) September 28, 2019, and (*b*) September 29, 2018.

5. Does Apple's collection of receivables *in* part 4 show a favorable or unfavorable change?

COMPARATIVE ANALYSIS

A1

AA 6-2 Key comparative figures for **Apple** and **Google** follow.

	Apple		Google	
$ millions	Current Year	Prior Year	Current Year	Prior Year
Accounts receivable	$ 22,926	$ 23,186	$ 25,326	$ 20,838
Net sales	260,174	265,595	161,857	136,819

Required

1. Compute days' sales uncollected (rounded to one decimal) for the current year and the prior year for (*a*) Apple and (*b*) Google.
2. Which company had more success collecting receivables?

EXTENDED ANALYSIS

C2 A1

AA 6-3 Key figures for **Samsung** follow.

$ millions	Current Year	Prior Year
Cash	$ 23,069	$ 26,033
Accounts receivable	33,730	31,703
Current assets	155,634	149,896
Total assets	302,511	291,179
Current liabilities	54,728	59,274
Shareholders' equity	225,559	212,580
Net sales	197,691	209,163

Required

1. Compute cash and cash equivalents as a percent (rounded to one decimal) of total current assets, total assets, total current liabilities, and total shareholders' equity for both years.

2. Compute the percentage change (rounded to one decimal) between the current-year and prior-year cash balances.
3. Compute the days' sales uncollected (rounded to one decimal) at the end of both the (*a*) current year and (*b*) prior year.
4. Does Samsung's collection of receivables show a favorable or unfavorable change?

Discussion Questions

1. List the seven broad principles of internal control.
2. Internal control procedures are important in every business, but at what stage in the development of a business do they become especially critical?
3. Why should responsibility for related transactions be divided among different departments or individuals?
4. Why should the person who keeps the records of an asset not be the person responsible for its custody?
5. When a store purchases merchandise, why are individual departments not allowed to directly deal with suppliers?
6. What are the limitations of internal controls?
7. Which of the following assets—inventory, building, accounts receivable, or cash—is most liquid? Which is least liquid?
8. What is a petty cash receipt? Who should sign it?
9. Why should cash receipts be deposited on the day of receipt?
10. Franco Co.'s recordkeeper left town after the manager discovered that a large sum of money had been stolen. The recordkeeper had written and signed several checks made payable to her fiancé and then recorded the checks as salaries expense. The fiancé, who cashed the checks but never worked for the company, left town with the recordkeeper. The company had an uninsured loss of $184,000. Evaluate Franco's internal

control system and indicate which principles of internal control were ignored.

11. Recommend an internal control procedure for each situation: (*a*) A concession company has one employee who sells towels, coolers, and sunglasses at the beach. Each day, the employee is given enough towels, coolers, and sunglasses to last through the day and enough cash to make change. The money is kept in a box at the stand. (*b*) An antique store has one employee who is given cash and sent to garage sales each weekend. The employee pays cash for any merchandise acquired that the antique store resells.

12. Cash receipts from customers are received by the company with regular mail. The recordkeeper opens these letters and deposits the cash received each day. (**a**) Identify any internal control problem(s) in this arrangement. (**b**) What changes to its internal control system do you recommend?

13. Why would companies invest their idle cash in cash equivalents?

14. (*a*) The voucher system of control establishes procedures for what two processes? (*b*) When is the voucher initially prepared?

Beyond the Numbers

ETHICS CHALLENGE

C1

BTN 6-1 Harriet Knox, Ralph Patton, and Marcia Diamond work for a family physician, Dr. Gwen Conrad, who is in private practice. Dr. Conrad is knowledgeable about office management practices and has segregated the cash receipt duties as follows. Knox opens the mail and prepares a triplicate list of money received. She sends one copy of the list to Patton, the cashier, who deposits the receipts daily in the bank. Diamond, the recordkeeper, receives a copy of the list and posts payments to patients' accounts. About once a month the office clerks have an expensive lunch they pay for as follows. First, Patton endorses a patient's check in Dr. Conrad's name and cashes

it at the bank. Knox then destroys the remittance advice accompanying the check. Finally, Diamond posts payment to the customer's account as a miscellaneous credit. The three justify their actions by their relatively low pay and knowledge that Dr. Conrad will likely never miss the money.

Required

1. Who is the best person in Dr. Conrad's office to reconcile the bank statement?
2. Would a bank reconciliation uncover this office fraud?
3. What are some procedures to detect this type of fraud?
4. Suggest additional internal controls that Dr. Conrad could implement.

COMMUNICATING IN PRACTICE

P4

BTN 6-2 Assume you are a business consultant. The owner page 279 of a company sends you an e-mail expressing concern that the company is not taking advantage of its discounts offered by vendors. The company currently uses the gross method of recording purchases. The owner is considering a review of all invoices and payments from the previous period. Due to the volume of purchases, however, the owner recognizes that this is time-consuming and costly. The owner *seeks your advice about monitoring purchase discounts* in the future. Provide a response in memorandum form. *Hint:* It will help to review the recording of purchase discounts in Appendix 5C.

TEAMWORK IN ACTION

C1

BTN 6-3 Organize the class into teams. Each team must prepare a list of 10 internal controls a consumer could observe in a typical retail department store. When called upon, the team's spokesperson must

be prepared to share controls identified by the team that have not been shared by another team's spokesperson.

ENTREPRENEURIAL DECISION

C1 P1

BTN 6-4 Review the opening feature of this chapter that highlights Jean Liu and **Didi Chuxing** (or **DiDi**). The company plans to open a kiosk in the Ferry Building in San Francisco to sell shirts, hats, and other merchandise. Other retail outlets and expansion plans may be in the works.

Required

1. List the seven principles of internal control and explain how a retail outlet might implement each of the principles in its store.
2. Do you believe that a retail outlet will need to add controls to the business as it expands? Explain.

7 Accounting for Receivables

page 280

Chapter Preview

VALUING RECEIVABLES

C1 Sales on credit

Sales on bank card

Sales on installment

NTK 7-1

DIRECT WRITE-OFF METHOD

P1 Recording bad debts

Recovery of bad debts

When to use direct write-off

NTK 7-2

ALLOWANCE METHOD

P2 Recording and writing off bad debts

Recovery of bad debts

P3 Estimating bad debts

NTK 7-3, 7-4

NOTES RECEIVABLE

C2 Maturity and interest

P4 Accounting for notes

C3 Selling and pledging

A1 Receivable turnover

NTK 7-5

Learning Objectives

CONCEPTUAL

C1 Describe accounts receivable and how they occur and are recorded.

C2 Describe a note receivable, the computation of its maturity date, and the recording of its existence.

C3 Explain how receivables can be converted to cash before maturity.

ANALYTICAL

A1 Compute accounts receivable turnover and use it to help assess financial condition.

PROCEDURAL

P1 Apply the direct write-off method to accounts receivable.

P2 Apply the allowance method to accounts receivable.

P3 Estimate uncollectibles based on sales and accounts receivable.

P4 Record the honoring and dishonoring of a note and adjustments for interest.

Deserving Credit

"We've got something"—**NICHOLE MUSTARD**

SAN FRANCISCO—Nichole Mustard studied zoology in college. She planned to work in a lab after graduating until she found out that meant working with mice. "A bunch of mice was not a great future," laughs Nichole. Instead, Nichole completed some accounting courses, which gave her the skills to help co-found **Credit Karma** (**CreditKarma.com**), a free credit report and financial management site.

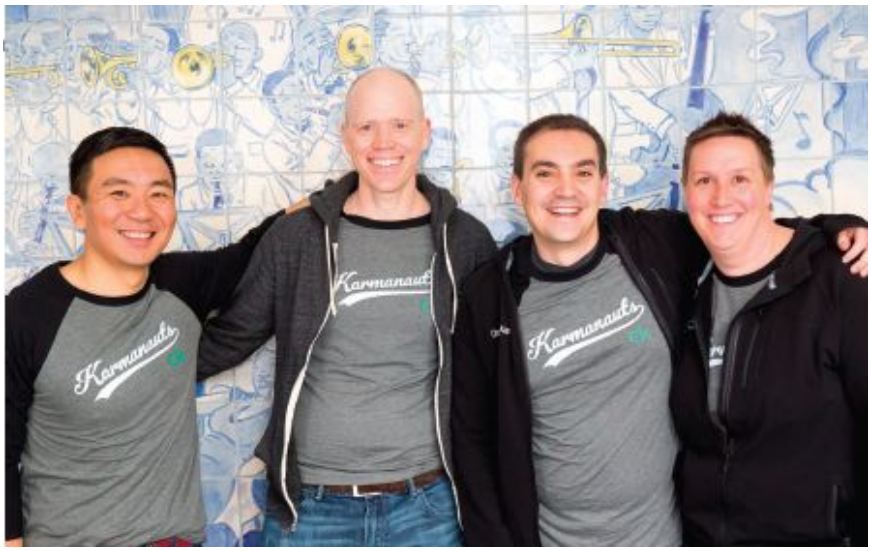
Credit Karma provides users their current credit score along with a tracking feature that shows how their credit score has changed over time. One's credit score is driven by many factors, including on-time payment history, usage of credit, number of derogatory marks, and number of accounts. Credit card companies and financial institutions use credit scores to determine whether or not to extend credit.

Nichole initially struggled with how to make money from this free service. "It was like hitting a brick wall," recalls Nichole. Things changed when Nichole began to apply predictive analytics to give recommendations on which credit cards and loans are likely to be approved. "It was like lights going on," says Nichole.

Today, financial institutions pay Credit Karma for referrals. When approving customers for use of credit cards and loans, the financial

institution has a receivable from its customer. Interest is charged for loans and past-due credit card balances.

Nichole focuses on helping others. “To do this in a way that’s really actually helping consumers and not just making money,” insists Nichole, “that feels great!”



Credit Karma, Inc.

Sources: *Credit Karma website,* January 2021; *Business Insider,* August 2018

VALUING ACCOUNTS RECEIVABLE

C1

Describe accounts receivable and how they occur and are recorded.

A *receivable* is an amount due from another party. The two most common receivables are accounts receivable and notes receivable. Other receivables include interest receivable, rent receivable, tax refund receivable, and receivables from employees.

Accounts receivable are amounts due from customers for credit sales. Exhibit 7.1 shows amounts of receivables and their percent of total assets for some well-known companies.

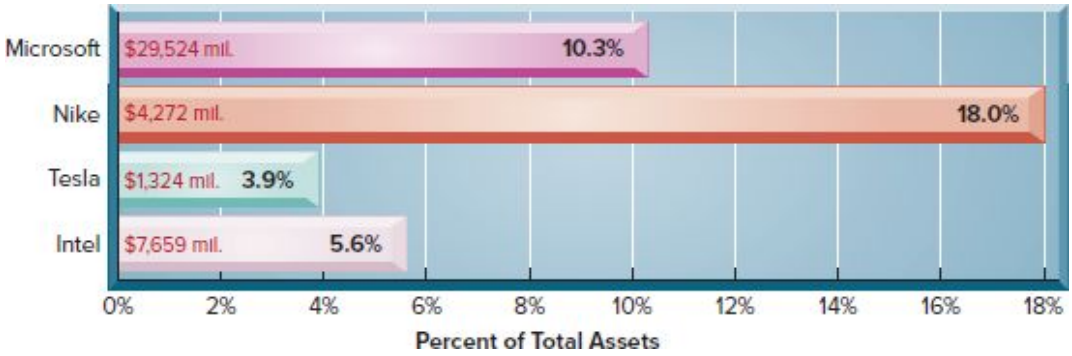


EXHIBIT 7.1

Accounts Receivable

Sales on Credit Credit sales are recorded by increasing (debiting) Accounts Receivable. The general ledger has a single Accounts Receivable account called a *control* account. A company uses a separate account for each customer to track how much that customer purchases, has already paid, and still owes. A supplementary record has a separate account for each customer and is called the *accounts receivable ledger* or *accounts receivable subsidiary ledger*.

Exhibit 7.2 shows the relation between the Accounts Receivable account in the general ledger and its customer accounts in the accounts receivable ledger for TechCom, a small wholesaler. TechCom's accounts receivable reports a $3,000 ending balance for June 30. TechCom has two credit customers: CompStore and RDA Electronics. Its *schedule of accounts receivable* shows that the $3,000 balance of the Accounts Receivable account in the general ledger equals the total of its two customers' balances in the accounts receivable ledger.

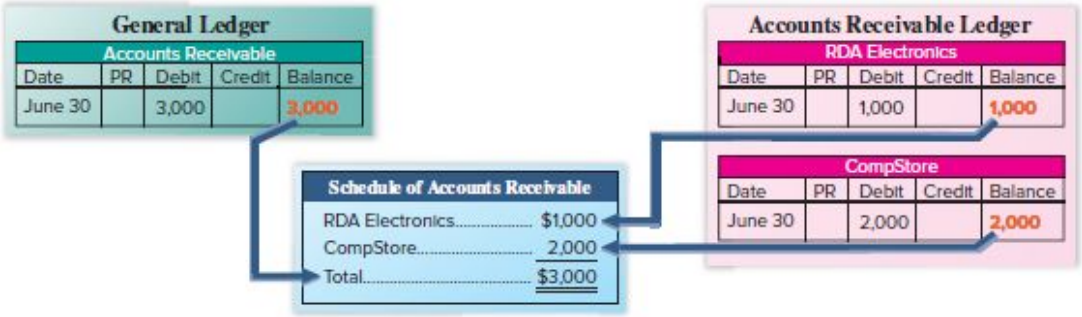


EXHIBIT 7.2

General Ledger and the Accounts Receivable Ledger (before July 1)

To see how to record accounts receivable from credit sales, page 282 we look at two transactions between TechCom and its credit customers—see Exhibit 7.3. The first is a credit sale of $950 to CompStore. The second is a collection of $720 from RDA Electronics from a prior credit sale.

Assets	=	Liabilities	+	Equity
+950				+950

Assets	=	Liabilities	+	Equity
+720				
−720				

EXHIBIT 7.3

Accounts Receivable Transactions

July 1	Accounts Receivable—CompStore	950	
	Sales		950
	*Record credit sales.**		
July 1	Cash	720	
	Accounts Receivable—RDA Electronics		720
	Record collection of credit sales.		

*We omit the entry to Dr. Cost of Sales and Cr. Inventory to focus on sales and receivables.

Exhibit 7.4 shows the general ledger and the accounts receivable ledger after recording the two July 1 transactions. The general ledger shows the effects of the sale, the collection, and the resulting balance of $3,230. These transactions are also shown in the individual customer accounts: RDA Electronics's ending balance is $280 and CompStore's ending balance is $2,950. The $3,230 total of customer accounts equals the balance of the Accounts Receivable account in the general ledger.

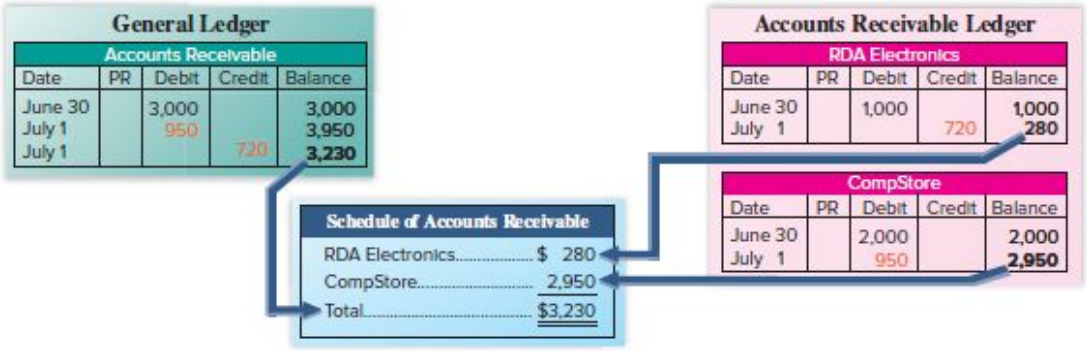


EXHIBIT 7.4

General Ledger and the Accounts Receivable Ledger (after July 1)

Sales on Bank Credit Cards Most companies allow customers to pay using bank (or third-party) credit cards, such as **Visa**, **Mastercard**, or **American Express**, and debit cards. Sellers allow customers to use credit cards and debit cards for several reasons. First, the seller does not have to decide who gets credit and how much. Second, the seller avoids the risk of customers not paying (this risk is transferred to the card company). Third, the seller typically receives cash from the card company sooner than had it granted credit directly to customers. Fourth, more credit options for customers can lead to more sales.

Point: JCPenney reported third-party credit card costs exceed $10 million.

The seller pays a fee when a card is used by the customer, often ranging from 1% to 5% of card sales. This fee reduces the cash received by the seller. If TechCom has $100 of credit card sales with a 4% fee, the entry follows. Some sellers report Credit Card Expense in the income statement as a discount subtracted from sales to get net sales. Other sellers report it as a selling expense or an administrative expense. In this text, we report credit card expense as a selling expense.

July 15	Cash	96	
	Credit Card Expense	4	
	Sales		100
	*Record credit card sales less 4% credit card expense.**		

*We omit the entry to Dr. Cost of Sales and Cr. Inventory to focus on credit card expense.

Assets	= Liabilities	+ Equity
+96		+100
		−4

Dragon Images/Shutterstock

Entrepreneur As a small retailer, you are considering allowing customers to use credit cards. Until now, your store accepted only cash. What analysis do you use to decide? ■ *Answer:*This analysis must weigh benefits versus costs. The main benefit is the potential to increase sales by attracting customers who prefer credit cards. The main cost is the fee charged by the credit card company. We must estimate the expected increase in sales from allowing credit cards and then subtract (1) normal costs and expenses and (2) card fees from the expected sales increase. If analysis shows an increase in profit, the store should probably accept credit cards.

NEED-TO-KNOW 7-1

Credit Card Sales

C1 ▶

Prepare journal entries to record the following transactions for a retailer that uses the perpetual inventory system.

Jan. 2 Sold merchandise for $1,000 (that had cost $600) and accepted the customer's AA Bank Card. AA charges a 5% fee.

6 Sold merchandise for $400 (that had cost $300) and accepted the customer's VIZA Card. VIZA charges a 3% fee.

Solution

Do More: QS 7-1, E 7-1, E 7-2

Jan. 2	Cash	950	
	Credit Card Expense*	50	
	Sales		1,000
	Record credit card sales less 5% fee.		
	**($1,000 × 0.05)*		
Jan. 2	Cost of Goods Sold	600	
	Merchandise Inventory		600
	Record cost of sales.		

Jan. 6	Cash	388	
	Credit Card Expense†	12	
	Sales		400
	Record credit card sales less 3% fee.		
	†($400 × 0.03)		
Jan. 6	Cost of Goods Sold	300	
	Merchandise Inventory		300
	Record cost of sales.		

DIRECT WRITE-OFF METHOD

P1

Apply the direct write-off method to accounts receivable.

When a company directly grants credit to customers, it expects some customers will not pay what they promised. The accounts of these customers are *uncollectible accounts,* or **bad debts.** Uncollectible accounts are an expense of selling on credit. Why do companies sell on credit if they expect uncollectible accounts? The answer is that companies believe that granting credit will increase total sales enough to offset bad debts. Companies use two methods for uncollectible accounts: (1) direct write-off method and (2) allowance method.

Recording and Writing Off Bad Debts The **direct write-off method** records the loss from an uncollectible account receivable when it is determined to be uncollectible. No attempt is made to predict bad debts expense. If TechCom determines on January 23 that it cannot collect $520 owed by its customer J. Kent, it records the loss as follows. The debit in this entry charges the uncollectible amount directly to the current period's Bad Debts Expense account. The credit removes its balance from the Accounts Receivable account.

Assets = Liabilities + Equity
−520 −520

Jan. 23	Bad Debts Expense	520	
	Accounts Receivable—J. Kent		520
	Write off an uncollectible account.		

Recovering a Bad Debt Sometimes an account written off is later collected. If the account of J. Kent that was written off directly to Bad Debts Expense is later collected in full, then we record two entries.

Assets = Liabilities + Equity
+520 +520

Assets = Liabilities + Equity
+520
−520

Mar. 11	Accounts Receivable—J. Kent	520	
	Bad Debts Expense		520
	Reinstate account previously written off.		
Mar. 11	Cash	520	
	Accounts Receivable—J. Kent.		520
	Record full payment of account.		

Using Direct Write-Off Method Many publicly traded companies and thousands of privately held companies use the direct write-off method; they include **Rand Medical Billing**, **Gateway Distributors**, **First Industrial Realty**, **New Frontier Energy**, **Globalink**, and **Sub Surface Waste Management**. The following disclosure by **Pharma-Bio Serv** is the usual justification: Bad debts are mainly accounted for using the direct write-off method . . . this method approximates that of the allowance method.

Companies weigh at least two concepts when considering use of the direct write-off method: (1) *Expense recognition*—requires expenses be reported in the same period as the sales they helped produce. (2) *Materiality* constraint—GAAP permits use of the simple, low-cost direct write-off method when its results approximate those using the allowance method.

Direct write-off method

Advantages:

- Simple
- No estimates needed

Disadvantages:

- Receivables and income temporarily overstated
- Bad debts expense often not matched with sales

NEED-TO-KNOW 7-2

Entries under Direct Write-Off Method

P1

A retailer uses the direct write-off method. Record the following transactions.

Feb. 14 The retailer determines that it cannot collect $400 of its accounts receivable from a customer named ZZZ Company.

Apr. 1 ZZZ Company unexpectedly pays its account in full to the retailer, which then records its recovery of this bad debt.

Solution

Feb. 14	Bad Debts Expense	400	
	Accounts Receivable—ZZZ Co.		400
	Write off an account.		
Apr. 1	Accounts Receivable—ZZZ Co.	400	
	Bad Debts Expense		400
	Reinstate an account previously written off.		
Apr. 1	Cash	400	
	Accounts Receivable—ZZZ Co.		400
	Record cash received on credit.		

Do More: QS 7-2, QS 7-3, E 7-4

ALLOWANCE METHOD

P2

Apply the allowance method to accounts receivable.

The **allowance method** for bad debts matches the *estimated* loss from uncollectible accounts receivable against the sales they helped produce. We use estimated losses because when sales occur, sellers do not know which customers will not pay. This means that at the end of each period, the allowance method requires an estimate of the total bad debts expected from that period's sales. This method has two advantages over the direct write-off method: (1) It records estimated bad debts expense in the period when the related sales are recorded

and (2) it reports accounts receivable on the balance sheet at the estimated amount to be collected.

Recording Bad Debts Expense The allowance method estimates bad debts expense at the end of each accounting period and records it with an adjusting entry. TechCom had credit sales of $300,000 in its first year of operations. At the end of the first year, $20,000 of credit sales were uncollected. TechCom estimates that $1,500 of its accounts receivable is uncollectible and makes the following adjusting entry. (*How to estimate bad debts is explained in the next section.*)

Method	Bad Debts Expense Recorded . . .
Direct write-off. . .	*In future*, when accounts are uncollectible.
Allowance.	*Currently*, using estimated uncollectibles.

Dec. 31	Bad Debts Expense	1,500	
	Allowance for Doubtful Accounts		1,500
	Record estimated bad debts.		

Assets = Liabilities + Equity
−1,500 −1,500

The estimated Bad Debts Expense of $1,500 is reported on the income statement (as either a selling expense or an administrative expense). The **Allowance for Doubtful Accounts** is a contra asset account. TechCom's account balances for Accounts Receivable and the Allowance for Doubtful Accounts follow.

Accounts Receivable		
Dec. 31	20,000	

Allowance for Doubtful Accounts		
	Dec. 31	1,500

Allowance method

Advantages:

- **Receivables fairly stated**
- **Bad debts expense matched with sales**
- **Writing off bad debt does not affect net receivables or income**

Disadvantages:

- **Estimates needed**

The Allowance for Doubtful Accounts credit balance of $1,500 reduces accounts receivable to its **realizable value,** which is the amount

expected to be received. Although credit customers owe $20,000 to TechCom, only $18,500 is expected from customers. (TechCom still bills its customers for $20,000.) In the balance sheet, the Allowance for Doubtful Accounts is subtracted from Accounts Receivable and is reported in either of the following ways.

Current assets		
Accounts receivable	$20,000	
Less allowance for doubtful accounts	1,500	$18,500

or

Current assets	
Accounts receivable (net of $1,500 doubtful accounts)	$18,500

Writing Off a Bad Debt When specific accounts become uncollectible, they are written off against the Allowance for Doubtful Accounts. TechCom decides that J. Kent's $520 account is uncollectible and makes the following entry to write it off.

Jan. 23	Allowance for Doubtful Accounts	520	
	Accounts Receivable—J. Kent		520
	Write off an uncollectible account.		

Assets = Liabilities + Equity
+520
−520

Point: Bad Debts Expense is not debited in the write-off because it was recorded in the period when sales occurred.

This entry removes $520 from the Accounts Receivable account (and the subsidiary ledger). The general ledger accounts appear as follows.

page 286

Accounts Receivable			
Dec. 31	20,000	Jan. 23	520

Allowance for Doubtful Accounts			
Jan. 23	520	Dec. 31	1,500

The write-off does *not* affect the realizable value of accounts receivable; see Exhibit 7.5. Neither total assets nor net income is affected by the write-off of a specific account. Instead, both assets and net income are affected in the period when bad debts expense is predicted and recorded with an adjusting entry.

	Before Write-Off	After Write-Off
Accounts receivable	$ 20,000	$ 19,480
Less allowance for doubtful accounts	1,500	980
Realizable value of accounts receivable	$18,500	$18,500

EXHIBIT 7.5

Before and After Write-Off of a Bad Debt

Exhibit 7.6 portrays the allowance method. It shows the creation of the allowance for future write-offs—adding to a cookie jar. It also shows the decrease of the allowance through write-offs—taking cookies from the jar.

EXHIBIT 7.6

Allowance for Doubtful Accounts

Recovering a Bad Debt If an account that was written off is later collected, two entries are made. The first is to reverse the write-off and reinstate the customer's account. The second is to record the collection of the reinstated account. If on March 11 Kent pays in full his account previously written off, the entries are

Mar. 11	Accounts Receivable—J. Kent	520	
	Allowance for Doubtful Accounts		520
	Reinstate account previously written off.		
Mar. 11	Cash	520	
	Accounts Receivable—J. Kent.		520
	Record full payment of account.		

Kent paid the entire amount previously written off, but sometimes a customer pays only a portion. If we believe this customer will later pay in full, we return the entire amount owed to accounts receivable (in the first entry only). If we expect no further collection, we return only the amount paid.

Assets = Liabilities + Equity
+520
−520

Assets = Liabilities + Equity
+520
−520

Elnur/Shutterstock

Customer Analytics Financial institutions and credit card companies use data analytics to predict the risk of extending credit to customers. When evaluating a customer, they use analytics that include credit scores, income, employment, and payment history. ■

NEED-TO-KNOW 7-3

Entries under Allowance Method

P2

A retailer uses the allowance method. Record the following transactions.

Dec. 31 The retailer estimates $3,000 of its accounts receivable are uncollectible at its year-end.

Feb. 14 The retailer determines that it cannot collect $400 of its accounts receivable from a customer named ZZZ Company.

Apr. 1 ZZZ Company unexpectedly pays its account in full to the retailer, which then records its recovery of this bad debt.

Do More: QS 7-4, QS 7-5, QS 7-6, E 7-5, E 7-6, E 7-7, E 7-8

Solution

Dec. 31	Bad Debts Expense	3,000	
	Allowance for Doubtful Accounts		3,000
	Record estimated bad debts.		
Feb. 14	Allowance for Doubtful Accounts	400	
	Accounts Receivable—ZZZ Co.		400
	Write off an account.		

Apr. 1	Accounts Receivable—ZZZ Co.	400	
	Allowance for Doubtful Accounts		400
	Reinstate an account previously written off.		
Apr. 1	Cash	400	
	Accounts Receivable—ZZZ Co.		400
	Record cash received on credit.		

ESTIMATING BAD DEBTS FOR ALLOWANCE METHOD

P3

Estimate uncollectibles based on sales and accounts receivable.

Bad debts expense is estimated under the allowance method. This section covers methods for estimating bad debts expense.

Percent of Sales Method

The *percent of sales method,* or *income statement method,* assumes that a percent of credit sales for the period is uncollectible. For example, Musicland has credit sales of $400,000 in 2021. Musicland estimates 0.6% of credit sales to be uncollectible. This means Musicland expects $2,400 of bad debts expense from its sales ($400,000 × 0.006) and makes the following adjusting entry.

Dec. 31	Bad Debts Expense	2,400	
	Allowance for Doubtful Accounts		2,400
	Record estimated bad debts.		

Assets = Liabilities + Equity
−2,400 −2,400

Allowance for Doubtful Accounts, a balance sheet account, is not closed at period-end. Unless a company is in its first period of operations, its Allowance for Doubtful Accounts balance rarely equals the Bad Debts Expense balance. (When computing bad debts expense as a percent of sales, managers monitor and adjust the percent so it is not too high or too low.)

Point: When using the percent of sales method for estimating uncollectibles, and because the "Unadj. bal." in Bad Debts Expense is always $0, the adjusting entry amount always equals the % of sales.

Percent of Receivables Method

The *percent of accounts receivable method,* a *balance sheet method,* assumes that a percent of a company's receivables is uncollectible. This percent is based on experience and economic trends. Total receivables is multiplied by this percent to get the estimated uncollectible amount as reported in the balance sheet as Allowance for Doubtful Accounts.

Assume Musicland has $50,000 of accounts receivable on December 31, 2021. It estimates 5% of its receivables is uncollectible. This means that *after* the adjusting entry is posted, we want the Allowance for Doubtful Accounts to show a $2,500 credit balance (5% of $50,000). Musicland's beginning balance is $2,200 on December 31, 2020—see Exhibit 7.7.

EXHIBIT 7.7

Allowance for Doubtful Accounts after Bad Debts Adjusting Entry

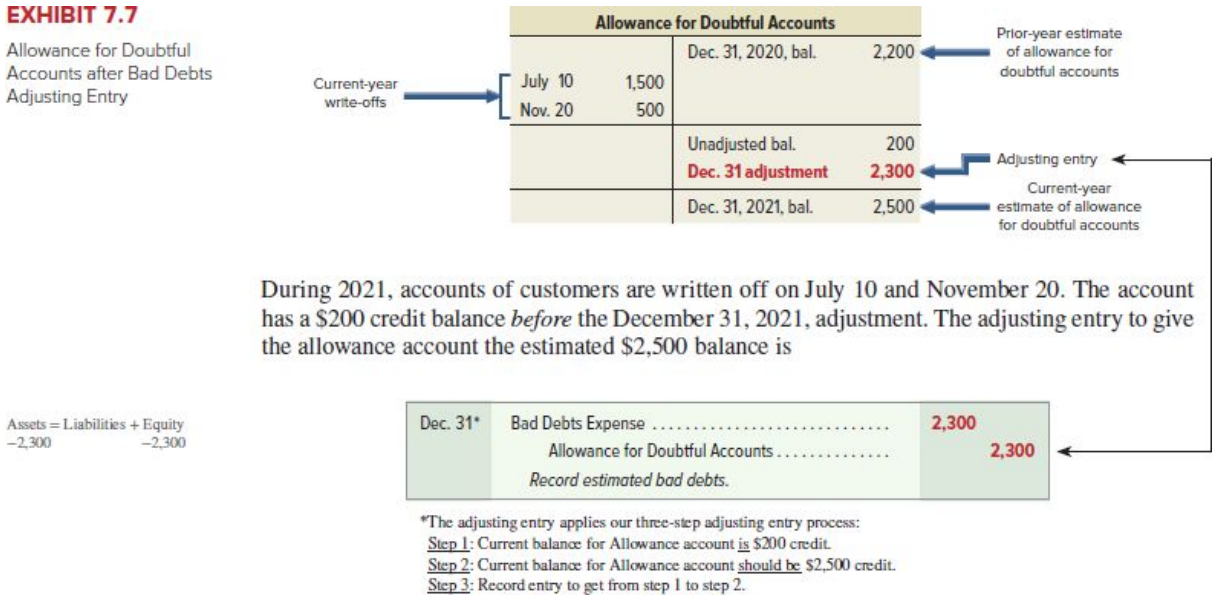


EXHIBIT 7.7

Allowance for Doubtful Accounts after Bad Debts Adjusting Entry

During 2021, accounts of customers are written off on July 10 and November 20. The account has a $200 credit balance *before* the December 31, 2021, adjustment. The adjusting entry to give the allowance account the estimated $2,500 balance is

Aging of Receivables Method

The **aging of accounts receivable** method, another *balance sheet method,* is applied like the percent of receivables method except that several percentages are used (versus one) to estimate the allowance. Each receivable is classified by how long it is past its due date. Then-estimates of uncollectible amounts are made assuming that the longer an amount is past due, the more likely it is uncollectible. After the amounts are classified (or aged), experience is used to estimate the percent of each uncollectible class. These percents are multiplied by the amounts in each class to get the estimated balance of the Allowance for Doubtful Accounts. An example schedule is shown in Exhibit 7.8.

Exhibit 7.8 lists each customer's balance assigned to one of five classes based on its days past due. The amounts in each class are totaled and multiplied by the estimated percent of uncollectible accounts for each class. To explain, Musicland has $3,700 in accounts receivable that are 31 to 60 days past due. Management estimates 10% of the amounts in this class are uncollectible, or a total of $370 ($3,700 × 10%). Similar analysis is done for each class. The final total of $2,270 ($740 + $325 + $370 + $475 + $360) shown in the first column is the estimated balance for the Allowance for Doubtful Accounts.

Each receivable is grouped by how long it is past its due date.

Each age group is multiplied by its estimated bad debts percent.

Estimated bad debts for each group are totaled.

MUSICLAND
Schedule of Accounts Receivable by Age
December 31, 2021

Customer	Totals	Not Yet Due	1 to 30 Days Past Due	31 to 60 Days Past Due	61 to 90 Days Past Due	Over 90 Days Past Due
Carlie Abbott	$ 5,890	$ 5,890				
Jamie Allen	710			$ 710		
Chavez Andres	10,500	10,300	$ 200			
Balicia Company	2,800				$1,900	$ 900
Texas Rawhide	9,100		6,110	2,990		
Zem Services	21,000	20,810	190			
Total receivables	$50,000	$37,000	$6,500	$3,700	$1,900	$ 900
Percent uncollectible		× 2%	× 5%	× 10%	× 25%	× 40%
Estimated uncollectible	$ 2,270	$ 740	$ 325	$ 370	$ 475	$ 360

EXHIBIT 7.8

Aging of Accounts Receivable

Unadjusted Credit Balance in the Allowance Account Exhibit 7.9 shows that because the allowance account has an unadjusted credit balance of $200, the required adjustment to the Allowance for Doubtful Accounts is $2,070. (We can use a T-account for this analysis as shown to the side.) This analysis yields the following end-of-period adjusting entry.

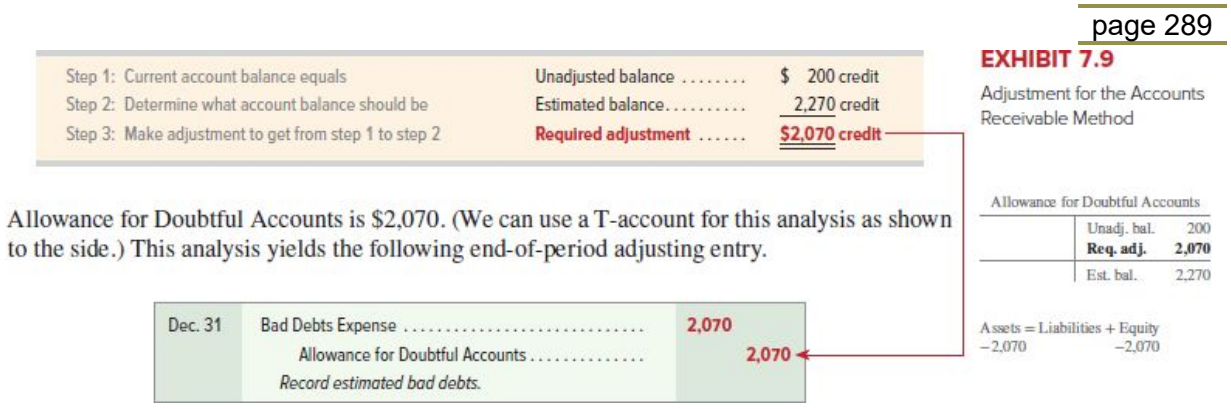


EXHIBIT 7.9

Adjustment for the Accounts Receivable Method

Point: A debit balance implies that write-offs for that period exceed the total allowance.

Unadjusted Debit Balance in the Allowance Account If the allowance account had an unadjusted *debit* balance of $500 instead of the $200 credit balance, its required adjustment would be computed as follows.

The entry to record the end-of-period adjustment is

Estimating Bad Debts—Summary of Methods Exhibit 7.10 summarizes the three estimation methods. The aging of accounts

receivable method focuses on specific accounts and is usually the most reliable of the estimation methods.

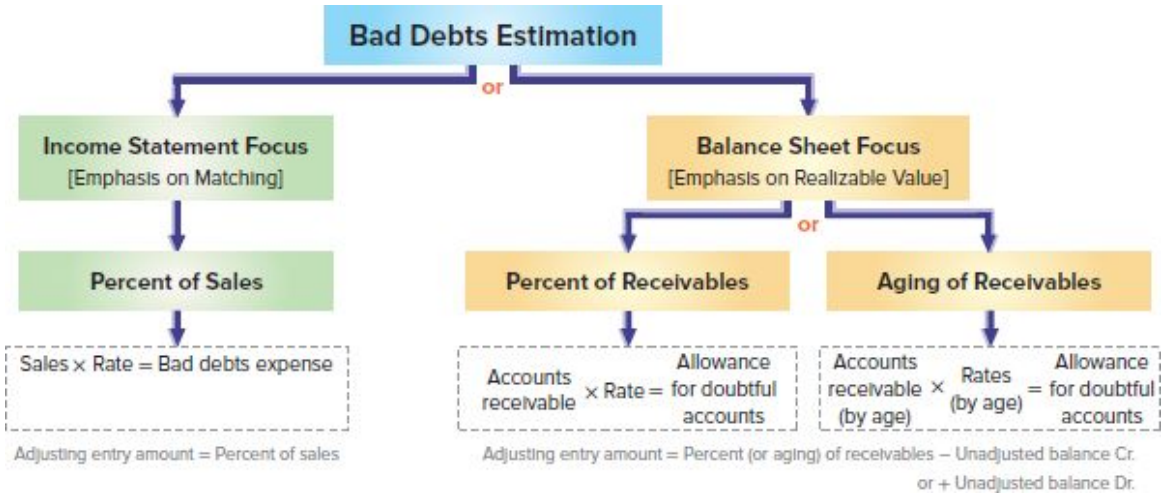


EXHIBIT 7.10

Methods to Estimate Bad Debts under the Allowance Method

Bogdanhoda/Shutterstock

Decision Maker

Labor Union One week prior to labor contract negotiations, financial statements are released showing no income growth. A 10% growth was predicted. Your analysis finds that the company increased its allowance for uncollectibles from 1.5% to 4.5% of receivables. Without this change, income would show a 9% growth. Does this analysis impact negotiations? ■ *Answer:* Yes, this information is likely to impact negotiations. The obvious question is why the company greatly increased this allowance. The large increase means a substantial increase in bad debts expense and a decrease in earnings. This change (coming prior to labor negotiations) also raises concerns because it reduces labor's bargaining power. We want to ask management for documentation justifying this increase.

NEED-TO-KNOW 7-4

Estimating Bad Debts

P3

At its December 31 year-end, a company estimates uncollectible accounts using the allowance method.

1. It prepared the following aging of receivables analysis. (a) Estimate the balance of the Allowance for Doubtful Accounts using the aging of accounts receivable method. (b) Prepare the adjusting entry to record bad debts expense using the estimate from part *a*. Assume the unadjusted balance in the Allowance for Doubtful Accounts is a $10 debit.

		Days Past Due				
	Total	0	1 to 30	31 to 60	61 to 90	Over 90
Accounts receivable	$2,600	$2,000	$300	$80	$100	$120
Percent uncollectible		1%	2%	5%	7%	10%

2. Refer to the data in part 1. (a) Estimate the balance of the Allowance for Doubtful Accounts assuming the company uses 2% of total accounts receivable to estimate uncollectibles instead of the aging of receivables method in part 1. (b) Prepare the adjusting entry to record bad debts expense using the estimate from part 2*a*. Assume the unadjusted balance in the Allowance for Doubtful Accounts is a $4 credit.

3. Refer to the data in part 1. (a) Estimate the balance of the uncollectibles assuming the company uses 0.5% of annual credit sales (annual credit sales were $10,000). (b) Prepare the adjusting entry to record bad debts expense using the estimate from part 3*a*. Assume the unadjusted balance in the Allowance for Doubtful Accounts is a $4 credit.

Solutions

1a. Computation of the estimated balance of the allowance for uncollectibles.

Not due	$2,000 × 0.01 =	$20
1 to 30	300 × 0.02 =	6
31 to 60	80 × 0.05 =	4
61 to 90	100 × 0.07 =	7
Over 90	120 × 0.10 =	12
		$49 credit

1b.

1b.

Dec. 31	Bad Debts Expense	59	
	Allowance for Doubtful Accounts		59
	*Record estimated bad debts.**		

Allowance for Doubtful Accounts

Unadj. Dec. 31	10		
		Adj. Dec. 31	**59**
		Est. bal. Dec. 31	49

Step 1:	Current account balance equals	*Unadjusted balance	$10 debit
Step 2:	Determine what account balance should be	Estimated balance	49 credit
Step 3:	Make adjustment to get from step 1 to step 2	Required adjustment	$59 credit

2a. Computation of the estimated balance of the allowance for uncollectibles.

$$\$2{,}600 \times 0.02 = \$52 \text{ credit}$$

2b.

Dec. 31	Bad Debts Expense	48	
	Allowance for Doubtful Accounts		48
	*Record estimated bad debts.**		

Allowance for Doubtful Accounts

		Unadj. Dec. 31	4
		Adj. Dec. 31	**48**
		Est. bal. Dec. 31	52

Step 1:	Current account balance equals	*Unadjusted balance	$ 4 credit
Step 2:	Determine what account balance should be	Estimated balance	52 credit
Step 3:	Make adjustment to get from step 1 to step 2	Required adjustment	$48 credit

3a. Computation of the estimated balance of the bad debts expense.

$$\$10{,}000 \times 0.005 = \$50 \text{ credit}$$

3b.

Dec. 31	Bad Debts Expense	50	
	Allowance for Doubtful Accounts		50
	Record estimated bad debts.		

Do More: QS 7-7, QS 7-8, QS 7-9, E 7-9, E 7-10, E 7-11, E 7-12, E 7-13, E 7-14

Do More: QS 7-7, QS 7-8, QS 7-9, E 7-9, E 7-10, E 7-11, E 7-12, E 7-13, E 7-14

C2

Describe a note receivable, the computation of its maturity date, and the recording of its existence.

A **promissory note** is a written promise to pay a specified amount, usually with interest, either on demand or at a stated future date. Promissory notes are used in many transactions, including paying for products and services and lending and borrowing money. Sellers sometimes ask for a note to replace an account receivable when a customer requests more time to pay a past-due account. Sellers prefer notes when the credit period is long and when the receivable is for a large amount. If a lawsuit is needed to collect from a customer, a note is the customer's written promise to pay the debt, its amount, and its terms.

Exhibit 7.11 shows a promissory note dated July 10, 2021. For this note, Julia Browne promises to pay TechCom or to its order a specified amount ($1,000), called the **principal of a note,** at a stated future date (October 8, 2021). As the one who signed the note and promised to pay it, Browne is the **maker of the note.** As the person to whom the note is payable, TechCom is the **payee of the note.** To Browne, the note is a liability called a *note payable*. To TechCom, the same note is an asset called a *note receivable*. This note's interest rate is 12%, as written on the note. **Interest** is the charge for using the money until its due date. To a borrower, interest is an expense. To a lender, it is revenue.

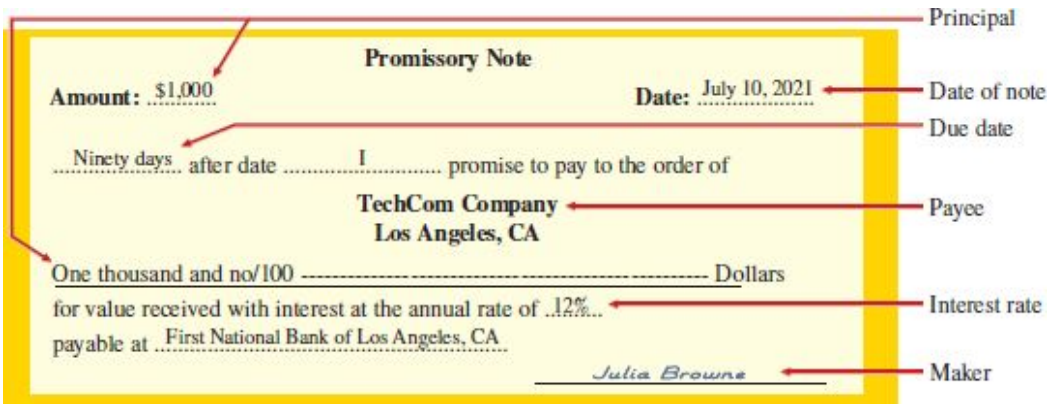


EXHIBIT 7.11

Promissory Note

Computing Maturity and Interest

This section covers a note's maturity date, period covered, and interest computation.

Maturity Date and Period The **maturity date of a note** is the day the note (principal and interest) must be repaid. The *period* of a note is the time from the note's (contract) date to its maturity date. Many notes mature in less than a full year, and the period they cover is often-expressed in days. As an example, a 90-day note dated July 10 matures on October 8. This count is shown in Exhibit 7.12. The period of a note is sometimes expressed in months or years. When months are used, the note is payable in the month of its maturity on the *same day of the month* as its original date. A nine-month note dated July 10, for example, is payable on April 10. The same rule applies when years are used.

Point: When counting days, omit the day a note is issued, but count the due date.

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EXHIBIT 7.12

Maturity Date Computation

Days in July	31	
Minus the date of the note	10	
Days remaining in July	21	← July 11–31
Add days in August	31	← Aug. 1–31
Add days in September	30	← Sep. 1–30
Days to equal 90 days, or **maturity date of October 8**	8	← Oct. 1–8
Period of the note in days	90	

EXHIBIT 7.12

Maturity Date Computation

Interest Computation *Interest* is the cost of borrowing money for the borrower and the profit from lending money for the lender. Unless otherwise stated, the rate of interest on a note is the rate charged for the use of principal for one year (*annual rate*). The formula for-computing interest on a note is in Exhibit 7.13.

Point: Excel for maturity date.

	A	B
1	Note date	10-Jul
2	# of days	90
3	Maturity	

=B1+B2 = 8-Oct

EXHIBIT 7.13

Computation of Interest

Principal of the note	×	Annual interest rate	×	Time expressed in fraction of year	=	Interest

To simplify interest computations, a year is commonly treated as having 360 days (called the *banker's rule* and widely used in business transactions). **We treat a year as having 360 days for interest computations in examples and assignments.** Using the promissory note in Exhibit 7.11, where we have a 90-day, 12%, $1,000 note, the total interest follows.

$$\$1{,}000 \times 12\% \times \frac{90}{360} = \$1{,}000 \times 0.12 \times 0.25 = \$30$$

Point: If the banker's rule is not used, interest is $29.589041. The banker's rule yields $30, which is easier to account for than $29.589041.

Recording Notes Receivable

Notes receivable are usually recorded in a single Notes Receivable account to simplify record-keeping. To show how we record receipt of a note, we use the $1,000, 90-day, 12% promissory note in Exhibit 7.11. TechCom received this note at the time of a product sale to Julia Browne. This is recorded as

Assets = Liabilities + Equity
+1,000 +1,000

July 10*	Notes Receivable	1,000	
	Sales		1,000
	Sold goods in exchange for a 90-day, 12% note.		

*We omit the entry to Dr. Cost of Sales and Cr. Inventory to focus on sales and receivables.

When a seller accepts a note from an overdue customer to grant a time extension on a past-due account receivable, it often will collect

part of the past-due balance in cash. Assume that TechCom agreed to accept $232 in cash along with a $600, 60-day, 15% note from Jo Cook to settle her $832 past-due account. TechCom makes the following entry.

Assets = Liabilities + Equity
+232
+600
−832

Oct. 5	Cash	232	
	Notes Receivable	600	
	Accounts Receivable—J. Cook		832
	Received cash and note to settle account.		

page 293

Valuing and Settling Notes

P4

Record the honoring and dishonoring of a note and adjustments for interest.

Recording an Honored Note The principal and interest of a note are due on its maturity date. The maker of the note usually *honors* the note and pays it in full. When J. Cook pays the note above on its due date, TechCom records it as follows. Interest revenue is reported on the income statement.

Dec. 4	Cash	615	
	Notes Receivable		600
	Interest Revenue		15
	Collect note with interest of $600 × 15% × 60/360.		

Assets = Liabilities + Equity
+615 +15
−600

Recording a Dishonored Note When a note's maker does not pay at maturity, the note is *dishonored.* Dishonoring a note does not mean the maker no longer has to pay. The payee still tries to collect. How do companies report this? The balance of the Notes Receivable-account should only include notes that have not matured. When a note is dishonored, we remove the amount of this note from Notes Receivable and charge it to an account receivable from its maker. Assume that J. Cook dishonors the note at maturity. The following records the dishonoring of the note.

Dec. 4	Accounts Receivable—J. Cook	615	
	Interest Revenue		15
	Notes Receivable		600
	Charge account of J. Cook for a dishonored note and interest of $600 × 15% × 60/360.		

Assets = Liabilities + Equity
+615 +15
−600

Point: Maturity value of a note equals principal plus interest earned.

Charging a dishonored note to accounts receivable does two things. First, it removes the note from the Notes Receivable account and records the dishonored note in the maker's account. Second, if the maker of the dishonored note asks for credit in the future, his or her account will show the dishonored note.

Recording End-of-Period Interest Adjustment When notes receivable are outstanding at period-end, any accrued interest is recorded. Assume on December 16 TechCom accepts a $3,000, 60-day, 12% note from a customer. When TechCom's accounting period ends on December 31, $15 of interest has accrued on this note ($3,000 × 12% × 15/360). The following adjusting entry records this revenue.

Dec. 31	Interest Receivable	15	
	Interest Revenue		15
	Record accrued interest earned.		

Assets = Liabilities + Equity
+15 +15

Interest revenue is on the income statement, and interest receivable is on the balance sheet as a current asset. When the December 16 note is collected on February 14, TechCom's entry to record the cash receipt is

Feb. 14	Cash	3,060	
	Interest Revenue		45
	Interest Receivable		15
	Notes Receivable		3,000
	Received payment of note and its interest.		

Assets = Liabilities + Equity
+3,060 +45
−15
−3,000

Total interest on the 60-day note is $60 ($3,000 × 12% × 60/360). The $15 credit to Interest Receivable is the collection of interest accrued from the December 31 entry. The $45 interest revenue is from holding the note from January 1 to February 14.

NEED-TO-KNOW 7-5

Honoring and Dishonoring Notes

C2 P4

Ace Company purchases $1,400 of merchandise from Zitco on December 16. Zitco accepts Ace's $1,400, 90-day, 12% note as payment. Zitco's accounting period ends on December 31.

a. Prepare entries for Zitco on December 16 and December 31.

b. Prepare Zitco's March 16 entry if Ace dishonors the note.

c. Instead of the facts in part *b*, prepare Zitco's March 16 entry if Ace honors the note.

d. Assume the facts in part *b* (Ace dishonors the note). Then, on March 31, Zitco writes off the receivable from Ace Company. Prepare that write-off entry assuming that Zitco uses the allowance method.

Do More: QS 7-11 through 7-17, E 7-18 through E 7-21

Solution

a.

Dec. 16	Notes Receivable—Ace	1,400	
	Sales[†]		1,400
Dec. 31	Interest Receivable	7	
	Interest Revenue *($1,400 × 12% × 15/360)*		7

b.

Mar. 16	Accounts Receivable—Ace	1,442	
	Interest Revenue *($1,400 × 12% × 75/360)*		35
	Interest Receivable		7
	Notes Receivable—Ace		1,400

c.

Mar. 16	Cash	1,442	
	Interest Revenue		35
	Interest Receivable		7
	Notes Receivable—Ace		1,400

d.

Mar. 31	Allowance for Doubtful Accounts....	1,442	
	Accounts Receivable—Ace		1,442

The entry for Cost of Goods Sold is not shown as cost of merchandise is not provided.

Disposal of Receivables

C3

Explain how receivables can be converted to cash before maturity.

Companies convert receivables to cash before they are due if they need cash or do not want to deal with collecting receivables. This is usually done by (1) selling them or (2) using them as security for a loan.

Selling Receivables A company can sell its receivables to a finance company or bank. The buyer, called a *factor,* acquires ownership of the receivables and receives cash when they come due. The seller is charged a *factoring fee*. By incurring a factoring fee, the seller gets cash earlier and can pass the risk of bad debts to the factor. The seller also avoids costs of billing and accounting for receivables. If TechCom sells $20,000 of its accounts receivable and is charged a 4% factoring fee, it records this sale as follows.

Assets = Liabilities + Equity
+19,200 −800
−20,000

Aug. 15	Cash	19,200	
	Factoring Fee Expense.....	800	
	Accounts Receivable.....		20,000
	Sold accounts receivable for cash less 4% fee.		

Pledging Receivables A company can borrow money by *pledging* its receivables as security for the loan. If the borrower defaults on (does not pay) the loan, the lender is paid from the cash receipts of the receivables. The borrower discloses pledging receivables in financial statement footnotes. If TechCom borrows $35,000 and pledges its receivables as security, it records

Assets = Liabilities + Equity
+35,000 + 35,000

Aug. 20	Cash	35,000	
	Notes Payable		35,000
	Borrow with a note secured by pledging receivables.		

Decision Maker

Analyst/Auditor You are reviewing accounts receivable of a coffee grower. Over the past five years, the allowance account as a percentage of gross accounts receivable shows a steady downward trend. What does this finding suggest? ■ *Answer: The downward trend means the company is reducing the relative amount charged to bad debts expense each year. This* action could be to increase net income. Alternatively, collections may have improved and fewer bad debts are justified.

Saravutpics/Shutterstock

Decision Analysis — Accounts Receivable Turnover

Accounts receivable turnover helps assess the quality and page 295 liquidity of receivables. *Quality* of receivables is the likelihood of collection without loss. *Liquidity* of receivables is the speed of collection. **Accounts receivable turnover** measures how often, on average, receivables are collected during the period and is defined in Exhibit 7.14.

$$\text{Accounts receivable turnover} = \frac{\text{Net sales}}{\text{Average accounts receivable, net}}$$

EXHIBIT 7.14

Accounts Receivable Turnover

The denominator is the *average* accounts receivable, net balance, computed as (Beginning balance + Ending balance) ÷ 2. TechCom has an accounts receivable turnover of 5.1. This means its average

accounts receivable balance is converted into cash 5.1 times during the period, which is pictured here.

A1

Compute accounts receivable turnover and use it to help assess financial condition.

Accounts receivable turnover shows how well management is doing in granting credit to customers. A high turnover suggests that management should consider using less strict credit terms to increase sales. A low turnover suggests management should consider more strict credit terms and more aggressive collection efforts to avoid having assets tied up in accounts receivable.

Exhibit 7.15 shows accounts receivable turnover for **Visa** and **Mastercard**. Visa's current-year turnover is 16.7, computed as $22,977/$1,375 ($ millions). This means that Visa's average accounts receivable balance was converted into cash 16.7 times in the current year. Its turnover slightly decreased in the current year (16.7) compared with one year ago (17.6). Visa's turnover also exceeds that for Mastercard in each of these three years. Both Visa and Mastercard seem to be doing an adequate job of managing receivables.

Company	Figure ($ millions)	Current Year	1 Year Ago	2 Years Ago
Visa	Net sales	$22,977	$20,609	$18,358
	Average accounts receivable, net	$ 1,375	$ 1,170	$ 1,087
	Accounts receivable turnover	16.7	17.6	16.9
Mastercard	Net sales	$16,883	$14,950	$12,497
	Average accounts receivable, net	$ 2,395	$ 2,123	$ 1,693
	Accounts receivable turnover	7.0	7.0	7.4

EXHIBIT 7.15

System Principles

Decision Maker

Dietitian Your private practice is barely profitable, so you hire an analyst. The analyst says, *"Accounts receivable turnover is too low. Tighter credit policies are recommended along with discontinuing service to those most delayed in payments."* What actions do you take? ■ *Answer:* Both suggestions are probably financially wise recommendations, but we may be troubled by eliminating services to those less able to pay. One alternative is to follow the recommendations but start a care program directed at clients less able to pay for services. This allows you to continue services to clients less able to pay and to discontinue services to clients able but unwilling to pay.

NEED-TO-KNOW 7-6

COMPREHENSIVE

Recording Accounts and Notes Receivable Transactions; Estimating Bad Debts

Clayco Company completes the following transactions during the year.

July 14 Writes off a $750 account receivable arising from a sale to Briggs Company that dates to 10 months ago. (Clayco Company uses the allowance method.)

30 Clayco Company receives a $1,000, 90-day, 10% note in exchange for merchandise sold to Sumrell Company (the merchandise cost $600).

Aug. 15 Receives $2,000 cash plus a $10,000 note from JT Co. in exchange for merchandise that sells for $12,000 (its cost is $8,000). The note is dated August 15, bears 12% interest, and matures in 120 days.

Nov. 1 Completes a $200 credit card sale with a 4% fee (the cost of sales is $150). The cash is transferred immediately from the credit card company.

3 Sumrell Company refuses to pay the note that was due to Clayco Company on October 28. Prepare the journal entry to charge the dishonored note plus accrued interest to Sumrell Company's accounts receivable.

5 Completes a $500 credit card sale with a 5% fee (the cost of sales is $300). The cash is transferred immediately from the credit card company.

15 Receives the full amount of $750 from Briggs Company that was previously written off on July 14. Record the bad debts recovery.

Dec. 13 Receives payment of principal plus interest from JT for the August 15 note.

Required

1. Prepare Clayco Company's journal entries to record these transactions.

2. Prepare a year-end adjusting journal entry as of December 31 for each separate situation.

a. Bad debts are estimated to be $20,400 by aging accounts receivable. The unadjusted balance of the Allowance for Doubtful Accounts is a $1,000 debit.

b. Alternatively, assume that bad debts are estimated using the percent of sales method. The Allowance for Doubtful Accounts had a $1,000 debit balance before adjustment, and the company estimates bad debts to be 1% of its credit sales of $2,000,000.

SOLUTION

1.

July 14	Allowance for Doubtful Accounts	750	
	Accounts Receivable—Briggs Co.		750
	Wrote off an uncollectible account.		
July 30	Notes Receivable—Sumrell Co.	1,000	
	Sales		1,000
	Sold merchandise for a 90-day, 10% note.		
July 30	Cost of Goods Sold	600	
	Merchandise Inventory		600
	Record the cost of July 30 sale.		
Aug. 15	Cash	2,000	
	Notes Receivable—JT Co.	10,000	
	Sales		12,000
	Sold merchandise for $2,000 cash and $10,000 note.		
Aug. 15	Cost of Goods Sold	8,000	
	Merchandise Inventory		8,000
	Record the cost of Aug. 15 sale.		
Nov. 1	Cash	192	
	Credit Card Expense	8	
	Sales		200
	Record credit card sale less a 4% credit card expense.		
Nov. 1	Cost of Goods Sold	150	
	Merchandise Inventory		150
	Record the cost of Nov. 1 sale.		

Nov. 3	Accounts Receivable—Sumrell Co.	1,025	
	Interest Revenue		25
	Notes Receivable—Sumrell Co.		1,000
	Charge account of Sumrell Co. for a $1,000 dishonored note and interest of $1,000 × 10% × 90/360.		
Nov. 5	Cash	475	
	Credit Card Expense	25	
	Sales		500
	Record credit card sale less a 5% credit card expense.		
Nov. 5	Cost of Goods Sold	300	
	Merchandise Inventory		300
	Record the cost of Nov. 5 sale.		
Nov. 15	Accounts Receivable—Briggs Co.	750	
	Allowance for Doubtful Accounts		750
	Reinstate account of Briggs Co. previously written off.		
Nov. 15	Cash	750	
	Accounts Receivable—Briggs Co.		750
	Cash received in full payment of account.		
Dec. 13	Cash	10,400	
	Interest Revenue		400
	Notes Receivable—JT Co.		10,000
	Collect note with interest of $10,000 × 12% × 120/360.		

2a. Aging of accounts receivable method.

Dec. 31	Bad Debts Expense	21,400	
	Allowance for Doubtful Accounts		21,400
	Adjust allowance account from a $1,000 debit balance to a $20,400 credit balance.		

2b. Percent of sales method. (For the income statement approach, which requires estimating bad debts as a percent of sales or credit sales, the Allowance for Doubtful Accounts balance is *not* considered when making the adjusting entry.)

Dec. 31	Bad Debts Expense	20,000	
	Allowance for Doubtful Accounts		20,000
	Record bad debts expense as 1% × $2,000,000 of credit sales.		

Summary: Cheat Sheet

VALUING RECEIVABLES

Accounts Receivable: Amounts due from customers for credit sales.

Credit sales and later collection:

Accounts Receivable—CompStore	950	
Sales		950
Cash	720	
Accounts Receivable—RDA Electronics		720

Sales using bank credit card:

Cash	96	
Credit Card Expense	4	
Sales		100

DIRECT WRITE-OFF METHOD

Direct write-off method: Record bad debt expense when an account is determined to be uncollectible.

Writing off a bad debt under *direct method:*

Bad Debts Expense	520	
Accounts Receivable—J. Kent		520

Bad debt later recovered under *direct method:*

Accounts Receivable—J. Kent	520	
Bad Debts Expense		520
Cash	520	
Accounts Receivable—J. Kent		520

ALLOWANCE METHOD

Allowance method: Matches estimated loss from uncollectible accounts receivable against the sales they helped produce.

Estimating bad debts:

Allowance for Doubtful Accounts: A contra asset account that reduces accounts receivable. It has a normal credit balance.

Writing off a bad debt under *allowance method:*

Allowance for Doubtful Accounts	520	
Accounts Receivable—J. Kent		520

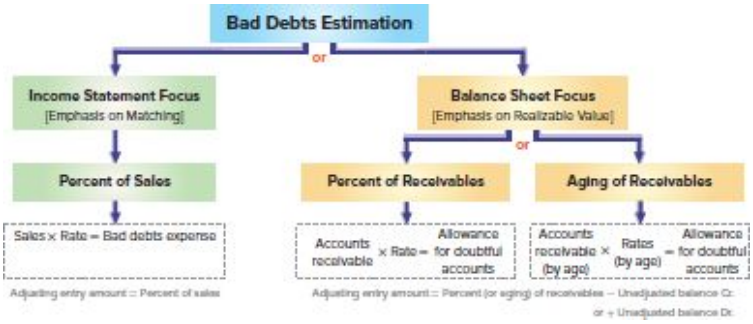
Bad debt later recovered under *allowance method:*

Accounts Receivable—J. Kent	520	
Allowance for Doubtful Accounts		520
Cash	520	
Accounts Receivable—J. Kent		520

ESTIMATING BAD DEBTS USING ALLOWANCE METHOD

When using the allowance method, we often use one of the following methods to estimate bad debts.

- **Percent of sales:** Uses a percent of credit sales for the period to estimate bad debts.
- **Percent of accounts receivable:** Uses a percent of total accounts receivable to estimate bad debts.
- **Aging of accounts receivable:** Applies increasing percentages to accounts receivable (classified by days past due) to estimate bad debts.



NOTES RECEIVABLE

Note receivable: A promise to pay a specified amount of money at a future date.

Principal of a note: Amount promised to be repaid.

Maturity date: Day the note must be repaid.

Interest formula (year assumed to have 360 days):

Principal of the note	×	Annual interest rate	×	Time expressed in fraction of year	=	Interest

Note receivable from sales:

Notes Receivable	1,000	
Sales		1,000

Note receivable and cash in exchange for accounts receivable:

Cash	232	
Notes Receivable	600	
Accounts Receivable—J. Cook		832

Note is *honored*; cash received in full (with interest):

Cash	615	
Notes Receivable		600
Interest Revenue		15

Note is *dishonored*; accounts receivable and interest recorded:

Accounts Receivable—J. Cook	615	
Interest Revenue		15
Notes Receivable		600

Accrue interest on note receivable:

Interest Receivable	15	
Interest Revenue		15

Note is *honored*; when note term runs over two periods:

Cash	3,060	
Interest Revenue		45
Interest Receivable		15
Notes Receivable		3,000

Factoring (selling) receivables: Accounts receivable are sold to a bank and the seller is charged a *factoring fee*.

Sale of receivables for cash with a charged factoring fee:

Cash	19,200	
Factoring Fee Expense	800	
Accounts Receivable		20,000

Pledging of receivables: Borrowing money by *pledging* receivables as security for a loan. Borrower discloses pledging in notes to financial statement.

Key Terms

Accounts receivable (281)

Accounts receivable turnover (295)

Aging of accounts receivable (288)

Allowance for Doubtful Accounts (285)

Allowance method (285)

Bad debts (283)

Direct write-off method (283)

Interest (291)

Maker of the note (291)

Maturity date of a note (291)

Payee of the note (291)

Principal of a note (291)

Promissory note (or note) (291)

Realizable value (285)

Multiple Choice Quiz

1. A company's Accounts Receivable balance at its December 31 year-end is $125,650, and its Allowance for Doubtful Accounts has a credit balance of $328 before year-end adjustment. Its net sales are $572,300. It estimates that 4% of outstanding accounts

receivable are uncollectible. What amount of bad debts expense is recorded at December 31?

a. $5,354

b. $328

c. $5,026

d. $4,698

e. $34,338

2. A company's Accounts Receivable balance at its December 31 year-end is $489,300, and its Allowance for Doubtful Accounts has a debit balance of $554 before year-end adjustment. Its net sales are $1,300,000. It estimates that 6% of outstanding accounts receivable are uncollectible. What amount of bad debts expense is recorded at December 31?

a. $29,912

b. $28,804

c. $78,000

d. $29,358

e. $554

3. Total interest to be earned on a $7,500, 5%, 90-day note is

a. $93.75.

b. $375.00.

c. $1,125.00.

d. $31.25.

e. $125.00.

4. A company receives a $9,000, 8%, 60-day note. The maturity value of the note is

a. $120.

b. $9,000.

c. $9,120.

d. $720.

e. $9,720.

5. A company has net sales of $489,600 and average accounts receivable of $40,800. What is its accounts receivable turnover?

a. 0.08

b. 30.41

c. 1,341.00

d. 12.00

e. 111.78

ANSWERS TO MULTIPLE CHOICE QUIZ

1. d; Desired balance in Allowance for Doubtful Accounts = $ 5,026 cr.($125,650 × 0.04)

Current balance in Allowance for Doubtful Accounts = (328) cr.

Bad debts expense to be recorded = $ 4,698

2. a; Desired balance in Allowance for Doubtful Accounts = $29,358 cr. ($489,300 × 0.06)

Current balance in Allowance for Doubtful Accounts = 554 dr.

Bad debts expense to be recorded = $29,912

3. a; $7,500 × 0.05 × 90⁄360 = $93.75

4. c; Principal amount.....$9,000

Interest accrued ..... 120 ($9,000 × 0.08 × 60⁄360)

Maturity value $9,120

5. d; $489,600⁄$40,800 = = 12

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect.Hints use different numbers, and instructors can turn this feature on or off.

connect

QUICK STUDY

QS 7-1

Credit card sales

C1

Prepare journal entries for the following credit card sales transactions. The company uses the perpetual inventory system.

1. Sold $20,000 of merchandise, which cost $15,000, on Mastercard credit cards. Mastercard charges a 5% fee.
2. Sold $5,000 of merchandise, which cost $3,000, on an assortment of bank credit cards. These cards charge a 4% fee.

QS 7-2

Direct write-off method

P1

Solstice Company determines on October 1 that it cannot collect $50,000 of its accounts receivable from its customer P. Moore. Apply the direct write-off method to record this loss as of October 1.

QS 7-3

Recovering a bad debt

P1

Solstice Company determines on October 1 that it cannot collect $50,000 of its accounts receivable from its customer P. Moore. It uses the direct write-off method to record this loss as of October 1. On October 30, P. Moore unexpectedly pays his account in full to Solstice Company. Record Solstice's entries for recovery of this bad debt.

QS 7-4

Distinguishing between allowance method and direct write-off method

P1 P2

Indicate whether each statement best describes the allowance method or the direct write-off method.

1. Does not predict bad debts expense.
2. Accounts receivable on the balance sheet is reported at net realizable value.
3. The write-off of a specific account does not affect net income.
4. When an account is written off, the debit is to Bad Debts Expense.
5. Usually does *not* best match sales and expenses because bad debts expense is not recorded until an account becomes uncollectible, which usually occurs in a period after the credit sale.
6. Estimates bad debts expense related to the sales recorded in that period.

QS 7-5

Comparing direct write-off and allowance method entries **P1 P2**

Flynn Co. determines that it cannot collect $7,000 of its accounts receivable from its customer, MDC. Record the journal entry required of Flynn under (*a*) the direct write-off method and (*b*) the allowance method.

QS 7-6

Allowance method for bad debts

P2

Gomez Corp. uses the allowance method to account for uncollectibles. On January 31, it wrote off an $800 account of a customer C. Green. On March 9, it receives a $300 payment from Green.

1. Prepare the journal entry for January 31.

2. Prepare the journal entries for March 9; assume no additional money is expected from Green.

QS 7-7

Reporting allowance for doubtful accounts

P2

On December 31 of Swift Co.'s first year, $50,000 of accounts receivable was not yet collected. Swift estimated that $2,000 of its accounts receivable was uncollectible and recorded the year-end adjusting entry.

1. Compute the realizable value of accounts receivable reported on Swift's year-end balance sheet.
2. On January 1 of Swift's second year, it writes off a customer's account for $300. Compute the realizable value of accounts receivable on January 1 after the write-off.

QS 7-8

Percent of accounts receivable method

P3

Warner Company's year-end unadjusted trial balance shows accounts receivable of $99,000, allowance for doubtful accounts of $600 (credit), and sales of $280,000. Uncollectibles are estimated to be 1.5% of accounts receivable.

1. Prepare the December 31 year-end adjusting entry for uncollectibles.
2. What amount would have been used in the year-end adjusting entry if the allowance account had a year-end unadjusted debit balance of $300?

QS 7-9

Percent of sales method

P3

BioWare's year-end unadjusted trial balance shows accounts receivable of $17,000 and sales of $150,000. Uncollectibles are estimated to be 2% of sales. Prepare the December 31 year-end adjusting entry for uncollectibles using the percent of sales method.

QS 7-10

Aging of receivables method

P3

Net Zero Products, a wholesaler of sustainable raw materials, prepares the following aging of receivables analysis. (1) Estimate the balance of the Allowance for Doubtful Accounts using the aging of accounts receivable method. (2) Prepare the adjusting entry to record bad debts expense assuming the unadjusted balance in the Allowance for Doubtful Accounts is a $1,000 credit.

		Days Past Due				
	Total	0	1 to 30	31 to 60	61 to 90	Over 90
Accounts receivable	$115,200	$80,000	$18,000	$7,200	$4,000	$6,000
Percent uncollectible		1%	3%	5%	8%	11%

QS 7-11

Computing interest

C2

Principal of Note	Annual Interest Rate	Time Period	Interest
$10,000	8%	90 days	$?
40,000	?	180 days	2,000
?	4	270 days	900

Complete the following table by filling in missing amounts.

QS 7-12

Computing note interest and maturity date

C2

Determine the maturity date and compute interest for each note.

Note	Contract Date	Principal	Interest Rate	Period of Note (Term)
1.	March 1	$10,000	6%	60 days
2.	May 15	15,000	8	90 days
3.	October 20	8,000	4	45 days

QS 7-13

Note receivable **C2**

On August 2, Jun Co. receives a $6,000, 90-day, 12% note from customer Ryan Albany as payment on his $6,000 account receivable. (1) Compute the maturity date for this note. (2) Prepare Jun's journal entry for August 2.

QS 7-14

Note receivable honored

P4

On August 2, Jun Co. receives a $6,000, 90-day, 12% note from customer Ryan Albany as payment on his $6,000 account receivable. Prepare Jun's journal entry assuming the note is honored by the customer on October 31 of that same year.

QS 7-15

Note receivable interest and maturity P4

On December 1, Daw Co. accepts a $10,000, 45-day, 6% note from a customer.

1. Prepare the year-end adjusting entry to record accrued interest revenue on December 31.
2. Prepare the entry required on the note's maturity date assuming it is honored.

QS 7-16

Computing interest revenue for two periods **P4**

On April 1 of Year 1, Respawn accepted a $10,000, 12-month, 8% note from a customer in granting a time extension on his past-due account receivable. Respawn's year-end is December 31. Compute interest revenue recorded by Respawn in Year 1 and Year 2.

QS 7-17

page 301

Dishonoring a note

P4

Prepare journal entries to record the following transactions of Namco.

April 1 Accepted a $5,000, 90-day, 4% note from Travis in granting a time extension on his past-due account receivable.

June 30 Travis dishonored his note.

QS 7-18

Factoring receivables **C3**

Record the sale by Balus Company of $125,000 in accounts receivable on May 1. Balus is charged a 2.5% factoring fee.

QS 7-19

Preparing an income statement

C3 P2 P4

Selected accounts from Fair Trader Co.'s adjusted trial balance for the year ended December 31 follow. Prepare its income statement.

Factoring fees	$ 300	Interest revenue	$ 3,000
Insurance expense	4,000	Salaries expense	22,000
Sales	50,000	Supplies expense	200
Rent expense	15,000	Bad debt expense	1,000

QS 7-20

Preparing a balance sheet

C3 P2 P4

Selected accounts from Bennett Co.'s adjusted trial balance for the year ended December 31 follow. Prepare a classified balance sheet. *Note:* Allowance for doubtful accounts is reported and subtracted from accounts receivable on the company's balance sheet.

Prepaid rent	$ 1,000	Accounts payable	$2,500
Accounts receivable	10,000	Allowance for doubtful accounts	500
Cash	12,000	Notes payable (due in 10 years)	6,000
Common stock	5,000	Notes receivable (due in 4 years)	4,000
Retained earnings	13,000		

QS 7-21

Accounts receivable turnover

A1

The following data are for Rocky Company. (*a*) Compute Rocky's accounts receivable turnover. (*b*) If its competitor, Dixon, has an accounts receivable turnover of 7.5, which company appears to be doing a better job of managing its receivables?

	Current Year	1 Year Ago
Accounts receivable, net	$153,400	$138,500
Net sales	861,105	910,600

EXERCISES

Exercise 7-1

Accounts receivable subsidiary ledger; schedule of accounts receivable

C1

Vail Company recorded the following transactions during November.

Nov. 5	Accounts Receivable—Ski Shop	4,615	
	Sales		4,615
10	Accounts Receivable—Welcome Inc.	1,350	
	Sales		1,350
13	Accounts Receivable—Zia Co.	832	
	Sales		832
21	Sales Returns and Allowances	209	
	Accounts Receivable—Zia Co.		209
30	Accounts Receivable—Ski Shop	2,713	
	Sales		2,713

1. Open a general ledger having T-accounts for Accounts Receivable, Sales, and Sales Returns and Allowances. Also open an accounts receivable subsidiary ledger having a T-account for each of its three customers. Post these entries to both the general ledger and the accounts receivable ledger.
2. Prepare a schedule of accounts receivable (see Exhibit 7.4) and compare its total with the balance of the Accounts Receivable controlling account as of November 30.

Check Accounts Receivable ending balance, $9,301

Exercise 7-2

Accounting for credit card sales

C1

Levine Company uses the perpetual inventory system. Prepare journal entries to record the following credit card transactions of Levine Company.

Apr. 8 Sold merchandise for $8,400 (that had cost $6,000) and accepted the customer's Suntrust Bank Card. Suntrust charges a 4% fee.

12 Sold merchandise for $5,600 (that had cost $3,500) and accepted the customer's Continental Card. Continental charges

a 2.5% fee.

Exercise 7-3

Computing cash collections C1

Grande Co. had credit sales of $20,000 in the current period. Accounts Receivable had a beginning balance of $4,000 and an ending balance of $5,000. Compute its cash collections from its credit sales for the current period.

Exercise 7-4

Direct write-off method

P1

Dexter Company uses the direct write-off method. Prepare journal entries to record the following transactions.

Mar. 11 Dexter determines that it cannot collect $45,000 of its accounts receivable from Leer Co.

29 Leer Co. unexpectedly pays its account in full to Dexter Company. Dexter records its recovery of this bad debt.

Exercise 7-5

Writing off receivables

P2

On January 1, Wei Company begins the accounting period with a $30,000 credit balance in Allowance for Doubtful Accounts.

a. On February 1, the company determined that $6,800 in customer accounts was uncollectible; specifically, $900 for Oakley Co. and $5,900 for Brookes Co. Prepare the journal entry to write off those two accounts.

b. On June 5, the company unexpectedly received a $900 payment on a customer account, Oakley Company, that had previously been

written off in part *a*. Prepare the entries to reinstate the account and record the cash received.

Exercise 7-6

Recording and reporting allowance for doubtful accounts

P2

In its first year of operations, Cloudbox has credit sales of $200,000. Its year-end balance in Accounts Receivable is $10,000, and the company estimates that $1,500 of its accounts receivable is uncollectible.

a. Prepare the year-end adjusting entry to estimate bad debts expense.

b. Prepare the current assets section of Cloudbox's classified balance sheet assuming Inventory is $22,000, Cash is $14,000, and Prepaid Rent is $3,000. *Note:* The company reports Accounts receivable, net on the balance sheet.

Exercise 7-7

Determining bad debts expense using financial disclosures

P2

Helix reported the following information in its financial statements. Write-offs of accounts receivable were $200 in the current year. Helix did not recover any write-offs. Determine bad debts expense for the current year.

At December 31	Current Year	Prior Year
Accounts receivable	$5,000	$4,000
Allowance for doubtful accounts	400	350
Accounts receivable, net	$4,600	$3,650

Exercise 7-8

Financial statement impact of receivables transactions

P2

Analyze each of the following transactions by showing the effects on the accounting equation—specifically, identify the accounts and amounts (including + or −) for each transaction.

a. The company provides $20,000 of services on credit.

b. The company estimates that $800 of its accounts receivable is uncollectible.

c. The company writes off a customer's entire $300 account as uncollectible.

Exercise 7-9

Comparing direct write-off and allowance method entries

P1 P2

Prepare journal entries for Sal Co. to record the following under (*a*) the direct write-off method and (*b*) the allowance method.

May 3 Sal Co. determines that it cannot collect its accounts receivable of $2,000 from Joey Co.

21 Sal Co. unexpectedly receives payment of $2,000 cash from Joey Co. toward its previously written-off account. Sal records recovery of this bad debt.

Exercise 7-10

Percent of sales method; write-off

P3

At year-end December 31, Chan Company estimates its bad debts as 1% of its annual credit sales of $487,500. Chan records its bad debts expense for that estimate. On the following February 1, Chan decides that the $580 account of P. Park is uncollectible and writes it off as a bad debt. On June 5, Park unexpectedly pays the amount previously written off.

Prepare Chan's journal entries to record the transactions of December 31, February 1, and June 5.

Exercise 7-11

Financial statement impact of bad debts expense and write-offs **P3**

Using information from Exercise 7-10, determine the impact of page 303 the December 31, February 1, and June 5 transactions on the accounting equation. For each transaction, indicate whether there would be an increase, decrease, or no effect, for Assets, Liabilities, and Equity.

Exercise 7-12

Percent of sales method

P3

Warner Company's year-end unadjusted trial balance shows accounts receivable of $99,000, allowance for doubtful accounts of $600 (credit), and sales of $140,000. Uncollectibles are estimated to be 1% of sales. Prepare the December 31 year-end adjusting entry for uncollectibles.

Exercise 7-13

Percent of accounts receivable method

P3

Mazie Supply Co. uses the percent of accounts receivable method. On December 31, it has outstanding accounts receivable of $55,000, and it estimates that 2% will be uncollectible.

Prepare the year-end adjusting entry to record bad debts expense under the assumption that the Allowance for Doubtful Accounts has (*a*) a $415 credit balance before the adjustment and (*b*) a $291 debit-balance before the adjustment.

Exercise 7-14

Aging of receivables method

P3

Daley Company prepared the following aging of receivables analysis at December 31.

		Days Past Due				
	Total	0	1 to 30	31 to 60	61 to 90	Over 90
Accounts receivable	$570,000	$396,000	$90,000	$36,000	$18,000	$30,000
Percent uncollectible		1%	2%	5%	7%	10%

a. Estimate the balance of the Allowance for Doubtful Accounts using aging of accounts receivable.

b. Prepare the adjusting entry to record bad debts expense using the estimate from part *a*. Assume the unadjusted balance in the Allowance for Doubtful Accounts is a $3,600 credit.

c. Prepare the adjusting entry to record bad debts expense using the estimate from part *a*. Assume the unadjusted balance in the Allowance for Doubtful Accounts is a $100 debit.

Exercise 7-15

Percent of receivables method

P3

Refer to the information in Exercise 7-14 to complete the following requirements.

a. Estimate the balance of the Allowance for Doubtful Accounts assuming the company uses 4.5% of total accounts receivable to estimate uncollectibles, instead of the aging of receivables method.

b. Prepare the adjusting entry to record bad debts expense using the estimate from part *a*. Assume the unadjusted balance in the Allowance for Doubtful Accounts is a $12,000 credit.

c. Prepare the adjusting entry to record bad debts expense using the estimate from part *a*. Assume the unadjusted balance in the Allowance for Doubtful Accounts is a $1,000 debit.

Exercise 7-16

Aging of receivables schedule

P3

Following is a list of credit customers along with their amounts owed and the days past due at December 31. Also shown are five classifications of accounts receivable and estimated bad debts percent for each class.

1. Create an aging of accounts receivable schedule similar to Exhibit 7.8 and calculate the estimated balance for the Allowance for Doubtful Accounts.
2. Assuming an unadjusted credit balance of $100, record the required adjustment to the Allowance for Doubtful Accounts.

Customer	Accounts Receivable	Days Past Due
BCC Company	$4,000	12
Lannister Co.	1,000	0
Mike Properties	5,000	107
Ted Reeves	500	72
Jen Steffens	2,000	35

Days Past Due	0	1 to 30	31 to 60	61 to 90	Over 90
Percent uncollectible	1%	3%	5%	8%	12%

Exercise 7-17

Estimating bad debts

P3

At December 31, Folgeys Coffee Company reports the following results for its calendar year.

Cash sales.	$900,000	Credit sales.	$300,000

Its year-end unadjusted trial balance includes the following items.

Accounts receivable	$125,000 debit	Allowance for doubtful accounts	$5,000 debit

1. Prepare the adjusting entry to record bad debts expense assuming uncollectibles are estimated to be 3% of credit sales.

Check Dr. Bad Debts Expense: (1) $9,000

(3) $12,500

2. Prepare the adjusting entry to record bad debts expense assuming uncollectibles are estimated to be 1% of total sales.
3. Prepare the adjusting entry to record bad debts expense assuming uncollectibles are estimated to be 6% of year-end accounts receivable.

Exercise 7-18

Notes receivable transactions

C2

Prepare journal entries for the following transactions of Danica Company.

Dec. 13 Accepted a $9,500, 45-day, 8% note in granting Miranda Lee a time extension on her past-due account receivable.

31 Prepared an adjusting entry to record the accrued interest on the Lee note.

Check Dec. 31, Cr. Interest Revenue, $38

Exercise 7-19

Notes receivable transactions

P4

Refer to the information in Exercise 7-18 and prepare the journal entries for the *following year* for Danica Company.

Jan. 27 Received Lee's payment for principal and interest on the note dated December 13.

Check Jan. 27, Dr. Cash, $9,595

June 1, Dr. Cash, $5,125

Mar. 3 Accepted a $5,000, 10%, 90-day note in granting a time extension on the past-due account receivable of Tomas Company.

17 Accepted a $2,000, 30-day, 9% note in granting H. Cheng a time extension on his past-due account receivable.

Apr. 16 Cheng dishonored his note.

May 1 Wrote off the Cheng account against the Allowance for Doubtful Accounts.

June 1 Received the Tomas payment for principal and interest on the note dated March 3.

Exercise 7-20

Honoring a note

P4

Prepare journal entries to record transactions for Vitalo Company.

Nov. 1 Accepted a $6,000, 180-day, 8% note from Kelly White in granting a time extension on her past-due account receivable.

Dec. 31 Adjusted the year-end accounts for the accrued interest earned on the White note.

Apr. 30 White honored her note when presented for payment.

Exercise 7-21

Dishonoring a note

P4

Prepare journal entries to record the following transactions of Ridge Company.

Mar. 21 Accepted a $9,500, 180-day, 8% note from Tamara Jackson in granting a time extension on her past-due account receivable.

Sep. 17 Jackson dishonored her note.

Dec. 31 After trying several times to collect, Ridge Company wrote off Jackson's account against the Allowance for Doubtful Accounts.

Exercise 7-22

Selling and pledging accounts receivable

C3

On November 30, Petrov Co. has $128,700 of accounts receivable and uses the perpetual inventory system. (1) Prepare journal entries to record the following transactions. (2) Which transaction would most likely require a note to the financial statements?

Dec. 4 Sold $7,245 of merchandise (that had cost $5,000) to customers on credit, terms n/30.

9 Sold $20,000 of accounts receivable to Main Bank. Main charges a 4% factoring fee.

17 Received $5,859 cash from customers in payment on their accounts.

27 Borrowed $10,000 cash from Main Bank, pledging $12,500 of accounts receivable as security for the loan.

Exercise 7-23

Accounts receivable turnover

A1

The following information is from the annual financial statements of Raheem Company. (1) Compute its accounts receivable turnover for Year 2 and Year 3. (2) Assuming its competitor has a turnover of 11, is Raheem performing better or worse at collecting receivables than its competitor?

	Year 3	Year 2	Year 1
Net sales	$405,140	$335,280	$388,000
Accounts receivable, net (year-end)	44,800	41,400	34,800

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PROBLEM SET A

Problem 7-1A

Sales on credit and sales on credit cards

C1

Mayfair Co. completed the following transactions and uses a perpetual inventory system.

June 4 Sold $650 of merchandise on credit (that had cost $400) to Natara Morris, terms n/15.

5 Sold $6,900 of merchandise (that had cost $4,200) to customers who used their Zisa cards. Zisa charges a 3% fee.

6 Sold $5,850 of merchandise (that had cost $3,800) to customers who used their Access cards. Access charges a 2% fee.

8 Sold $4,350 of merchandise (that had cost $2,900) to customers who used their Access cards. Access charges a 2% fee.

13 Wrote off the account of Abigail McKee against the Allowance for Doubtful Accounts. The $429 balance in McKee's account was from a credit sale last year.

18 Received Morris's check in full payment for the June 4 purchase.

Check June 18, Dr. Cash, $650

Required

Prepare journal entries to record these transactions and events.

Problem 7-2A

Estimating and reporting bad debts

P2 P3

At December 31, Hawke Company reports the following results for its calendar year.

Cash sales	$1,905,000	Credit sales	$5,682,000

In addition, its unadjusted trial balance includes the following items.

Accounts receivable	$1,270,100 debit	Allowance for doubtful accounts	$16,580 debit

Required

1. Prepare the adjusting entry to record bad debts under each separate assumption.
   a. Bad debts are estimated to be 1.5% of credit sales.

Check Bad Debts Expense: (1*a*) $85,230, (1*c*) $80,085

   b. Bad debts are estimated to be 1% of total sales.
   c. An aging analysis estimates that 5% of year-end accounts receivable are uncollectible.
2. Show how Accounts Receivable and the Allowance for Doubtful Accounts appear on its December 31 balance sheet given the facts in part 1*a*.
3. Show how Accounts Receivable and the Allowance for Doubtful Accounts appear on its December 31 balance sheet given the facts in part 1*c*.

Problem 7-3A

Aging accounts receivable and accounting for bad debts

P2 P3

On December 31, Jarden Co.'s Allowance for Doubtful Accounts has an unadjusted credit balance of $14,500. Jarden prepares a schedule

of its December 31 accounts receivable by age.

	A	B	C
1	Accounts Receivable	Age of Accounts Receivable	Expected Percent Uncollectible
2	$830,000	Not yet due	1.25%
3	254,000	1 to 30 days past due	2.00
4	86,000	31 to 60 days past due	6.50
5	38,000	61 to 90 days past due	32.75
6	12,000	Over 90 days past due	68.00

Required

1. Compute the required balance of the Allowance for Doubtful Accounts at December 31 using an aging of accounts receivable.
2. Prepare the adjusting entry to record bad debts expense at December 31.

Analysis Component

3. On June 30 of the next year, Jarden concludes that a customer's $4,750 receivable is uncollectible and the account is written off. Does this write-off directly affect Jarden's net income?

Check (2) Dr. Bad Debts Expense, $27,150

Problem 7-4A

Accounts receivable transactions and bad debts adjustments

C1 P2 P3

Liang Company began operations in Year 1. During its first two years, the company completed a number of transactions involving sales on credit, accounts receivable collections, and bad debts. These transactions are summarized as follows.

Year 1

a. Sold $1,345,434 of merchandise (that had cost $975,000) on credit, terms n/30.

b. Wrote off $18,300 of uncollectible accounts receivable.

c. Received $669,200 cash in payment of accounts receivable.

d. In adjusting the accounts on December 31, the company estimated that 1.5% of accounts receivable would be uncollectible.

Year 2

e. Sold $1,525,634 of merchandise on credit (that had cost $1,250,000), terms n/30.

f. Wrote off $27,800 of uncollectible accounts receivable.

g. Received $1,204,600 cash in payment of accounts receivable.

h. In adjusting the accounts on December 31, the company estimated that 1.5% of accounts receivable would be uncollectible.

Required

Prepare journal entries to record Liang's summarized transactions and its year-end adjustments to record bad debts expense. (The company uses the perpetual inventory system, and it applies the allowance method for its accounts receivable. Round to the nearest dollar.)

Check *(d)* Dr. Bad Debts Expense, $28,169

(h) Dr. Bad Debts Expense, $32,199

Problem 7-5A

Analyzing and journalizing notes receivable transactions

C2 C3 P4

The following transactions are from Ohlm Company.

Year 1

Dec. 16 Accepted a $10,800, 60-day, 8% note in granting Danny Todd a time extension on his past-due account receivable.

31 Made an adjusting entry to record the accrued interest on the Todd note.

Year 2

Feb. 14 Received Todd's payment of principal and interest on the note dated December 16.

Mar. 2 Accepted a $6,100, 8%, 90-day note in granting a time extension on the past-due account receivable from Midnight Co.

17 Accepted a $2,400, 30-day, 7% note in granting Ava Privet a time extension on her past-due account receivable.

Apr. 16 Privet dishonored her note.

May 31 Midnight Co. dishonored its note.

Check Feb. 14, Cr. Interest Revenue, $108

May 31, Cr. Interest Revenue, $122

Nov. 2, Cr. Interest Revenue, $35

Aug. 7 Accepted a $7,440, 90-day, 10% note in granting a time extension on the past-due account receivable of Mulan Co.

Sep. 3 Accepted a $2,100, 60-day, 10% note in granting Noah Carson a time extension on his past-due account receivable.

Nov. 2 Received payment of principal plus interest from Carson for the September 3 note.

Nov. 5 Received payment of principal plus interest from Mulan for the August 7 note.

Dec. 1 Wrote off the Privet account against the Allowance for Doubtful Accounts.

Required

1. Prepare journal entries to record these transactions and events.

Analysis Component

2. If Ohlm pledged its receivables as security for a loan from the bank, where on the financial statements does it disclose this pledge of receivables?

PROBLEM SET B

Problem 7-1B

Sales on credit and sales on credit cards **C1**

Archer Co. completed the following transactions and uses a perpetual inventory system.

Aug. 4 Sold $3,700 of merchandise on credit (that had cost $2,000) to McKenzie Carpenter, terms n/10.

10 Sold $5,200 of merchandise (that had cost $2,800) to customers who used their Commerce Bank credit cards. Commerce charges a 3% fee.

11 Sold $1,250 of merchandise (that had cost $900) to customers who used their Goldman cards. Goldman charges a 2% fee.

14 Received Carpenter's check in full payment for the August 4 purchase.

15 Sold $3,250 of merchandise (that had cost $1,758) to customers who used their Goldman cards. Goldman charges a 2% fee.

22 Wrote off the account of Craw Co. against the Allowance for Doubtful Accounts. The $498 balance in Craw Co.'s account was from a credit sale last year.

Required

Prepare journal entries to record these transactions and events.

Check Aug. 14, Dr. Cash, $3,700

Problem 7-2B

Estimating and reporting bad debts

P2 P3

At December 31, Ingleton Company reports the following results for the year.

Cash sales	$1,025,000	Credit sales	$1,342,000

In addition, its unadjusted trial balance includes the following items.

Accounts receivable	$575,000 debit	Allowance for doubtful accounts.	$7,500 credit

Required

1. Prepare the adjusting entry to record bad debts under each separate assumption.
   - **a.** Bad debts are estimated to be 2.5% of credit sales.
   - **b.** Bad debts are estimated to be 1.5% of total sales.
   - **c.** An aging analysis estimates that 6% of year-end accounts receivable are uncollectible.
2. Show how Accounts Receivable and the Allowance for Doubtful Accounts appear on its December 31 balance sheet given the facts in part 1*a.*
3. Show how Accounts Receivable and the Allowance for Doubtful Accounts appear on its December 31 balance sheet given the facts in part 1*c.*

Check Dr. Bad Debts Expense: (1b) $35,505, (1c) $27,000

Problem 7-3B

Aging accounts receivable and accounting for bad debts

P2 P3

At December 31, Hovak Co.'s Allowance for Doubtful Accounts has an unadjusted debit balance of $3,400. Hovak prepares a schedule of its December 31 accounts receivable by age.

	A	B	C
1	**Accounts Receivable**	**Age of Accounts Receivable**	**Expected Percent Uncollectible**
2	$396,400	Not yet due	2.0%
3	277,800	1 to 30 days past due	4.0
4	48,000	31 to 60 days past due	8.5
5	6,600	61 to 90 days past due	39.0
6	2,800	Over 90 days past due	82.0

Required

1. Compute the required balance of the Allowance for Doubtful Accounts at December 31 using an aging of accounts receivable.
2. Prepare the adjusting entry to record bad debts expense at December 31.

Analysis Component

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3. On July 31 of the following year, Hovak concludes that a customer's $3,455 receivable is uncollectible and the account is written off. Does this write-off directly affect Hovak's net income?

Check (2) Dr. Bad Debts Expense, $31,390

Problem 7-4B

Accounts receivable transactions and bad debts adjustments

C1 P2 P3

Sherman Co. began operations in Year 1. During its first two years, the company completed several transactions involving sales on credit, accounts receivable collections, and bad debts. These transactions are summarized as follows.

Year 1

a. Sold $685,350 of merchandise on credit (that had cost $500,000), terms n/30.

b. Received $482,300 cash in payment of accounts receivable.

c. Wrote off $9,350 of uncollectible accounts receivable.

d. In adjusting the accounts on December 31, the company estimated that 1% of accounts receivable would be uncollectible.

Year 2

e. Sold $870,220 of merchandise on credit (that had cost $650,000), terms n/30.

f. Received $990,800 cash in payment of accounts receivable.

g. Wrote off $11,090 of uncollectible accounts receivable.

h. In adjusting the accounts on December 31, the company estimated that 1% of accounts receivable would be uncollectible.

Required

Prepare journal entries to record Sherman's summarized transactions and its year-end adjusting entries to record bad debts expense. (The company uses the perpetual inventory system, and it applies the allowance method for its accounts receivable.)

Check (d) Dr. Bad Debts Expense, $11,287

(h) Dr. Bad Debts Expense, $9,773

Problem 7-5B

Analyzing and journalizing notes receivable transactions

C2 C3 P4

The following transactions are from Springer Company.

Year 1

Nov. 1 Accepted a $4,800, 90-day, 8% note in granting Steve Julian a time extension on his past-due account receivable.

Dec. 31 Made an adjusting entry to record the accrued interest on the Julian note.

Year 2

Jan. 30 Received Julian's payment for principal and interest on the note dated November 1.

Feb. 28 Accepted a $12,600, 30-day, 8% note in granting a time extension on the past-due account receivable from King Co.

Mar. 1 Accepted a $6,200, 60-day, 12% note in granting Myron Shelley a time extension on his past-due account receivable.

30 The King Co. dishonored its note.

Apr. 30 Received payment of principal plus interest from M. Shelley for the March 1 note.

June 15 Accepted a $2,000, 72-day, 8% note in granting a time extension on the past-due account receivable of Ryder Solon.

21 Accepted a $9,500, 90-day, 8% note in granting J. Felton a time extension on his past-due account receivable.

Aug. 26 Received payment of principal plus interest from R. Solon for the June 15 note.

Sep. 19 Received payment of principal plus interest from J. Felton for the June 21 note.

Nov. 30 Wrote off King's account against the Allowance for Doubtful Accounts.

Required

1. Prepare journal entries to record these transactions and events.

Analysis Component

2. If Springer pledged its receivables as security for a loan from the bank, where on the financial statements does it disclose this pledge of receivables?

Check Jan. 30, Cr. Interest Revenue, $32

Apr. 30, Cr. Interest Revenue, $124

Sep. 19, Cr. Interest Revenue, $190

SERIAL PROBLEM

Business Solutions

P1 P2

Alexander Image/Shutterstock

Serial problem began in Chapter 1. If previous chapter segments were not completed, the serial problem can begin at this point. It is available in Connect with an algorithmic option.

SP 7 Santana Rey, owner of **Business Solutions**, realizes that she needs to begin accounting for bad debts expense. Assume that Business Solutions has total revenues of $44,000 during the first three months of 2022 and that the Accounts Receivable balance on March 31, 2022, is $22,867.

Required

1. Prepare the adjusting entry to record bad debts expense on March 31, 2022, under each separate assumption. There is a zero unadjusted balance in the Allowance for Doubtful Accounts at March 31.
   - **a.** Bad debts are estimated to be 1% of total revenues.
   - **b.** Bad debts are estimated to be 2% of accounts receivable. (Round to the dollar.)
2. Assume that Business Solutions's Accounts Receivable balance at June 30, 2022, is $20,250 and that one account of $100 has been written off against the Allowance for Doubtful Accounts since March 31, 2022. If Rey uses the method in part 1*b*, what adjusting journal entry is made to recognize bad debts expense on June 30, 2022?
3. Should Rey consider adopting the direct write-off method of accounting for bad debts expense rather than one of the allowance

methods considered in part 1? Explain.

Check (2) Dr. Bad Debts Expense, $31,390

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA 7-1 Quick Study, Percent of accounts receivable method, **P3**—similar to QS 7-8

Tableau DA 7-2 Exercise, Percent of sales method, percent of receivables method, and aging of receivables method, **P3**—similar to QS 7-8,9,10

Tableau DA 7-3 Mini-Case, Aging of receivables method and adjusting entries, **P3**—similar to Exercise 7-14

GENERAL LEDGER

General Ledger (GL) Assignments expose students to general ledger software similar to that in practice. **GL** is part of Connect, and **GL** assignments are auto-gradable and have algorithmic options.

GL 7-1 analyzes transactions relating to accounts and notes receivable and their impact on interest revenue.

connect

Accounting Analysis

connect

COMPANY ANALYSIS

A1

AA 7-1 Use **Apple**'s financial statements in Appendix A to answer the following.

1. What is the amount of Apple's accounts receivable as of September 28, 2019?
2. Compute Apple's accounts receivable turnover as of September 28, 2019.
3. Apple's most liquid assets include (*a*) cash and cash equivalents, (*b*) marketable securities (current), (*c*) accounts receivable, and (*d*) inventory. Compute the percentage that these liquid assets (in total) make up of current liabilities as of September 28, 2019, and as of September 29, 2018.
4. Did Apple's liquid assets as a percentage of current liabilities improve or worsen as of its fiscal 2019 year-end compared to its fiscal 2018 year-end?

COMPARATIVE ANALYSIS

A1 P2

AA 7-2 Comparative figures for **Apple** and **Google** follow.

	Apple			Google		
$ millions	Current Year	One Year Prior	Two Years Prior	Current Year	One Year Prior	Two Years Prior
Accounts receivable, net . .	$ 22,926	$ 23,186	$ 17,874	$ 25,326	$ 20,838	$ 18,336
Net sales	260,174	265,595	229,234	161,857	136,819	110,855

Required

1. Compute the accounts receivable turnover for the two most recent years for (*a*) Apple and (*b*) Google.
2. Which company more quickly collects its accounts receivable in the current year?

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EXTENDED ANALYSIS

C1 A1

AA 7-3 Key figures for **Samsung** follow.

$ millions	Current Year	One Year Prior
Accounts receivable, net	$ 30,144	$ 29,060
Sales	197,691	209,163

1. Compute Samsung's accounts receivable turnover for the current year.
2. In the current year, does Samsung's accounts receivable turnover underperform or outperform the industry (assumed) average of 7?

Discussion Questions

1. How do sellers benefit from allowing their customers to use credit cards?
2. Why does the direct write-off method of accounting for bad debts usually fail to match revenues and expenses?
3. Explain the accounting constraint of materiality.
4. Why might a business prefer a note receivable to an account receivable?
5. Explain why writing off a bad debt against the Allowance for Doubtful Accounts does not reduce the estimated realizable value of a company's accounts receivable.
6. Why does the Bad Debts Expense account usually not have the same adjusted balance as the Allowance for Doubtful Accounts?

Beyond the Numbers

ETHICS CHALLENGE

P2 P3

BTN 7-1 Anton Blair is the manager of a medium-size company. A few years ago, Blair persuaded the owner to base a part of his

compensation on the net income the company earns each year. Each December he estimates year-end financial figures in anticipation of the bonus he will receive. If the bonus is not as high as he would like, he offers several recommendations to the accountant for year-end adjustments. One of his favorite recommendations is for the controller to reduce the estimate of doubtful accounts.

Required

1. What effect does lowering the estimate for doubtful accounts have on the income statement and balance sheet?
2. Do you believe Blair's recommendation to adjust the allowance for doubtful accounts is within his rights as manager, or do you believe this action is an ethics violation? Justify your response.
3. What type of internal control(s) might be useful for this company in overseeing the manager's recommendations for accounting changes?

COMMUNICATING IN PRACTICE

P2 P3

BTN 7-2 As the accountant for Pure-Air Distributing, you attend a sales managers' meeting devoted to a discussion of credit policies. At the meeting, you report that bad debts expense is estimated to be $59,000 and accounts receivable at year-end amount to $1,750,000 less a $43,000 allowance for doubtful accounts. Sid Omar, a sales manager, expresses confusion over why bad debts expense and the allowance for doubtful accounts are different amounts. Write a one-page memorandum to him explaining why a difference in bad debts expense and the allowance for doubtful accounts is not unusual. The company estimates bad debts expense as 2% of sales.

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TAKING IT TO THE NET

C1 P3

BTN 7-3 Access **eBay**'s January 30, 2019, filing of its 10-K report for the year ended December 31, 2018, at **SEC.gov**.

Required

1. What is the amount of eBay's net accounts receivable at December 31, 2018, and at December 31, 2017?
2. "Financial Statement Schedule II" of its 10-K report lists eBay's allowance for doubtful accounts (including authorized credits). For the two years ended December 31, 2018 and 2017, identify its allowance for doubtful accounts (including authorized credits), and then compute it as a percent of gross accounts receivable.
3. Do you believe that these percentages are reasonable based on what you know about eBay? Explain.

TEAMWORK IN ACTION

P2 P3

BTN 7-4 Each member of a team is to participate in estimating uncollectibles using the aging schedule and percents shown in Problem 7-3A. The division of labor is up to the team. Your goal is to accurately complete this task as soon as possible. After estimating uncollectibles, check your estimate with the instructor. If the estimate is correct, the team then should prepare the adjusting entry and the presentation of accounts receivable (net) for the December 31 year-end balance sheet.

ENTREPRENEURIAL DECISION

C1

BTN 7-5 Nichole Mustard and **Credit Karma** are introduced in the chapter's opening feature. Assume that they are considering two options.

Plan A. The company would begin selling access to a premium version of its website. The new online customers would use their credit cards. The company has the capability of selling the premium

service with no additional investment in hardware or software. Annual credit sales are expected to increase by $250,000.

Costs associated with Plan A: Additional wages related to these new sales are $135,500; credit card fees will be 4.75% of sales; and additional recordkeeping costs will be 6% of sales. Premium service sales will reduce advertising revenues by $8,750 annually because some customers will now only use the premium service.

Plan B. The company would begin selling merchandise. It would make additional annual credit sales of $500,000.

Costs associated with Plan B: Cost of these new sales is $375,000; additional recordkeeping and shipping costs will be 4% of sales; and uncollectible accounts will be 6.2% of sales.

Required

1. Compute the additional annual net income or loss expected under (*a*) Plan A and (*b*) Plan B.
2. Should the company pursue either plan? Discuss both the financial and nonfinancial factors relevant to this decision.

Check (1*b*) Additional net income, $74,000

8 Accounting for Long-Term Assets

Chapter Preview

PLANT ASSETS

C1 Cost determination

P1 Depreciation

C2 Partial years and changes in estimates

C3 Additional expenditures

P2 Disposal

NTK 8-1, 8-2, 8-3

NATURAL RESOURCES

P3 Cost determination

Depletion

Presentation

Plant assets tied into extracting resources

NTK 8-4

INTANGIBLES

P4 Cost determination

Amortization

Types of intangibles

A1 Analyze asset usage

NTK 8-5

Learning Objectives

CONCEPTUAL

C1 Compute the cost of plant assets.

C2 Explain depreciation for partial years and changes in estimates.

C3 Distinguish between revenue and capital expenditures, and account for them.

ANALYTICAL

A1 Compute total asset turnover and apply it to analyze a company's use of assets.

PROCEDURAL

P1 Compute and record depreciation using the straight-line, units-of-production, and declining-balance methods.

P2 Account for asset disposal through discarding or selling an asset.

P3 Account for natural resource assets and their depletion.

P4 Account for intangible assets.

P5 *Appendix 8A*—Account for asset exchanges.

To Boldly Go

"We're at the dawn of a new era"—**ELON MUSK**

LOS ANGELES—Elon Musk's main goal in life is to help ensure the survival of mankind by populating Mars! "You back up your hard drive," explains Elon, "maybe we should back up life, too." To achieve his goal, Elon started **SpaceX**, an aerospace manufacturer and space transportation company.

SpaceX is working to build a spaceship capable of going to Mars. Elon vows, "We're going to make it happen." To fund his dream, Elon uses business innovations, with help from accounting analytics.

One breakthrough occurred when Elon was analyzing financial reports issued by NASA and concluded that NASA was spending too much building rockets to go to the International Space Station. He believed that if NASA outsourced its rocket production to SpaceX, NASA's costs would decline. SpaceX now builds rockets for NASA for one-tenth of their prior cost.

A key factor in Elon's cost-savings analysis is that SpaceX launches reusable rockets. Instead of building new rockets for each launch, SpaceX makes substantial repairs, called *betterments* or *extraordinary repairs,* to previously launched rockets. SpaceX was the first to apply this concept, which continues to save NASA billions.

Elon pushes to solve big problems. "When something is important enough," insists Elon, "you do it even if the odds are not in your favor."

Joe Marino-Bill Cantrell/UPI/Alamy Stock Photo

Sources: *SpaceX website*, January 2021; *GQ*, December 2015; *CBS*, May 2012

Section 1—Plant Assets

Plant assets are tangible assets used in a company's operations that have a useful life of more than one accounting period. Plant assets are also called *plant and equipment; property, plant and equipment (PP&E);* or *fixed assets.* Exhibit 8.1 shows plant assets as a percentage of total assets for several companies.

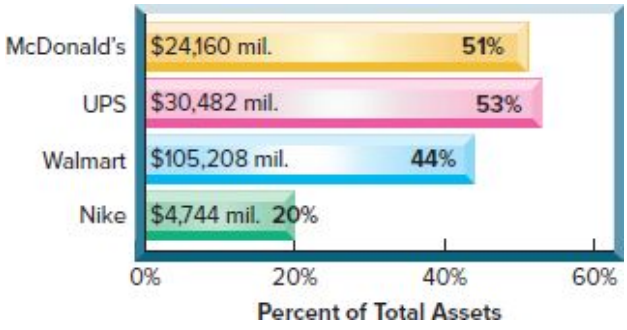


EXHIBIT 8.1

Plant Assets

Plant assets are set apart from other assets by two important features. First, *plant assets are used in operations.* A computer purchased to resell is reported on the balance sheet as inventory. If the same computer is used in operations, it is a plant asset. Another example is land held for expansion, which is reported as a long-term investment. Instead, if this land holds a factory used in operations, the land is a plant asset.

The second important feature is that *plant assets have useful lives extending over more than one accounting period.* This makes plant assets different from current assets such as supplies that are normally used up within one period.

Exhibit 8.2 shows four issues in accounting for plant assets: (1) computing the costs of plant assets, (2) allocating the costs of plant assets, (3) accounting for subsequent expenditures to plant assets, and (4) recording the disposal of plant assets. The following sections discuss these issues.

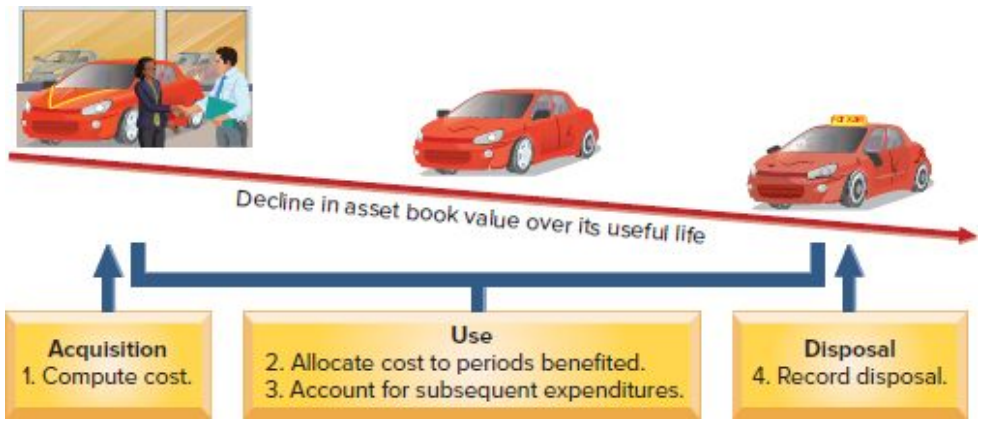


EXHIBIT 8.2

Accounting for Plant Assets

COST DETERMINATION

page 314

C1

Compute the cost of plant assets.

Plant assets are recorded at cost when acquired. **Cost** includes all expenditures necessary to get an asset in place and ready for use.

The cost of a machine, for example, includes its invoice cost minus any discount, plus necessary shipping, assembling, installing, and testing costs. Examples are the costs of building a base for a machine, installing electrical hookups, and testing the asset before using it in operations.

To be recorded as part of the cost of a plant asset, an expenditure must be normal, reasonable, and necessary in preparing it for its intended use. If an asset is damaged during unpacking, the repairs are not added to its cost. Instead, they are charged to an expense account. Costs to modify or customize a new plant asset are added to the asset's cost. This section explains how to determine the cost of plant assets for its four major classes.

Machinery and Equipment

The costs of machinery and equipment consist of all costs normal and necessary to purchase them and prepare them for their intended use. These include the purchase price, taxes, transportation charges, insurance while in transit, and the installing, assembling, and testing of the machinery and equipment.

Buildings

A Building account consists of the costs of purchasing or constructing a building that is used in operations. A purchased building's costs include its purchase price, taxes, title fees, and lawyer fees. Its costs also include all expenditures to ready it for its intended use, including necessary repairs or renovations. When a company constructs a building or any plant asset for its own use, its costs include materials and labor plus indirect overhead cost. Overhead includes heat, lighting, power, and depreciation on machinery used to construct the asset. Costs of construction also include design fees, building permits, and insurance during construction. However, costs such as insurance to cover the asset *after* it is being used are operating expenses.

Land Improvements

Point: Entry for cash purchase of land improvements:

Land Improvements #

Cash #

Land improvements are additions to land and have limited useful lives. Examples are parking lots, driveways, walkways, fences, and lighting systems. Land improvements include costs necessary to make those improvements ready for their intended use.

Land

Land is the earth's surface and has an indefinite (unlimited) life. Land includes costs necessary to make it ready for its intended use. When land is purchased for a building site, its cost includes the total amount paid for the land, including real estate commissions, title insurance fees, legal fees, and any accrued property taxes paid by the purchaser. Payments for surveying, clearing, grading, and draining also are included in the cost of land. Other costs include government assessments, whether incurred at the time of purchase or later, for items such as public roads, sewers, and sidewalks. These assessments are included because they permanently add to the land's value (and are not depreciated as they are not the company's responsibility). Land purchased as a building site can include unwanted structures. The cost of removing those structures, less amounts recovered through sale of salvaged materials, is charged to the Land account.

Assume **Starbucks** paid $167,000 cash to acquire land for a coffee shop. This land had an old service garage that was removed at a net cost of $13,000 ($15,000 in costs less $2,000 proceeds from salvaged materials). Additional closing costs total $10,000, consisting of brokerage fees ($8,000), legal fees ($1,500), and title costs ($500). The cost of this land to Starbucks is $190,000 and is computed as shown in Exhibit 8.3.

Cash price of land	$ 167,000
Net cost of garage removal	13,000
Closing costs	10,000
Cost of land	**$190,000**

Entry for cash purchase of land:

Land	190,000	
Cash		190,000
Record purchase of land.		

EXHIBIT 8.3

Recording Cost of Land

Lump-Sum Purchase

page 315

Plant assets sometimes are purchased as a group in a single transaction for a lump-sum price. This transaction is called a *lump-sum purchase,* or *group, bulk,* or *basket purchase.* When this occurs, we allocate the cost to the assets acquired based on their *relative market* (or *appraised*) *values.* Assume **CarMax** paid $90,000 cash to acquire a group of items consisting of a building appraised at $60,000 and land appraised at $40,000. The $90,000 cost is allocated based on appraised values, as shown in Exhibit 8.4. The entry to record the lump-sum purchase also is shown in Exhibit 8.4.

	Appraised Value	Percent of Total	Apportioned Cost
Building	$ 60,000	60% ($60,000/$100,000)	**$54,000** ($90,000 × 60%)
Land	40,000	40 ($40,000/$100,000)	**36,000** ($90,000 × 40%)
Totals	$100,000	100%	$ 90,000

Entry for lump-sum cash purchase:

Building	54,000	
Land	36,000	
Cash		90,000
Record costs of assets.		

EXHIBIT 8.4

Lump-Sum Purchase

NEED-TO-KNOW 8-1

Cost Determination

C1

Compute the recorded cost of a new machine given the following payments related to its purchase: gross purchase price, $700,000; sales tax, $49,000; purchase discount taken, $21,000; freight cost—terms FOB shipping point, $3,500; normal assembly costs, $3,000; cost of necessary machine platform, $2,500; and cost of parts used in maintaining machine, $4,200.

Solution

$$\$737{,}000 = \$700{,}000 + \$49{,}000 - \$21{,}000 + \$3{,}500 + \$3{,}000 + \$2{,}500$$

= $700,000 + $49,000 − $21,000 + $3,500 + $3,000 + $2,500

Do More: QS 8-1, QS 8-2, E 8-1, E 8-2, E 8-3

DEPRECIATION

P1

Compute and record depreciation using the straight-line, units-of-production, and declining-balance methods.

Depreciation is the process of allocating the cost of a plant asset to expense while it is in use. Depreciation does not measure the decline in the asset's market value or its physical deterioration. This section covers computing depreciation.

Factors in Computing Depreciation

Factors that determine depreciation are (1) cost, (2) salvage value, and (3) useful life.

Cost The cost of a plant asset consists of all necessary and reasonable expenditures to acquire it and to prepare it for its intended use.

Salvage Value **Salvage value**, also called *residual value* or *scrap value,* is an estimate of the asset's value at the end of its useful life. This is the amount the owner expects to receive from disposing of the asset at the end of its useful life. If the asset is expected to be traded in on a new asset, its salvage value is the expected trade-in value. If we expect disposal costs, the salvage value equals the expected amount received from disposal less any disposal costs.

Useful Life **Useful life** of a plant asset is the length of time it is used in a company's operations. Useful life, or *service life,* might not be as long as the asset's total productive life. For example, the productive life of a computer can be eight years or more. Some companies, however, trade in old computers for new ones every two years. In this case, these computers have a two-year useful life. The useful life of a plant asset is impacted by inadequacy and obsolescence. **Inadequacy** is the inability of a plant asset to meet its demands. **Obsolescence** is the process of becoming outdated and no longer used.

Point: Useful life and salvage value are estimates.

Depreciation Methods

Depreciation methods are used to allocate a plant asset's cost over its useful life. The most frequently used method is the straight-line method. The units-of-production and double-declining methods are also commonly used. We explain all three methods. Computations in this section use information about a machine used by **Reebok** and **Adidas** to inspect athletic shoes before packaging. Data for this machine are in Exhibit 8.5.

Cost	$10,000
Salvage value	1,000
Depreciable cost	$ 9,000

Useful life:	
Accounting periods	5 years
Units inspected	36,000 shoes

EXHIBIT 8.5

Data for Machine

Straight-Line Method **Straight-line depreciation** charges the same amount to each period of the asset's useful life. A two-step

process is used. We first compute the **depreciable cost** of the asset, also called *cost to be depreciated.* It is computed as asset total cost minus salvage value. Second, depreciable cost is divided by the number of accounting periods in the asset's useful life. The computation for the inspection machine is in Exhibit 8.6.

$$\frac{\textbf{Cost} - \textbf{Salvage value}}{\textbf{Useful life in periods}} = \frac{\$10{,}000 - \$1{,}000}{5 \text{ years}} = \$1{,}800 \text{ per year}$$

Point: Excel for SLN.

	A	B
1	Cost	$10,000
2	Salvage	$1,000
3	Life	5
4	SLN depr.	

=SLN(B1,B2,B3) = $1,800

Assets = Liabilities + Equity
−1,800 −1,800

EXHIBIT 8.6

Straight-Line Depreciation Formula

If this machine is purchased on December 31, 2020, and used during its predicted useful life of five years, the straight-line method allocates equal depreciation to each of the years 2021 through 2025. We make the following adjusting entry at the end of each of the five years to record straight-line depreciation.

Dec. 31	Depreciation Expense	1,800	
	Accumulated Depreciation—Machinery		1,800
	Record annual depreciation.		

The $1,800 Depreciation Expense is reported on the income statement. The $1,800 **Accumulated Depreciation is a contra asset account to the Machinery account on the balance sheet.** Accumulated Depreciation has a normal credit balance. The left graph in Exhibit 8.7 shows the $1,800 per year expense reported in each of the five years. The right graph shows the Machinery account balance (net) on each of the six December 31 balance sheets.

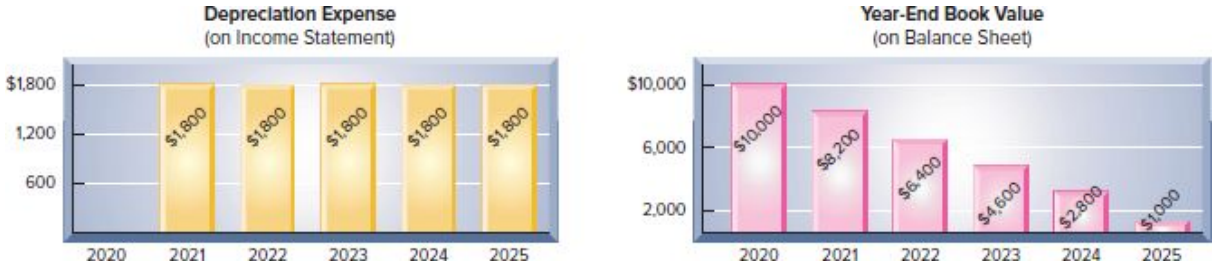


EXHIBIT 8.7

Financial Statement Effects of Straight-Line Depreciation

The net balance sheet amount is the **asset book value,** or *book value,* and is the asset's total cost minus accumulated depreciation. For example, at the end of the first year, its book value is $8,200, which is $10,000 minus $1,800, and is reported in the balance sheet as follows.

Book value = Cost - Accumulated depreciation

Machinery	$10,000		OR	
Less accumulated depreciation	1,800	$8,200 ←	Book value	→ Machinery (net of $1,800 accumulated depreciation) $8,200

We also can compute the *straight-line depreciation rate,* page 317 which is 100% divided by the number of periods in the asset's useful life. For the inspection machine, this rate is 20% (100% ÷ 5 years, or 20% per period). We use this rate, along with other information, to compute the machine's *straight-line depreciation schedule* shown in Exhibit 8.8. This exhibit shows (1) straight-line depreciation is the same each period, (2) accumulated depreciation is the total of current and prior periods' depreciation expense, and (3) book value declines each period until it equals salvage value.

	Depreciation for the Period			End of Period	
Annual Period	Depreciable Cost*	Depreciation Rate	Depreciation Expense	Accumulated Depreciation	Book Value†
2020	—	—	—	—	$10,000
2021	$9,000	20%	$1,800	$1,800	8,200
2022	9,000	20	1,800	3,600	6,400
2023	9,000	20	1,800	5,400	4,600
2024	9,000	20	1,800	7,200	2,800
2025	9,000	20	1,800	9,000	**1,000**
			$9,000 ←	$10,000 cost – $1,000 salvage	

*$10,000 – $1,000. †Book value is total cost minus accumulated depreciation.

EXHIBIT 8.8

Straight-Line Depreciation Schedule

Units-of-Production Method The use of some plant assets varies greatly from one period to the next. For example, a builder might use a piece of equipment for a month and then not use it again for several months. When equipment use varies from period to period, the units-of-production depreciation method can better match expenses with revenues. **Units- of-production depreciation** charges a varying amount for each period depending on an asset's *usage*. A two-step process is used.

1. Compute *depreciation per unit* as the asset's total cost minus salvage value and then divide by the total units expected to be produced during its useful life. Units of production can be expressed in product or other units such as hours used or miles driven.
2. Compute depreciation expense for the period by multiplying the depreciation per unit by the units produced in the period.

The computation for the machine described in Exhibit 8.5 is in Exhibit 8.9. The company reports that 7,000 shoes are inspected and sold in its first year.

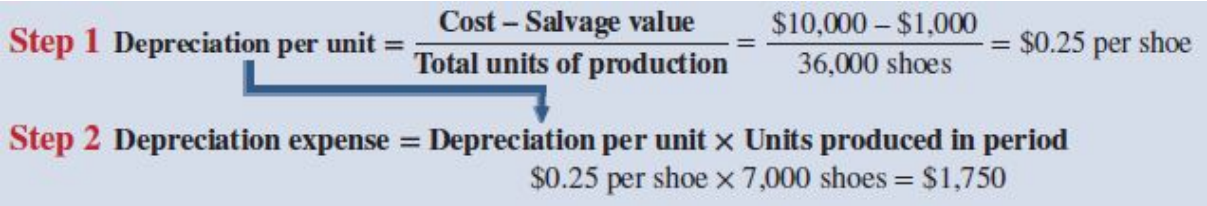


EXHIBIT 8.9

Units-of-Production Depreciation Formula

Using data on the number of units inspected (shoes produced) by the machine, we compute the *units-of-production depreciation schedule* in Exhibit 8.10. For example, depreciation for the first year is $1,750 (7,000 shoes at $0.25 per shoe). Depreciation for the second year is $2,000 (8,000 shoes at $0.25 per shoe). Exhibit 8.10 shows (1) depreciation expense depends on unit output, (2) accumulated

depreciation is the total of current and prior periods' depreciation expense, and (3) book value declines each period until it equals salvage value. **Once an asset's book value equals its salvage value, depreciation stops.**

Example: Refer to Exhibit 8.10. If the number of shoes inspected in 2025 is 5,500, what is depreciation for 2025? Answer: $1,250 (never depreciate below salvage value)

	Depreciation for the Period			End of Period	
Annual Period	Number of Units	Depreciation per Unit	Depreciation Expense	Accumulated Depreciation	Book Value
2020	—	—	—	—	$10,000
2021	7,000	$0.25	$1,750	$1,750	8,250
2022	8,000	0.25	2,000	3,750	6,250
2023	9,000	0.25	2,250	6,000	4,000
2024	7,000	0.25	1,750	7,750	2,250
2025	5,000	0.25	1,250	9,000	1,000
	36,000 units	$10,000 cost – $1,000 salvage →	$9,000	Salvage value is not depreciated.	

EXHIBIT 8.10

Units-of-Production Depreciation Schedule

$$\text{SL rate} = \frac{100\%}{\text{Useful life}}$$

$$\text{DDB rate} = \frac{200\%}{\text{Useful life}}$$

Point: Excel for DDB.

	A	B
1	Cost	$10,000
2	Salvage	$1,000
3	Life	5
4	DDB depr.	
5	1	
6	2	
7	etc.	

=DDB(B1,B2,B3,A5)= $4,000

=DDB(B1,B2,B3,A6)= $2,400

Declining-Balance Method An **accelerated depreciation method** has more depreciation in the early years and less depreciation in later years. The most common accelerated method is the **declining-balance method**, which uses a depreciation rate that is a multiple of the straight-line rate. A common depreciation

page 318

rate is double the straight-line rate. This is called *double-declining-balance (DDB)*. This is done in three steps.

1. Compute the asset's straight-line depreciation rate.
2. Double the straight-line rate.
3. Compute depreciation by multiplying this rate by the asset's beginning-period book value.

The first-year depreciation computation for the machine described in Exhibit 8.5 is in Exhibit 8.11. The three steps are

1. Divide 100% by five years to get the straight-line rate of 20%, or 1/5, per year.
2. Double this 20% rate to get the declining-balance rate of 40%, or 2/5, per year.
3. Compute depreciation as 40%, or 2/5, multiplied by the beginning-period book value.

Step 1 **Straight-line rate = 100% ÷ Useful life** = 100% ÷ 5 years = 20%

Step 2 **Double-declining-balance rate = 2 × Straight-line rate** = 2 × 20% = 40%

Step 3 **Depreciation expense = Double-declining-balance rate × Beginning-period book value**

40% × $10,000 = $4,000 (for 2021)

*In simple form: DDB depreciation = (2 × Beginning-period book value)/Useful life.

EXHIBIT 8.11

Double-Declining-Balance Depreciation Formula*

The *double-declining-balance depreciation schedule* is in Exhibit 8.12. The schedule follows the formula except for year 2025, when depreciation is $296. This $296 is not equal to 40% × $1,296, or $518.40. If we had used the $518.40 for depreciation in 2025, the ending book value would equal $777.60, which is less than the $1,000 salvage value. Instead, the $296 is computed as $1,296 book value minus $1,000 salvage value (for the year when DDB depreciation cuts into salvage value).

Annual Period	Depreciation for the Period: Beginning-of-Period Book Value	Depreciation for the Period: Depreciation Rate	Depreciation for the Period: Depreciation Expense	End of Period: Accumulated Depreciation	End of Period: Book Value
2020	—	—	—	—	$10,000
2021	$10,000	40%	$4,000	$4,000	6,000
2022	6,000	40	2,400	6,400	3,600
2023	3,600	40	1,440	7,840	2,160
2024	2,160	40	864	8,704	1,296
2025	1,296	40	296	9,000	1,000
		$10,000 cost – $1,000 salvage →	$9,000	Salvage value is not depreciated.	

EXHIBIT 8.12

Double-Declining-Balance Depreciation Schedule

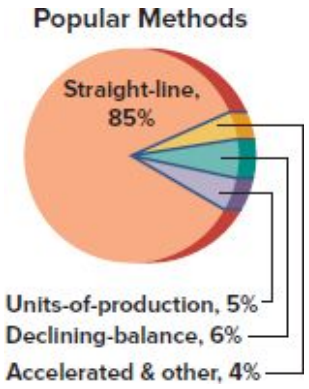
Comparing Depreciation Methods Exhibit 8.13 shows page 319 depreciation for each year under the three methods. While depreciation per period differs, total depreciation of $9,000 is the same over the useful life.

Period	Straight-Line	Units-of-Production	Double-Declining-Balance
2021	$1,800	$1,750	$4,000
2022	1,800	2,000	2,400
2023	1,800	2,250	1,440
2024	1,800	1,750	864
2025	1,800	1,250	296
Totals	$9,000	$9,000	$9,000

EXHIBIT 8.13

Depreciation Expense for the Different Methods

Depreciation for Tax Reporting Many companies use accelerated depreciation in computing taxable income. Reporting higher depreciation expense in the early years of an asset's life reduces the company's taxable income in those years and increases it in later years. The goal is to *postpone* its tax payments. The U.S. tax law has rules for depreciating assets. These rules include the **Modified Accelerated Cost Recovery System (MACRS)**, which allows straight-line depreciation for some assets but requires accelerated depreciation for most kinds of assets. MACRS is *not* acceptable for financial reporting because it does not consider an asset's useful life or salvage value.



Partial-Year Depreciation

C2

Explain depreciation for partial years and changes in estimates.

When an asset is purchased or sold at a time other than the beginning or end of an accounting period, depreciation is recorded for part of that period.

Mid-Period Asset Purchase Assume that the machine in Exhibit 8.5 is purchased and placed in service on October 1, 2020, and the annual accounting period ends on December 31. Because this machine is used for three months in 2020, the calendar-year income statement reports depreciation for those three months. Using straight-line depreciation, we compute three months' depreciation of $450 as follows.

$$\frac{\$10{,}000 - \$1{,}000}{5 \text{ years}} \times \frac{3}{12} = \$450$$

Mid-Period Asset Sale Assume that the machine above is sold on June 1, 2025. Depreciation is recorded in 2025 for the period January 1 through June 1 as follows.

$$\frac{\$10{,}000 - \$1{,}000}{5 \text{ years}} \times \frac{5}{12} = \$750$$

Point: Assets purchased on days 1 through 15 of a month are usually recorded as purchased on the 1st of that month. Assets purchased on

days 16 to month-end are recorded as if purchased on the 1st of the next month. The same applies to asset sales.

Change in Estimates

Depreciation is based on estimates of salvage value and useful life. If our estimate of an asset's useful life and/or salvage value changes, what should we do? The answer is to use the new estimate to compute depreciation for current and future periods. Revising an estimate of the useful life or salvage value of a plant asset is called a **change in an accounting estimate** and only affects current and future financial statements. We do not go back and restate (change) prior years' statements. This applies to all depreciation methods.

Let's return to the machine in Exhibit 8.8 using straight-line depreciation. At the beginning of this asset's third year, its book value is $6,400. Assume that at the beginning of its third year, the estimated number of years remaining in its useful life changes from three to four years *and* its estimate of salvage value changes from $1,000 to $400. Depreciation for each of the four remaining years is computed as in Exhibit 8.14.

	Original Depreciation	Revised Depreciation
2020	—	—
2021	$1,800	$1,800
2022	1,800	1,800
2023	1,800	1,500
2024	1,800	1,500
2025	1,800	1,500
2026	—	1,500
	$9,000	$9,600

EXHIBIT 8.14

Revised Straight-Line Depreciation

$$\frac{\text{Book value} - \text{Revised salvage value}}{\text{Revised remaining useful life}} = \frac{\$6{,}400 - \$400}{4 \text{ years}} = \$1{,}500 \text{ per year}$$

Standret/Shutterstock

Decision Ethics

Controller You are the controller for a struggling tulip grower. Depreciation of equipment is its largest expense. Competitors depreciate equipment over three years. The company president tells you to revise useful lives of equipment from three to six years. What should you do? ■ *Answer:* The president's instructions may be an honest and reasonable prediction of the future. However, you might confront the president if you believe the aim is only to increase income.

NEED-TO-KNOW 8-2

Depreciation Computations

C2 P1

Part 1. A machine costing $22,000 with a five-year life and an estimated $2,000 salvage value is installed on January 1. The manager estimates the machine will produce 1,000 units of product during its life. It actually produces the following units: 200 in Year 1, 400 in Year 2, 300 in Year 3, 80 in Year 4, and 30 in Year 5. The total units produced by the end of Year 5 exceed the original estimate—this difference was not predicted. (The machine must not be depreciated below its estimated salvage value.) Compute-depreciation for each year under straight-line, units-of-production, and double-declining-balance.

Part 2. In early January, a company acquires equipment for $3,800. The company estimates this equipment has a useful life of three years and a salvage value of $200. On January 1 of the third year, the company changes its estimates to a total four-year useful life and zero salvage value. Using the straight-line method, what is depreciation expense for the third year?

Solution—Part 1

Year	Depreciation Expense: Straight-Line[a]	Units-of-Production[b]	Double-Declining-Balance[c]
1	$ 4,000	$ 4,000	$ 8,800
2	4,000	8,000	5,280
3	4,000	6,000	3,168
4	4,000	1,600	1,901
5	4,000	400	851
Totals	$20,000	$20,000	$20,000

[a]Straight-line: Expense per year = ($22,000 − $2,000)/5 years = **$4,000 per year**

[b]Units-of-production: Expense per unit = ($22,000 − $2,000)/1,000 units = $20 per unit

Year	Units	Depreciation per Unit	Depreciation Expense	Accum. Deprec.	Book Value
1	200	$20	$ 4,000	$ 4,000	$18,000
2	400	20	8,000	12,000	10,000
3	300	20	6,000	18,000	4,000
4	80	20	1,600	19,600	2,400
5	30	20	400*	20,000*	2,000
Total			$20,000		

*30 × $20 = $600; however, $600 would make accumulated depreciation exceed the $20,000 total depreciable cost. This means we take only enough depreciation in Year 5, a total of $400, to decrease book value to the asset's $2,000 salvage value (never lower).

[c]Double-declining-balance: (100%/5) × 2 = 40% depreciation rate

Year	Beginning Book Value	Depreciation Expense (40% of Beg. book value)	Accumulated Depreciation at Year-End	Ending Book Value (Cost less Accumulated Depreciation)
1	$22,000	$ 8,800	$ 8,800	$13,200
2	13,200	5,280	14,080	7,920
3	7,920	3,168	17,248	4,752
4	4,752	1,901*	19,149	2,851
5	2,851	851†	20,000	2,000
Total		$20,000		

*Rounded to the nearest dollar.

†Set depreciation in Year 5 to reduce book value to the $2,000 salvage value; namely, instead of $1,140 ($2,851 × 40%), we use the maximum of $851 ($2,851 − $2,000).

Solution—Part 2

($3,800 − $200)/3 years = $1,200 (original depreciation per year)

$1,200 × 2 years = $2,400 (accumulated depreciation at date of change in estimate)

($3,800 − $2,400)/2 years = **$700** (revised depreciation)

Do More: QS 8-4 through QS 8-10, E 8-4 through E 8-13

ADDITIONAL EXPENDITURES

C3

Distinguish between revenue and capital expenditures, and account for them.

Plant assets require maintenance, repairs, and improvements. We must decide whether to expense or capitalize these expenditures (to capitalize is to increase the asset account).

Revenue expenditures, also called *income statement expenditures,* are costs that do not materially increase the plant asset's life or capabilities. They are recorded as expenses on the current-period income statement.

Capital expenditures, also called *balance sheet expenditures,* are costs of plant assets that provide benefits for longer than the current period. They increase the asset on the balance sheet.

Ordinary Repairs

Ordinary repairs are expenditures to keep an asset in good operating condition. Ordinary repairs do not extend an asset's useful life or increase its productivity beyond original expectations. Examples are normal costs of cleaning, lubricating, changing oil, and replacing small parts of a machine. Ordinary repairs are *revenue expenditures.* This means their costs are reported as expenses on the current-period income statement. Following this rule, **Brunswick** reports that "maintenance and repair costs are expensed as incurred." If Brunswick's current- year repair costs are $9,500, it makes the following entry.

Dec. 31	Repairs Expense	9,500	
	Cash		9,500
	Record ordinary repairs of equipment.		

Assets = Liabilities + Equity
−9,500 −9,500

Betterments and Extraordinary Repairs

Betterments and extraordinary repairs are *capital expenditures*.

Betterments (Improvements) **Betterments**, or *improvements,* are expenditures that make a plant asset more efficient or productive. A betterment often involves adding a component to an asset or replacing an old component with a better one and does not always increase useful life. An example is replacing manual controls on a machine with automatic controls. One special type of betterment is an *addition,* such as adding a new dock to a warehouse. Because a betterment benefits future periods, it is debited to the asset account as a capital expenditure. The new book value (less salvage value) is then depreciated over the asset's remaining useful life. Assume a company pays $8,000 for a machine with an eight-year useful life and no salvage value. After three years and $3,000 of depreciation, it adds an automated control system to the machine at a cost of $1,800. The cost of the betterment is added to the Machinery account with the following entry.

Jan. 2	Machinery	1,800	
	Cash		1,800
	Record installation of automated system.		

Assets = Liabilities + Equity
+1,800
−1,800

After this entry, the remaining cost to be depreciated is $6,800, computed as $8,000 − $3,000 + $1,800. Depreciation for the remaining five years is $1,360 per year, computed as $6,800⁄5 years.

Additional Expenditures	Examples	Expense Timing	Entry
Ordinary repairs	• Cleaning • Lubricating • Adjusting • Repainting	Expensed currently	Repairs Expense..... # Cash..... #
Betterments and extraordinary repairs	• Replacing main parts • Major asset expansions	Expensed in future	Asset (such as Equip.) # Cash..... #

Extraordinary Repairs (Replacements) **Extraordinary repairs** are expenditures that extend the asset's useful life beyond its original estimate. Their costs are debited to the asset account. Both extraordinary repairs and betterments require revising future depreciation.

DISPOSALS OF PLANT ASSETS

P2

Account for asset disposal through discarding or selling an asset. page 322

Disposal of plant assets occurs in one of three ways: discarding, sale, or exchange. Discarding and selling are covered here; Appendix 8A covers exchanges. The steps for disposing of plant assets are in Exhibit 8.15.

1. Record depreciation up to the date of disposal—this also updates Accumulated Depreciation.
2. Record the removal of the disposed asset's account balances—including its accumulated depreciation.
3. Record any cash (and/or other assets) received or paid in the disposal.
4. Record any gain or loss—equal to the value of any assets received minus the disposed asset's book value.

EXHIBIT 8.15

Accounting for Disposals

Discarding Plant Assets

A plant asset is *discarded* when it is no longer useful to the company and it has no market value. Assume that a machine costing $9,000 with accumulated depreciation of $9,000 is discarded. When accumulated depreciation equals the asset's cost, it is said to be *fully depreciated* (zero book value). The entry to record the discarding of this asset is

Assets = Liabilities + Equity
+9,000
−9,000

June 5	Accumulated Depreciation—Machinery	9,000	
	Machinery		9,000
	Discarding of fully depreciated machinery.		

This entry reflects all four steps of Exhibit 8.15. Step 1 is unnecessary because the machine is fully depreciated. Step 2 is reflected in the debit to Accumulated Depreciation and credit to Machinery. Because no other asset is involved, step 3 is irrelevant. Finally, because book value is zero and no other asset is involved, no gain or loss is recorded in step 4.

How do we account for discarding an asset that is not fully depreciated or one whose depreciation is not up-to-date? To answer this, consider equipment costing $8,000 with accumulated depreciation of $6,000 on December 31 of the prior fiscal year-end. This equipment is being depreciated by $1,000 per year using the straight-line method over eight years with zero salvage. On July 1 of the current year it is discarded. Step 1 is to bring depreciation up-to-date.

Assets = Liabilities + Equity
−500 −500

July 1	Depreciation Expense	500	
	Accumulated Depreciation—Equipment		500
	Record 6 months' depreciation ($1,000 × 6/12).		

Point: Recording depreciation expense up-to-date gives an up-to-date book value for determining gain or loss.

Assets = Liabilities + Equity
+6,500 −1,500
−8,000

July 1	Accumulated Depreciation—Equipment	6,500	
	Loss on Disposal of Equipment	1,500	
	Equipment		8,000
	Discard equipment with a $1,500 book value.		

Steps 2 through 4 of Exhibit 8.15 are reflected in the second (and final) entry.

This loss is computed by comparing the equipment's $1,500 book value ($8,000 − $6,000 − $500) with the zero net cash proceeds. The loss is reported in the Other Expenses and Losses section of the income statement. Discarding an asset can sometimes require a cash payment that would increase the loss.

page 323

Selling Plant Assets

To demonstrate selling plant assets, consider BTO's March 31 sale of equipment that cost $16,000 and has accumulated depreciation of $12,000 at December 31 of the prior year-end. Annual depreciation on this equipment is $4,000 using straight-line. Step 1 of this sale is to record depreciation expense and update accumulated depreciation to March 31 of the current year.

Mar. 31	Depreciation Expense	1,000	
	Accumulated Depreciation—Equipment		1,000
	Record 3 months' depreciation ($4,000 × 3/12).		

Assets = Liabilities + Equity
−1,000 −1,000

Steps 2 through 4 need one final entry that depends on the amount received from the sale. We cover three different possibilities.

Sale at Book Value If BTO receives $3,000 cash, an amount equal to the equipment's book value as of March 31 (book value = $16,000 − $12,000 − $1,000), no gain or loss is recorded. The entry is

Sale price = Book value → No gain or loss

Mar. 31	Cash	3,000	
	Accumulated Depreciation—Equipment	13,000	
	Equipment		16,000
	Record sale of equipment for no gain or loss.		

Assets = Liabilities + Equity
+3,000
+13,000
−16,000

Sale above Book Value If BTO receives $7,000, an amount that is $4,000 above the equipment's $3,000 book value as of March 31, a gain is recorded. The entry is

Mar. 31	Cash	7,000	
	Accumulated Depreciation—Equipment	13,000	
	Gain on Disposal of Equipment		4,000
	Equipment		16,000
	Record sale of equipment for a $4,000 gain.		

Assets = Liabilities + Equity
+7,000 +4,000
+13,000
−16,000

Sale below Book Value If BTO receives $2,500, an amount that is $500 below the equipment's $3,000 book value as of March 31, a loss is recorded. The entry is

Sale price < Book value → Loss

Mar. 31	Cash	7,000	
	Accumulated Depreciation—Equipment	13,000	
	Gain on Disposal of Equipment		4,000
	Equipment		16,000
	Record sale of equipment for a $4,000 gain.		

Assets = Liabilities + Equity
+7,000 +4,000
+13,000
−16,000

NEED-TO-KNOW 8-3

Additional Expenditures and Asset Disposals

C3 P2

Part 1. A company pays $1,000 for equipment expected to last four years and have a $200 salvage value. Prepare journal entries to record the following costs related to the equipment.

a. During the second year of the equipment's life, $400 cash is paid for a new component expected to materially increase the equipment's productivity.

b. During the third year, $250 cash is paid for normal repairs necessary to keep the equipment in good working order.

c. During the fourth year, $500 is paid for repairs expected to increase the useful life of the equipment from four to five years.

Part 2. A company owns a machine that cost $500 and has page 324 accumulated depreciation of $400. Prepare the entry to record the disposal of the machine on January 2 in each separate situation.

a. The company disposed of the machine, receiving nothing in return.

b. The company sold the machine for $80 cash.

c. The company sold the machine for $100 cash.

d. The company sold the machine for $110 cash.

Solution—Part 1

a.

Year 2	Equipment	400	
	Cash		400
	Record betterment.		

b.

Year 3	Repairs Expense	250	
	Cash		250
	Record ordinary repairs.		

c.

Year 4	Equipment	500	
	Cash		500
	Record extraordinary repairs.		

Do More: QS 8-11, QS 8-12, E 8-14 through E 8-18

Solution—Part 2 *(Note: Book value of machine = $500 − $400 = $100)*

a. Disposed of at no value.

Jan. 2	Loss on Disposal of Machine	100	
	Accumulated Depreciation—Machine	400	
	Machine		500
	Record disposal of machine.		

b. Sold for $80 cash.

Jan. 2	Cash	80	
	Loss on Sale of Machine	20	
	Accumulated Depreciation—Machine	400	
	Machine		500
	Record sale of machine below book value.		

c. Sold for $100 cash.

Jan. 2	Cash	100	
	Accumulated Depreciation—Machine	400	
	Machine		500
	Record sale of machine at book value.		

d. Sold for $110 cash.

Jan. 2	Cash	110	
	Accumulated Depreciation—Machine	400	
	Gain on Sale of Machine		10
	Machine		500
	Record sale of machine above book value.		

Section 2—Natural Resources

P3

Account for natural resource assets and their depletion.

Natural resources are assets that are physically consumed when used. Examples are standing timber, mineral deposits, and oil and gas fields. These assets are soon-to-be inventories of raw materials after cutting, mining, or pumping. Until that conversion happens, they are reported as noncurrent assets under either plant assets or their own category using titles such as *Timberlands, Mineral deposits,* or *Oil reserves*.

Cost Determination and Depletion

Natural resources are recorded at cost, which includes all expenditures necessary to acquire the resource and prepare it for use. **Depletion** is the process of allocating the cost of a natural resource to the period when it is consumed. Natural resources are reported on the balance sheet at cost minus *accumulated depletion.* The depletion expense per period is usually based on units extracted from cutting, mining, or pumping. This is similar to units-of-production depreciation.

To demonstrate, consider a mineral deposit with an estimated 250,000 tons of available ore. It is purchased for $500,000, and we expect zero salvage value. The depletion charge per ton of ore mined is $2, computed as $500,000 ÷ 250,000 tons. If 85,000 tons are mined and sold in the first year, the depletion charge for that year is $170,000. These computations are in Exhibit 8.16.

Step 1 $$\text{Depletion per unit} = \frac{\text{Cost} - \text{Salvage value}}{\text{Total units of capacity}} = \frac{\$500{,}000 - \$0}{250{,}000 \text{ tons}} = \$2 \text{ per ton}$$

Step 2 $$\text{Depletion expense} = \text{Depletion per unit} \times \text{Units extracted and sold in period}$$
$$= \$2 \times 85{,}000 = \$170{,}000$$

EXHIBIT 8.6

Depletion Formula

Depletion expense for the first year is recorded as follows.

Dec. 31	Depletion Expense—Mineral Deposit	170,000	
	Accumulated Depletion—Mineral Deposit		170,000
	Record depletion of the mineral deposit.		

Assets = Liabilities + Equity
−170,000 −170,000

The period-end balance sheet reports the mineral deposit as shown in Exhibit 8.17.

Mineral deposit	$500,000	
Less accumulated depletion	170,000	$330,000

OR

Mineral deposit (net of $170,000 accumulated depletion)	$330,000

EXHIBIT 8.17

Balance Sheet Presentation of Natural Resources

Because all 85,000 tons of the mined ore are sold during the year, the entire $170,000 of depletion is reported on the income statement. If some of the ore remains unsold at year-end, the depletion related to the unsold ore is carried forward on the balance sheet and reported as Ore Inventory, a current asset. Altering our example, assume that of the 85,000 tons mined the first year, only 70,000 tons are sold. We record depletion of $140,000 (70,000 tons × $2 depletion per unit) and the remaining ore inventory of $30,000 (15,000 tons × $2 depletion per unit) as follows.

page 325

Dec. 31	Depletion Expense—Mineral Deposit	140,000	
	Ore Inventory	30,000	
	Accumulated Depletion—Mineral Deposit		170,000
	Record depletion and inventory of mineral deposit.		

Assets = Liabilities + Equity
−170,000 −140,000
+30,000

Plant Assets Tied into Extracting

Mining, cutting, or pumping natural resources requires machinery, equipment, and buildings. When the usefulness of these plant assets is directly related to the depletion of a natural resource, their costs are depreciated using the units-of-production method in proportion to the depletion of the natural resource. For example, if a machine is permanently installed in a mine and 10% of the ore is mined and sold in the period, then 10% of the machine's cost (minus any salvage value) is depreciated. The same procedure is used when a machine is abandoned once resources are extracted. If the machine will be used

at another site when extraction is complete, it is depreciated over its own useful life.

Ethical Risk

Play It Safe Long-term assets must be safeguarded against theft, misuse, and damage. Controls include use of security tags, monitoring of rights infringements, and approvals of asset disposals. A study reports that 43% of employees in operations and services witnessed the wasting, mismanaging, or abusing of assets in the past year (KPMG). ■

BeyondImages/iStock/Getty Images

NEED-TO-KNOW 8-4

Depletion Accounting

P3

A company acquires a zinc mine at a cost of $750,000 on January 1. At that same time, it incurs additional costs of $100,000 to access the mine, which is estimated to hold 200,000 tons of zinc. The estimated value of the land after the zinc is removed is $50,000.

1. Prepare the January 1 entry(ies) to record the cost of the zinc mine.
2. Prepare the December 31 year-end adjusting entry if 50,000 tons of zinc are mined, but only 40,000 tons are sold the first year.

Solution

1.

Jan. 1	Zinc Mine	850,000	
	Cash		850,000
	Record cost of zinc mine.		

2. Depletion per unit = ($750,000 + $100,000 − $50,000)/200,000 tons = $4.00 per ton

Dec. 31	Depletion Expense—Zinc Mine	160,000	
	Zinc Inventory	40,000	
	Accumulated Depletion—Zinc Mine		200,000
	Record depletion of zinc mine (50,000 × $4.00).		

Do More: QS 8-13, E 8-19, E 8-20, P 8-7

Section 3—Intangibles

P4

Account for intangible assets.

Intangible assets are nonphysical assets used in operations that give companies long-term rights or competitive advantages. Examples are patents, copyrights, licenses, leaseholds, franchises, and trademarks. Lack of physical substance does not always mean an intangible asset. For example, notes and accounts receivable lack physical substance but are not intangibles. This section covers common types of intangible assets.

Cost Determination and Amortization

An intangible asset is recorded at cost when purchased. Intangibles can have limited lives or indefinite lives. If an intangible has a **limited life**, its cost is expensed over its estimated useful life using **amortization**. If an intangible asset has an **indefinite life**—meaning that no legal, competitive, economic, or other factors limit its useful life

—it is not amortized. If an intangible with an indefinite life is later judged to have a limited life, it is amortized over that limited life.

Amortization of intangible assets is similar to depreciation. However, only the straight-line method is used for amortizing intangibles *unless* the company can show that another method is preferred. Amortization is recorded in a contra account, Accumulated Amortization, which has a normal credit balance. The acquisition cost of intangible assets is disclosed along with the accumulated amortization. The disposal of an intangible asset involves removing its book value, recording any other asset(s) received or given up, and recognizing any gain or loss for the difference.

Many intangibles have limited lives due to laws, contracts, or other reasons. Examples are patents, copyrights, and leaseholds. The cost of intangible assets is amortized over the periods expected to benefit from their use, but this period cannot be longer than the assets' legal existence. Other intangibles such as trademarks and trade names have indefinite lives and are not amortized. An intangible asset that is not amortized is tested annually for **impairment**—if necessary, an impairment loss is recorded. (Details are in advanced courses.)

Intangible assets are often in a separate section of the balance sheet immediately after plant assets. For example, **Nike** follows this approach in reporting nearly $300 million of intangible assets in its balance sheet, plus $140 million in goodwill. Companies usually disclose their amortization periods for intangibles. The remainder of our discussion focuses on accounting for specific types of intangible assets.

Jiangsihui/Shutterstock

Types of Intangibles

Patents The federal government grants patents to encourage the invention of new technology and processes. A **patent** is an exclusive

right granted to its owner to manufacture and sell a patented item or to use a process for 20 years. When patent rights are purchased, the cost to acquire the rights is debited to an account called Patents. If the owner engages in lawsuits to successfully defend a patent, the cost of lawsuits is debited to the Patents account; if the defense is unsuccessful, the book value of the patent is expensed. However, the costs of research and development leading to a new patent are expensed when incurred.

A patent's cost is amortized over its estimated useful life (not to exceed 20 years). If we purchase a patent costing $25,000 with a useful life of 10 years, we make the following adjusting entry at the end of each of the 10 years to amortize one-tenth of its cost. The $2,500 debit to Amortization Expense is on the income statement. The Accumulated Amortization—Patents account is a contra asset account to Patents.

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Dec. 31	Amortization Expense—Patents	2,500	
	Accumulated Amortization—Patents		2,500
	Amortize patent costs over its useful life.		

Assets = Liabilities + Equity
−2,500 −2,500

Copyrights A **copyright** gives its owner the exclusive right to publish and sell a musical, literary, or artistic work during the life of the creator plus 70 years, although the useful life of most copyrights is much shorter. The costs of a copyright are amortized over its useful life. The only identifiable cost of many copyrights is the fee paid to the Copyright Office. Identifiable costs of a copyright are capitalized (recorded in an asset account) and amortized by debiting an account called Amortization Expense—Copyrights.

Franchises and Licenses **Franchises** and **licenses** are rights that a company or government grants an entity to sell a product or service under specified conditions. Many organizations grant franchise and license rights—**Anytime Fitness**, **Firehouse Subs**, and **Major League Baseball** are just a few examples. The costs of franchises and licenses are debited to a Franchises and Licenses asset account and are amortized over the life of the agreement. If an agreement is for an indefinite time, those costs are not amortized.

Trademarks and Trade Names A **trademark** or **trade (brand) name** is a symbol, name, phrase, or jingle identified with a company,

product, or service. Examples are Nike Swoosh, Big Mac, Coca-Cola, and Corvette. Ownership and exclusive right to use a trademark or trade name often are granted to the company that used it first. Ownership is best established by registering a trademark or trade name with the government's Patent Office. The cost of developing, maintaining, or enhancing the value of a trademark or trade name (such as advertising) is charged to expense when incurred. If a trademark or trade name is purchased, however, its cost is debited to an asset account and then amortized over its expected life. If the company plans to renew indefinitely its right to the trademark or trade name, the cost is not amortized.

Point: McDonald's "golden arches" are one of the world's most valuable trademarks, yet this asset is not on McDonald's balance sheet.

Goodwill **Goodwill** is the amount by which a company's value exceeds the value of its individual assets and liabilities. This implies that the company as a whole has certain valuable attributes not measured in assets and liabilities. These can include superior management, skilled workforce, good supplier or customer relations, quality products or services, good location, or other competitive advantages.

Goodwill is only recorded when an entire company or business segment is purchased. Purchased goodwill is computed as purchase price of the company minus the market value of net assets (excluding goodwill). **Google** paid $1.19 billion to acquire **YouTube**; about $1.13 of the $1.19 billion was for goodwill. Goodwill is recorded as an asset, and it is *not* amortized. Instead, goodwill is annually tested for impairment. (Details are in advanced courses.)

Right-of-Use Asset (Lease) Property is rented under a contract called a **lease.** The property's owner, called the **lessor,** grants the lease. The one who secures the right to possess and use the property is called the **lessee.** A **leasehold** is the rights the lessor grants to the lessee under the terms of the lease.

Lease or Buy Some advantages of leasing an asset versus buying it are that

- Little or no up-front payment is normally required (making it more affordable).
- Lease terms often allow exchanges to trade up on leased assets (reducing obsolescence).

Leasehold Improvements A lessee sometimes pays for improvements to the leased property such as partitions, painting, and storefronts. These improvements are called **leasehold improvements,** and the lessee debits these costs to a Leasehold Improvements account. The lessee amortizes these costs over the life of the lease or the life of the improvements, whichever is shorter. The amortization entry *debits* Amortization Expense—Leasehold-Improvements and *credits* Accumulated Amortization—Leasehold Improvements.

Other Intangibles There are other types of intangible assets such as software, noncompete covenants, customer lists, and so forth. Accounting for them is the same as for other intangibles.

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Research and Development **Research and development costs** are expenditures to discover new products, new processes, or knowledge. Creating patents, copyrights, and innovative products and services requires research and development costs. **The costs of research and development are expensed when incurred** because it is difficult to predict the future benefits from research and development. GAAP does **not** include them as intangible assets.

Yoshikazu Tsuno/AFP/Getty Images

Decision Insight

Save Mickey **Walt Disney Company** successfully lobbied Congress to extend copyright protection from the life of the creator plus 50 years to the life of the creator plus 70 years. This extension allows the company to protect its characters for 20 additional years before the right to use them enters the public domain. Mickey Mouse is now protected by copyright law

through start of 2024. The law is officially termed the Copyright Term Extension Act (CTEA), but it is also known as the Mickey Mouse Protection Act. ■

NEED-TO-KNOW 8-5

Accounting for Intangibles

P4 ▶

Part 1. A publisher purchases the copyright on a book for $1,000 on January 1 of this year. The copyright lasts five more years. The company plans to sell prints for seven years. Prepare entries to record the purchase of the copyright on January 1 and its annual amortization on December 31.

Part 2. On January 3 of this year, a retailer pays $9,000 to modernize its store. Improvements include lighting, partitions, and a sound system. These improvements are estimated to yield benefits for five years. The retailer leases its store and has three years remaining on its lease. Prepare the entry to record (a) the cost of modernization and (b) amortization at the end of this year.

Part 3. On January 6 of this year, a company pays $6,000 for a patent with a remaining 12-year legal life to produce a supplement expected to be marketable for 3 years. Prepare entries to record its acquisition and the December 31 amortization entry.

Solution—Part 1

Jan. 1	Copyright	1,000	
	Cash		1,000
	Record purchase of copyright.		

Dec. 31	Amortization Expense—Copyright	200	
	Accumulated Amortization—Copyright		200
	Record amortization ($1,000/5 years).		

Solution—Part 2

a.

Jan. 3	Leasehold Improvements	9,000	
	Cash		9,000
	Record leasehold improvements.		

b.

Dec. 31	Amortization Expense—Leasehold Improvements	3,000	
	Accumulated Amortization—Leasehold Improvements		3,000
	*Record amortization over remaining life.**		

Solution—Part 3

Jan. 6	Patents	6,000	
	Cash		6,000
	Record purchase of patent.		

Dec. 31	Amortization Expense*	2,000	
	Accumulated Amortization—Patents		2,000
	Record amortization of patent.		
	**\$6,000/3 years = \$2,000*		

Do More: QS 8-15, QS 8-16, QS 8-17, QS 8-18, E 8-21, E 8-22, E 8-23

Decision Analysis — Total Asset Turnover

A1

Compute total asset turnover and apply it to analyze a company's use of assets.

$$\text{Total asset turnover} = \frac{\text{Net sales}}{\text{Average total assets}}$$

EXHIBIT 8.18

Total Asset Turnover

One important measure of a company's ability to use its assets efficiently and effectively is **total asset turnover**, defined in Exhibit 8.18. Net sales is net amounts earned from the

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sale of products and services. Average total assets is (Current period-end total assets + Prior period-end total assets)/2. A higher total asset turnover means a company is generating more net sales for each dollar of assets. Management is evaluated on efficient and effective use of total assets by looking at total asset turnover.

Let's look at total asset turnover in Exhibit 8.19 for two competing companies: **Starbucks** and **Jack in the Box**. To show how we use total asset turnover, let's look at Starbucks. We express Starbucks's use of assets in generating net sales by saying, "it turned its assets over 1.22 times during the current year." This means that each $1.00 of assets produced $1.22 of net sales.

Company	Figure ($ millions)	Current Year	1 Year Ago	2 Years Ago
Starbucks	Net sales	$26,509	$24,720	$22,387
	Average total assets	$21,688	$19,261	$14,339
	Total asset turnover	1.22	1.28	1.56
Jack in the Box	Net sales	$950	$870	$1,097
	Average total assets	$891	$1,029	$1,290
	Total asset turnover	1.07	0.85	0.85

EXHIBIT 8.19

Analysis Using Total Asset Turnover

Is a total asset turnover of 1.22 good or bad? All companies want a high total asset turnover. Interpreting the total asset turnover requires an understanding of company operations. Some operations are capital-intensive, meaning that a relatively large amount is invested in plant assets to generate sales. This results in a lower total asset turnover. Other companies' operations are labor-intensive, meaning that they generate sales using people instead of assets. In that case, we expect a higher total asset turnover.

Starbucks's turnover is higher than that for Jack in the Box. However, Starbucks's total asset turnover decreased over the last three years. To maintain a strong total asset turnover, Starbucks must grow sales at a rate equal to, or higher than, its total asset growth.

Decision Maker

Environmentalist A paper manufacturer claims it cannot afford more environmental controls. It points to its low total asset turnover of 1.9 and argues that it cannot compete with companies whose total asset turnover is much higher. Examples cited are food stores (5.5) and auto dealers (3.8). How do you respond? ■ *Answer:* The paper manufacturer's comparison of its total asset turnover with food stores and auto dealers is misdirected. You need to collect data from competitors in the paper industry to show that a 1.9 total asset turnover is about the norm for this industry.

NEED-TO-KNOW 8-6

COMPREHENSIVE

Acquisition, Cost Allocation, and Disposal of Tangible and Intangible Assets

On July 1, Year 1, Tulsa Company pays $600,000 to acquire a fully equipped factory. The purchase includes the following assets.

Asset	Appraised Value	Salvage Value	Useful Life	Depreciation Method
Land	$160,000			Not depreciated
Land improvements	80,000	$ 0	10 years	Straight-line
Building	320,000	100,000	10 years	Double-declining-balance
Machinery	240,000	20,000	10,000 units	Units-of-production
Total	$800,000			

Required

1. Allocate the total $600,000 purchase cost among the separate assets in the table above.
2. Compute the Year 1 (six months) and Year 2 depreciation expense for each asset in the table above. The machinery produced 700 units in Year 1 and 1,800 units in Year 2.
3. Tulsa also discarded equipment at year-end that had page 330 been on its books for five years. The equipment's original cost was $12,000 (estimated life of five years) and its salvage value was $2,000. No depreciation had been recorded for the fifth year when the disposal occurred. Journalize the fifth year of depreciation (straight-line method) and the asset's disposal.

4. On January 1 of the current year, Tulsa purchased a patent for $100,000 cash. The company estimated the patent's useful life to be 10 years. Journalize the patent acquisition and its amortization for this year.

5. Tulsa also acquired an ore deposit for $600,000 cash. It added roads and built mine shafts for an additional cost of $80,000. Salvage value of the mine is estimated to be $20,000. The company estimated 330,000 tons of available ore. During the first year, Tulsa mined and sold 10,000 tons of ore. Journalize the mine's acquisition and its first year's depletion.

SOLUTION

1. Allocation of the total cost of $600,000 among the separate assets.

Asset	Appraised Value	Percent of Total Value	Apportioned Cost
Land	$160,000	20%	$120,000 ($600,000 × 20%)
Land improvements	80,000	10	60,000 ($600,000 × 10%)
Building	320,000	40	240,000 ($600,000 × 40%)
Machinery	240,000	30	180,000 ($600,000 × 30%)
Total	$800,000	100%	$ 600,000

2. Depreciation for each asset. (Land is not depreciated.)

Land Improvements	
Cost	$ 60,000
Salvage value	0
Depreciable cost	$ 60,000
Useful life	10 years
Annual depreciation expense ($60,000/10 years)	$ 6,000
Year 1 depreciation ($6,000 × 6/12)	$ 3,000
Year 2 depreciation	$ 6,000

Building	
Straight-line rate = 100%/10 years = 10%	
Double-declining-balance rate = 10% × 2 = 20%	
Year 1 depreciation ($240,000 × 20% × 6/12)	$ 24,000
Year 2 depreciation [($240,000 − $24,000) × 20%]	$ 43,200

Machinery	
Cost	$180,000
Salvage value	20,000
Depreciable cost	$160,000
Total expected units of production	10,000 units
Depreciation per unit ($160,000/10,000 units)	$ 16
Year 1 depreciation ($16 × 700 units)	$ 11,200
Year 2 depreciation ($16 × 1,800 units)	$ 28,800

3. Record the depreciation up-to-date on the discarded asset.

Depreciation Expense—Equipment	2,000	
Accumulated Depreciation—Equipment		2,000
Record depreciation on date of disposal: ($12,000 – $2,000)/5.		

Record the removal of discarded asset and its loss on disposal.

Accumulated Depreciation—Equipment	10,000	
Loss on Disposal of Equipment	2,000	
Equipment		12,000
Record discarding of equipment with $2,000 book value.		

4.

Patent	100,000	
Cash		100,000
Record patent acquisition.		

Amortization Expense—Patent	10,000	
Accumulated Amortization—Patent		10,000
Record amortization expense: $100,000/10 years = $10,000.		

5.

Ore Deposit	680,000	
Cash		680,000
Record ore deposit acquisition.		

Depletion Expense—Ore Deposit	20,000	
Accumulated Depletion—Ore Deposit		20,000
Record depletion expense: ($680,000 – $20,000)/330,000 tons = $2 per ton. Depletion = $2 per ton × 10,000 tons mined and sold. = $20,000.		

APPENDIX 8A

P5

Account for asset exchanges.

Exchanging Plant Assets

Many plant assets such as machinery, automobiles, and equipment are exchanged for newer assets. In a typical exchange of plant assets, a *trade-in allowance* is received on the old asset and the balance is paid in cash. Accounting for the exchange of assets depends on whether the transaction has *commercial substance.* An exchange has commercial substance if the company's future cash flows change as a result of the exchange of one asset for another asset. If an asset exchange has commercial substance, a gain or loss is recorded based on the difference between the book value of the asset(s) given up and the market value of the asset(s) received. Because most exchanges have commercial substance, we cover gains and losses for only that situation. Advanced courses cover exchanges without commercial substance.

Exchange with Commercial Substance: A Loss A company acquires $42,000 in new equipment. In exchange, the company pays $33,000 cash and trades in old equipment. The old equipment originally cost $36,000 and has accumulated depreciation of $20,000, which implies a $16,000 book value at the time of exchange. This exchange has commercial substance and the old equipment has a trade-in allowance of $9,000. This exchange yields a loss, as computed in the middle (Loss) columns of Exhibit 8A.1; the loss is computed as Asset received − Assets given = $42,000 − $49,000 = $(7,000). We also can compute the loss as Trade-in allowance − Book value of assets given = $9,000 − $16,000 = $(7,000).

Asset Exchange Has Commercial Substance	Loss		Gain	
Market value of asset received		$42,000		$42,000
Book value of assets given:				
Equipment ($36,000 – $20,000)	$16,000		$16,000	
Cash	33,000	49,000	23,000	39,000
Gain (loss) on exchange		$(7,000)		$ 3,000

EXHIBIT 8A.1

Asset Exchange with Commercial Substance

The entry to record this asset exchange and the loss follows.

Jan. 3	Equipment (**new**)	42,000	
	Loss on Exchange of Assets	7,000	
	Accumulated Depreciation—Equipment (**old**)	20,000	
	Equipment (**old**)		36,000
	Cash		33,000
	Record exchange (with commercial substance) of old equipment and cash for new equipment.		

Assets	=	Liabilities	+	Equity
+42,000				−7,000
+20,000				
−36,000				
−33,000				

Point: "New" and "old" equipment are for illustration only. Both the debit and credit are to the same Equipment account.

Exchange with Commercial Substance: A Gain Let's assume the same facts as in the preceding asset exchange *except that the company pays $23,000 cash, not $33,000, with the trade-in.* This exchange has commercial substance and the old equipment has a trade-in allowance of $19,000. This exchange yields a gain, as computed in the right-most (Gain) columns of Exhibit 8A.1; the gain is computed as Asset received − Assets given = $42,000 − $39,000 = $3,000. We also can compute the gain as Trade-in allowance − Book value of assets given = $19,000 − $16,000 = $3,000. The entry to record this asset exchange and the gain follows.

Jan. 3	Equipment (**new**)	42,000	
	Accumulated Depreciation—Equipment (**old**)	20,000	
	Equipment (**old**)		36,000
	Cash		23,000
	Gain on Exchange of Assets		3,000
	Record exchange (with commercial substance) of old equipment and cash for new equipment.		

Assets	=	Liabilities	+	Equity
+42,000				+3,000
+20,000				
−36,000				
−23,000				

NEED-TO-KNOW 8-7

Asset Exchange

P5

A company acquires $45,000 in new web servers. In exchange, the company trades in old web servers along with a cash payment. The old servers originally cost $30,000 and had accumulated depreciation of $23,400 at the time of the trade. Prepare entries to record the trade under two different assumptions where (a) the

exchange has commercial substance and the old servers have a trade-in allowance of $3,000 and (b) the exchange has commercial substance and the old servers have a trade-in allowance of $7,000.

Solution

a.

Equipment (new)	45,000	
Loss on Exchange of Assets	3,600	
Accumulated Depreciation—Equipment (old)	23,400	
Equipment (old)		30,000
Cash ($45,000 – $3,000)		42,000

b.

Equipment (new)	45,000	
Accumulated Depreciation—Equipment (old)	23,400	
Equipment (old)		30,000
Cash ($45,000 – $7,000)		38,000
Gain on Exchange of Assets		400

Do More: QS 8-22, E 8-25, E 8-26

Summary: Cheat Sheet

PLANT ASSETS

Cost of plant assets: Normal, reasonable, and necessary costs in preparing an asset for its intended use. If an asset is damaged during unpacking, the repairs are not added to its cost. Instead, they are charged to an expense account.

Machinery and equipment: Cost includes purchase price, taxes, transportation, insurance while in transit, installation, assembly, and testing.

Building: A purchased building's costs include its purchase price, real estate fees, taxes, title fees, and attorney fees. A constructed building's costs include construction costs and insurance during construction, but not insurance after it is completed.

Land improvements: Additions to land that have limited useful lives.- Examples are parking lots, driveways, and lights.

Land: Has an indefinite (unlimited) life and costs include real estate commissions, clearing, grading, and draining.

Lump-sum purchase: Plant assets purchased as a group for a single lump-sum price. We allocate the cost to the assets acquired based on their relative market (or appraised) values.

	Appraised Value	Percent of Total	Apportioned Cost
Building	$ 60,000	60% ($60,000/$100,000)	$54,000 ($90,000 × 60%)
Land	40,000	40 ($40,000/$100,000)	36,000 ($90,000 × 40%)
Totals	$100,000	100%	$ 90,000

Entry for lump-sum cash purchase:

Building	54,000	
Land	36,000	
Cash		90,000
Record costs of assets.		

Depreciation: Process of allocating the cost of a plant asset to expense while it is in use.

Salvage value: Estimate of the asset's value at the end of its useful life.

Useful life: Length of time a plant asset is to be used in operations.

Record depreciation expense:

Depreciation Expense	1,800	
Accumulated Depreciation—"Asset Type"		1,800

Straight-line depreciation: Charges the same amount of depreciation expense in each period of the asset's useful life.

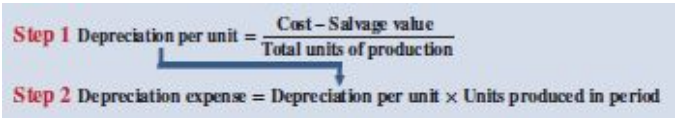
Straight-line depreciation formula:

$$\text{Depreciation expense} = \frac{\text{Cost} - \text{Salvage value}}{\text{Useful life in periods}}$$

Asset book value (or book value): Computed as the asset's total cost minus accumulated depreciation.

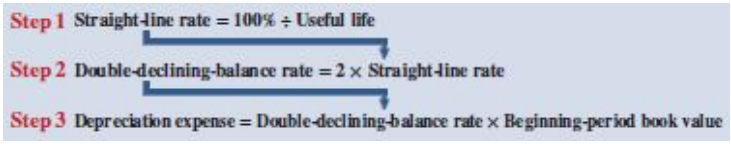
Units-of-production depreciation: Charges a varying amount for each period depending on an asset's usage.

Units-of-production formula:



Double-declining-balance depreciation: Charges more depreciation in early years and less depreciation in later years.

Double-declining-balance formula:



Change in an accounting estimate: For plant assets, it is changing the estimate of useful life or salvage value. It only affects current and future depreciation expense. Do not go back and change prior years' depreciation.

Straight-line depreciation after change in accounting estimate:

$$\frac{\text{Book value} - \text{Revised salvage value}}{\text{Revised remaining useful life}}$$

Ordinary repairs (revenue expenditure): Expenditures to keep an asset in good operating condition. They do not increase useful life or productivity. Include cleaning, changing oil, and minor repairs.

Repairs Expense	9,500	
Cash		9,500

Betterments (capital expenditure): Expenditures to make a plant asset more efficient or productive. Include upgrading components and adding additions onto plant assets.

Extraordinary repairs (capital expenditure): Expenditures that extend the asset's useful life beyond its original estimate.

Betterments and extraordinary repairs: These expenditures are "capitalized" by adding their costs to the plant asset.

"Plant Asset"	1,800	
Cash		1,800

Before discarding, selling, or exchanging a plant asset: Must record depreciation up to that date.

Depreciation Expense	500	
Accumulated Depreciation—Equipment		500

Discarding *fully* depreciated asset:

Accumulated Depreciation—Machinery	9,000	
Machinery		9,000

Discarding partially **depreciated asset:** Loss is the book value (Cost – Accumulated depreciation) of the asset when discarded.

Accumulated Depreciation—Equipment	6,500	
Loss on Disposal of Equipment	1,500	
Equipment		8,000

Sale of asset at book value: If sale price = book value, no gain or loss.

Cash	3,000	
Accumulated Depreciation—Equipment	13,000	
Equipment		16,000

Sale of asset above **book value:** If sale price > book value → gain.

Cash	7,000	
Accumulated Depreciation—Equipment	13,000	
Gain on Disposal of Equipment		4,000
Equipment		16,000

Sale of asset below **book value:** If sale price < book value → loss.

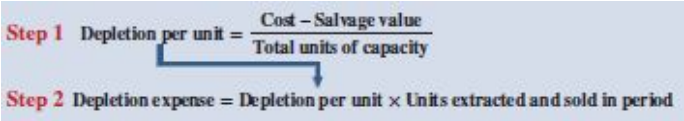
Cash	2,500	
Loss on Disposal of Equipment	500	
Accumulated Depreciation—Equipment	13,000	
Equipment		16,000

NATURAL RESOURCES

Natural resources: Assets that are physically consumed when used. Examples are standing timber, mineral deposits, and oil and gas fields.

Depletion*:* Process of allocating the cost of a natural resource.

Depletion formula:



Depletion expense (when *all* units extracted are sold):

Depletion Expense—Mineral Deposit	170,000	
Accumulated Depletion—Mineral Deposit		170,000

Depletion expense (when *not all* units extracted are sold):

Depletion Expense—Mineral Deposit	140,000	
Ore Inventory	30,000	
Accumulated Depletion—Mineral Deposit		170,000

INTANGIBLES

Intangible assets: Nonphysical assets (used in operations) that give companies long-term rights, privileges, or competitive advantages.

Amortization: Intangible assets with limited useful lives require amortization. It is similar to depreciation and uses the shorter of the legal life or useful life of the intangible for straight-line amortization.

Amortization Expense—Patents	2,500	
Accumulated Amortization—Patents		2,500

Patent: Exclusive right to manufacture and sell a patented item or to use a process for 20 years.

Copyright: Exclusive right to publish and sell a musical, literary, or artistic work during the life of the creator plus 70 years.

Franchises or licenses: Rights to sell a product or service under specified conditions.

Trademark or trade (brand) name: A symbol, name, phrase, or jingle identified with a company, product, or service.

Goodwill: Amount by which a company's value exceeds the value of its individual assets and liabilities (net assets). Goodwill is only recorded when an entire company or business segment is purchased. Not amortized, but tested for impairment.

Right-of-use asset (lease): Rights the lessor grants to the lessee under terms of the lease.

Leasehold improvements: Improvements to a leased (rented) property such as partitions, painting, and storefronts. The lessee amortizes these costs over the life of the lease or the life of the improvements, whichever is shorter.

Key Terms

Accelerated depreciation method (318)

Amortization (326)

Asset book value (316)

Betterments (321)

Capital expenditures (321)

Change in an accounting estimate (319)

Copyright (327)

Cost (314)

Declining-balance method (318)

Depletion (324)

Depreciable cost (316)

Depreciation (315)

Extraordinary repairs (322)

Franchises (327)

Goodwill (327)

Multiple Choice Quiz

1. A company paid $326,000 for property that included land, land improvements, and a building. The land was appraised at $175,000, the land improvements were appraised at $70,000, and the building was appraised at $105,000. What is the allocation of costs to the three assets?

a. Land, $150,000; Land Improvements, $60,000; Building, $90,000

b. Land, $163,000; Land Improvements, $65,200; Building, $97,800

c. Land, $150,000; Land Improvements, $61,600; Building, $92,400

d. Land, $159,000; Land Improvements, $65,200; Building, $95,400

e. Land, $175,000; Land Improvements, $70,000; Building, $105,000

2. A company purchased a truck for $35,000 on January 1, Year 1. The truck is estimated to have a useful life of four years and a salvage value of $1,000. Assuming that the company uses straight-line depreciation, what is depreciation expense for the year ended December 31, Year 2?

a. $8,750

b. $17,500

c. $8,500

d. $17,000

e. $25,500

3. A company purchased machinery for $10,800,000 on January 1, Year 1. The machinery has a useful life of 10 years and an estimated salvage value of $800,000. What is depreciation expense for the year ended December 31, Year 2, assuming that the double-declining-balance method is used?

a. $2,160,000

b. $3,888,000

c. $1,728,000

d. $2,000,000

e. $1,600,000

4. A company sold a machine that originally cost $250,000 for $120,000 when accumulated depreciation on the machine was $100,000. The gain or loss recorded on the sale is

a. $0 gain or loss.

b. $120,000 gain.

c. $30,000 loss.

d. $30,000 gain.

e. $150,000 loss.

5. A company had average total assets of $500,000, gross sales of $575,000, and net sales of $550,000. The company's total asset turnover is

a. 1.15.

b. 1.10.

c. 0.91.

d. 0.87.

e. 1.05.

ANSWERS TO MULTIPLE CHOICE QUIZ

1. b;

	Appraisal Value	%	Total Cost	Allocated
Land	$175,000	50%	$326,000	$163,000
Land improvements	70,000	20	326,000	65,200
Building	105,000	30	326,000	97,800
Totals	$350,000			$326,000

2. c; ($35,000 − $1,000)⁄4 years = $8,500 per year

3. c; Year 1: $10,800,000 × (2 × 10%) = $2,160,000 Year 2: ($10,800,000 − $2,160,000) × (2 × 10%) = $1,728,000

4. c;

Cost of machine	$250,000
Accumulated depreciation	100,000
Book value	150,000
Cash received	120,000
Loss on sale	$ 30,000

5. b; $550,000⁄$500,000 = 1.10

Superscript letter A denotes assignments based on Appendix 8A.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

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connect

QUICK STUDY

QS 8-1

Cost of plant assets **C1**

Kegler Bowling buys scorekeeping equipment with an invoice cost of $190,000. The electrical work required for the installation costs $20,000. Additional costs are $4,000 for delivery and $13,700 for sales tax. During the installation, the equipment was damaged and the cost of repair was $1,850.

What is the total recorded cost of the scorekeeping equipment?

QS 8-2

Assigning costs to plant assets

C1

Listed below are costs (or discounts) to purchase or construct new plant assets. (1) Indicate whether the costs should be *expensed* or *capitalized* (meaning they are included in the cost of the plant assets on the balance sheet). (2) For costs that should be capitalized, indicate in which category of plant assets (Equipment, Building, or Land) the related costs should be recorded on the balance sheet.

1. Wages paid to train employees to use new equipment.
2. Invoice cost paid for new equipment.
3. Early payment discount taken on the purchase of new equipment.
4. Realtor commissions incurred on land purchased.
5. Property taxes on land incurred a year after the land was purchased.
6. Costs of oil for the truck used to deliver new equipment.
7. Costs to lay foundation for a new building.
8. Insurance on a new building during its construction.

QS 8-3

Lump-sum purchase of assets **C1**

Diego Co. paid $180,000 cash to acquire a group of items page 335 consisting of land appraised at $50,000 and a building appraised at $150,000. Allocate total cost to these two assets and prepare an entry to record the purchase.

QS 8-4

Straight-line depreciation

P1

On January 1, the Matthews Band pays $65,800 for sound equipment. The band estimates it will use this equipment for four years and perform 200 concerts. It estimates that after four years it can sell the equipment for $2,000. During the first year, the band performs 45 concerts.

Compute the first-year depreciation using the straight-line method.

QS 8-5

Units-of-production depreciation **P1**

On January 1, the Matthews Band pays $65,800 for sound equipment. The band estimates it will use this equipment for four years and perform 200 concerts. It estimates that after four years it can sell the equipment for $2,000. During the first year, the band performs 45 concerts.

Compute the first-year depreciation using the units-of-production method.

QS 8-6

Double-declining-balance method **P1**

A building is acquired on January 1 at a cost of $830,000 with an estimated useful life of eight years and salvage value of $75,000. Compute depreciation expense for the first three years using the double-declining-balance method.

QS 8-7

Computing depreciation under different methods **P1**

Equipment costing $13,000 with a 10-year useful life and an estimated $3,000 salvage value is acquired and started operating on January 1. The equipment is estimated to produce 2,000 units of product during its life. It produced 160 units in the first year. Compute depreciation for the first year under straight-line, units-of-production, and double-declining-balance.

QS 8-8

Recording depreciation journal entries **P1**

Refer to QS 8-7 and record the journal entries for equipment depreciation for the first year under straight-line, units-of-production, and double-declining-balance.

QS 8-9

Straight-line, partial-year depreciation **C2**

On October 1, Organic Farming purchases wind turbines for $140,000. The wind turbines are expected to last six years, have a salvage value of $20,000, and be depreciated using the straight-line method.

1. Compute depreciation expense for the last three months of the first year.
2. Compute depreciation expense for the second year.

QS 8-10

Computing revised depreciation

C2

On January 1, the Matthews Band pays $65,800 for sound equipment. The band estimates it will use this equipment for four years and after four years it can sell the equipment for $2,000. Matthews Band uses straight-line depreciation but realizes at the start of the second year that this equipment will last only a total of three years. The salvage value is not changed.

Compute the revised depreciation for both the second and third years.

QS 8-11

Revenue and capital expenditures

C3

1. Classify the following as either a revenue expenditure or a capital expenditure.
    a. Paid $40,000 cash to replace a motor on equipment that extends its useful life by four years.

b. Paid $200 cash per truck for the cost of their annual tune-ups.

c. Paid $175 for the monthly cost of replacement filters on an air-conditioning system.

d. Completed an addition to a building for $225,000 cash.

2. Prepare the journal entries to record the four transactions from part 1.

QS 8-12

Disposal of assets **P2**

Garcia Co. owns equipment that cost $76,800, with accumulated depreciation of $40,800. Record the sale of the equipment under the following three separate cases assuming Garcia sells the equipment for (1) $47,000 cash, (2) $36,000 cash, and (3) $31,000 cash.

QS 8-13

Natural resources and depletion

P3

Perez Company acquires an ore mine at a cost of $1,400,000. It incurs additional costs of $400,000 to access the mine, which is estimated to hold 1,000,000 tons of ore. The estimated value of the land after the ore is removed is $200,000.

1. Prepare the entry(ies) to record the cost of the ore mine.

2. Prepare the year-end adjusting entry if 180,000 tons of ore are mined and sold the first year.

QS 8-14

Classifying assets

P3 P4

Identify the following as intangible assets, natural resources, or some other asset.

a. Oil well

b. Trademark

c. Leasehold

d. Gold mine

e. Building

f. Copyright

g. Franchise

h. Coal mine

i. Salt mine

QS 8-15

Intangible assets and amortization **P4**

On January 1 of this year, Diaz Boutique pays $105,000 to modernize its store. Improvements include new floors, ceilings, wiring, and wall coverings. These improvements are estimated to yield benefits for 10 years. Diaz leases (does not own) its store and has eight years remaining on the lease. Prepare the entry to record (1) the cost of modernization and (2) amortization at the end of this current year.

QS 8-16

Reporting intangible assets

P4

Robotix Co. purchases a patent for $20,000 on January 1. The patent is good for 18 years, after which anyone can use the patent technology. However, Robotix plans to sell products using that patent technology for only 5 years. Prepare the intangible asset section of the year end balance sheet after amortization expense for the year is recorded.

QS 8-17

Computing goodwill **P4**

Baine Company purchased Vera Company at a price of $500,000. The fair value of the net assets purchased equals $420,000. Compute the amount of goodwill that Baine records at the purchase date.

QS 8-18

Identifying research and development expenses

P4

A&J Co. incurred the following expenses related to patented drugs.

1. Indicate costs that are reported as research and development expenses on the income statement.
2. Indicate costs that are capitalized and reported in the Patent account on the balance sheet.

Legal fees in successful patent defense	$20,000	Acquired a new patent	$50,000
Researcher salaries to develop drugs	85,000	Research lab rent expense	6,000

QS 8-19

Preparing an income statement

P1 P3 P4

Selected accounts from Westeros Co.'s adjusted trial balance for the year ended December 31 follow. Prepare its income statement.

Sales	$30,000	Depreciation expense	$ 5,000
Repairs expense	500	Salaries expense	10,000
Depletion expense	4,000	Amortization expense	2,000

QS 8-20

Preparing assets section of a balance sheet

P1 P4

The asset accounts from Ridley Co.'s adjusted trial balance for its December 31 year-end follow. Prepare the assets section of its classified balance sheet.

Copyrights	$ 5,000	Trademarks	$20,000
Inventory	6,000	Cash	8,000
Accumulated amortization—Copyrights	1,000	Buildings	90,000
Accumulated depreciation—Buildings	18,000	Land	35,000

QS 8-21

Computing total asset turnover **A1**

Aneko Company reports the following: net sales of $14,800 for Year 2 and $13,990 for Year 1; end-of-year total assets of $19,100 for Year 2 and $17,900 for Year 1.

1. Compute total asset turnover for Year 2.
2. Aneko's competitor has a turnover of 2.0. Is Aneko performing better or worse than its competitor based on total asset turnover?

QS 8-22[A]

Asset exchange

P5

Caleb Co. owns a machine that had cost $42,400 with accumulated depreciation of $18,400. Caleb exchanges the machine for a newer model that has a market value of $52,000.

1. Record the exchange assuming Caleb paid $30,000 cash and the exchange has commercial substance.
2. Record the exchange assuming Caleb paid $22,000 cash and the exchange has commercial substance.

EXERCISES

Exercise 8-1

Cost of plant assets **C1**

Rizio Co. purchases a machine for $12,500, terms 2/10, n/60, FOB shipping point. Rizio paid within the discount period and took the $250 discount. Transportation costs of $360 were paid by Rizio. The machine required mounting and power connections costing $895. Another $475 is paid to assemble the machine, and $40 of materials are used to get it into operation. During installation, the machine was damaged and $180 worth of repairs were made. Compute the cost recorded for this machine.

Exercise 8-2

Recording costs of assets

C1

Cala Manufacturing purchases land for $390,000 as part of its page 337 plans to build a new plant. The company pays $33,500 to tear down an old building on the lot and $47,000 to fill and level the lot. It also pays construction costs of $1,452,200 for the new building and $87,800 for lighting and paving a parking area. Prepare a single journal entry to record these costs incurred by Cala, all of which are paid in cash.

Exercise 8-3

Lump-sum purchase of plant assets **C1**

Rodriguez Company pays $395,380 for real estate with land, land improvements, and a building. Land is appraised at $157,040; land improvements are appraised at $58,890; and the building is appraised at $176,670. Allocate the total cost among the three assets and prepare the journal entry to record the purchase.

Exercise 8-4

Straight-line depreciation

P1

Ramirez Company installs a computerized manufacturing machine in its factory at the beginning of the year at a cost of $43,500. The machine's useful life is estimated at 10 years, or 385,000 units of product, with a $5,000 salvage value. During its second year, the machine produces 32,500 units of product. Determine the machine's second-year depreciation under the straight-line method.

Exercise 8-5

Units-of-production depreciation **P1**

Ramirez Company installs a computerized manufacturing machine in its factory at the beginning of the year at a cost of $43,500. The machine's useful life is estimated at 10 years, or 385,000 units of product, with a $5,000 salvage value. During its second year, the machine produces 32,500 units of product. Determine the machine's second-year depreciation using the units-of-production method.

Exercise 8-6

Double-declining-balance depreciation **P1**

Ramirez Company installs a computerized manufacturing machine in its factory at the beginning of the year at a cost of $43,500. The machine's useful life is estimated at 10 years, or 385,000 units of product, with a $5,000 salvage value. During its second year, the machine produces 32,500 units of product. Determine the machine's second-year depreciation using the double-declining-balance method.

Exercise 8-7

Straight-line depreciation

P1

NewTech purchases computer equipment for $154,000 to use in operating activities for the next four years. It estimates the equipment's salvage value at $25,000. Prepare a table showing depreciation and book value for each of the four years assuming straight-line depreciation.

Exercise 8-8

Double-declining-balance depreciation **P1**

NewTech purchases computer equipment for $154,000 to use in operating activities for the next four years. It estimates the equipment's salvage value at $25,000. Prepare a table showing depreciation and book value for each of the four years assuming double-declining-balance depreciation.

Exercise 8-9

Straight-line depreciation and income effects

P1

Tory Enterprises pays $238,400 for equipment that will last five years and have a $43,600 salvage value. By using the equipment in its operations for five years, the company expects to earn $88,500 annually, after deducting all expenses except depreciation. Prepare a table showing income before depreciation, depreciation expense, and net (pretax) income for each year and for the total five-year period, assuming straight-line depreciation is used.

Exercise 8-10

Double-declining-balance depreciation **P1**

Tory Enterprises pays $238,400 for equipment that will last five years and have a $43,600 salvage value. By using the equipment in its operations for five years, the company expects to earn $88,500 annually, after deducting all expenses except depreciation. Prepare a table showing income before depreciation, depreciation expense, and net (pretax) income for each year and for the total five-year period, assuming double-declining-balance depreciation is used.

Check Year 3 NI, $54,170

Exercise 8-11

Straight-line, partial-year depreciation **C2**

On April 1, Cyclone Co. purchases a trencher for $280,000. The machine is expected to last five years and have a salvage value of $40,000. Compute depreciation expense at December 31 for both the first year and second year assuming the company uses the straight-line method.

Exercise 8-12

Double-declining- balance, partial-year depreciation **C2**

On April 1, Cyclone Co. purchases a trencher for $280,000. The machine is expected to last five years and have a salvage value of $40,000. Compute depreciation expense at December 31 for both the first year and second year assuming the company uses the double-declining-balance method.

Exercise 8-13

Revising depreciation

C2

Apex Fitness Club uses straight-line depreciation for a machine costing $23,860, with an estimated four-year life and a $2,400 salvage value. At the beginning of the third year, Apex determines that the machine has three more years of remaining useful life, after which it will have an estimated $2,000 salvage value. Compute (1) the machine's book value at the end of its second year and (2) the amount of depreciation for each of the final three years given the revised estimates.

Check (2) $3,710

Exercise 8-14

Ordinary repairs, extraordinary repairs, and betterments

C3

Oki Company pays $264,000 for equipment expected to last four years and have a $29,000 salvage value. Prepare journal entries to record the following costs related to the equipment.

1. Paid $22,000 cash for a new component that increased the equipment's productivity.
2. Paid $6,250 cash for minor repairs necessary to keep the equipment working well.
3. Paid $14,870 cash for significant repairs to increase the useful life of the equipment from four to seven years.

Exercise 8-15

Extraordinary repairs; plant asset age

C3

Martinez Company owns a building that appears on its prior year-end balance sheet at its original $572,000 cost less $429,000 accumulated depreciation. The building is depreciated on a straight-line basis assuming a 20-year life and no salvage value. During the first week in January of the current calendar year, major structural repairs are completed on the building at a $68,350 cost. The repairs extend its useful life for 5 years beyond the 20 years originally estimated.

1. Determine the building's age (plant asset age) as of the prior year-end balance sheet date.
2. Prepare the entry to record the cost of the structural repairs that are paid in cash.
3. Determine the book value of the building immediately after the repairs are recorded.
4. Prepare the entry to record the current calendar year's depreciation.

Check (3) $211,350

Exercise 8-16

Financial statement impact of plant asset transactions

C3 P1

Analyze each of the following transactions by showing its effects on the accounting equation—specifically, identify the accounts and amounts (including + or −) for each transaction.

Jan. 1 Purchased equipment for $25,000 cash. Estimated useful life is six years and salvage value is $6,000.

Jan. 2 Paid $5,000 cash to install automated controls on equipment. This betterment did not impact useful life or salvage value.

Aug. 15 Paid $200 cash for minor repair costs to equipment.

Exercise 8-17

Disposal of assets

P2

Diaz Company owns a machine that cost $250,000 and has accumulated depreciation of $182,000. Prepare the entry to record the disposal of the machine on January 1 in each separate situation.

1. The machine needed extensive repairs and was not worth repairing. Diaz disposed of the machine, receiving nothing in return.
2. Diaz sold the machine for $35,000 cash.
3. Diaz sold the machine for $68,000 cash.
4. Diaz sold the machine for $80,000 cash.

Exercise 8-18

Partial-year depreciation; disposal of plant asset

P2

Rayya Co. purchases a machine for $105,000 on January 1, 2021. Straight-line depreciation is taken each year for four years assuming a seven-year life and no salvage value. The machine is sold on July 1, 2025, during its fifth year of service. Prepare entries to record the

partial year's depreciation on July 1, 2025, and to record the sale under each separate situation.

1. The machine is sold for $45,500 cash.
2. The machine is sold for $25,000 cash.

Exercise 8-19

Depletion of natural resources

P3

Montana Mining Co. pays $3,721,000 for an ore deposit containing 1,525,000 tons. The company installs machinery in the mine costing $213,500. Both the ore and machinery will have no salvage value after the ore is completely mined. Montana mines and sells 166,200 tons of ore during the year. Prepare the December 31 year-end entries to record both the ore deposit depletion and the mining machinery depreciation. Mining machinery depreciation should be in proportion to the mine's depletion.

Exercise 8-20

Depletion of natural resources

P3

A company pays $760,000 cash to acquire an iron mine on January 1. At that same time, it incurs additional costs of $60,000 cash to access the mine, which is estimated to hold 100,000 tons of iron. The estimated value of the land after the iron is removed is $20,000.

1. Prepare the January 1 entry to record the cost of the iron mine.
2. Prepare the December 31 year-end adjusting entry if 20,000 tons of iron are mined but only 18,000 tons are sold this first year.

Exercise 8-21

Amortization of intangible assets **P4**

Milano Gallery purchases the copyright on a painting for $418,000 on January 1. The copyright is good for 10 more years, after which the copyright will expire and anyone can make prints. The company plans to sell prints for 11 years. Prepare entries to record the purchase of the copyright on January 1 and its annual amortization on December 31.

Exercise 8-22

Goodwill

P4

Robinson Company purchased Franklin Company at a price page 339 of $2,500,000. The fair market value of the net assets purchased equals $1,800,000.

1. What is the amount of goodwill that Robinson records at the purchase date?
2. Does Robinson amortize goodwill at year-end for financial reporting purposes? If so, over how many years is it amortized?
3. Robinson believes that its employees provide superior customer service, and through their efforts, Robinson believes it has created $900,000 of goodwill. Should Robinson Company record this goodwill?

Exercise 8-23

Preparing a balance sheet

P1 P3 P4

Selected accounts from Gregor Co.'s adjusted trial balance for the year ended December 31 follow. Prepare a classified balance sheet.

Common stock	$10,000	Accounts payable	$ 2,000
Retained earnings	40,000	Accumulated depreciation—Equipment	13,000
Patents	4,000	Notes payable (due in 9 years)	11,000
Cash	6,000	Goodwill	5,000
Land	30,000	Accumulated depletion—Silver mine	3,000
Equipment	20,000	Accumulated amortization—Patents	1,000
Silver mine	15,000		

Exercise 8-24

Computing and analyzing asset turnover **A1**

Lok Co. reports net sales of $5,856,480 for Year 2 and $8,679,690 for Year 3. End-of-year balances for total assets are Year 1, $1,686,000; Year 2, $1,800,000; and Year 3, $1,982,000. (a) Compute Lok's total asset turnover for Year 2 and Year 3. (b) Lok's competitor has a turnover of 3.0. Is Lok performing better or worse than its competitor on the basis of total asset turnover?

Exercise 8-25[A]

Exchanging assets

P5

Gilly Construction trades in an old tractor for a new tractor, receiving a $29,000 trade-in allowance and paying the remaining $83,000 in cash. The old tractor had cost $96,000 and had accumulated depreciation of $52,500. Answer the following questions assuming the exchange has commercial substance.

1. What is the book value of the old tractor at the time of exchange?
2. What is the loss on this asset exchange?
3. What amount should be recorded (debited) in the asset account for the new tractor?

Check (2) $14,500

Exercise 8-26[A]

Exchanging assets

P5

On January 2, Bering Co. disposes of a machine costing $44,000 with accumulated depreciation of $24,625. Prepare the entries to record the disposal under each separate situation.

1. The machine is sold for $18,250 cash.

2. The machine is traded in for a new machine having a $60,200 cash price. A $25,000 trade-in allowance is received, and the balance is paid in cash. Assume the asset exchange has commercial substance.
3. The machine is traded in for a new machine having a $60,200 cash price. A $15,000 trade-in allowance is received, and the balance is paid in cash. Assume the asset exchange has commercial substance.

Check (3) Dr. Loss on Exchange, $4,375

PROBLEM SET A

Problem 8-1A

Plant asset costs; depreciation methods

C1 P1

Timberly Construction makes a lump-sum purchase of several assets on January 1 at a total cash price of $900,000. The estimated market values of the purchased assets are building, $508,800; land, $297,600; land improvements, $28,800; and four vehicles, $124,800.

Required

1. Allocate the lump-sum purchase price to the separate assets purchased. Prepare the journal entry to record the purchase.
2. Compute the first-year depreciation expense on the building using the straight-line method, assuming a 15-year life and a $27,000 salvage value.
3. Compute the first-year depreciation expense on the land improvements assuming a five-year life and double-declining-balance depreciation.

Analysis Component

4. Compared to straight-line depreciation, does accelerated depreciation result in payment of less total taxes over the asset's

life?

Check (2) $30,000

(3) $10,800

Problem 8-2A

Depreciation methods

P1

A machine costing $257,500 with a four-year life and an estimated $20,000 salvage value is installed in Luther Company's factory on January 1. The factory manager estimates the machine will produce 475,000 units of product during its life. It actually produces the following units: 220,000 in Year 1, 124,600 in Year 2, 121,800 in Year 3, and 15,200 in Year 4. The total number of units produced by the end of Year 4 exceeds the original estimate—this difference was not predicted. Note: The machine cannot be depreciated below its estimated salvage value.

Check Year 4: units-of-production depreciation, $4,300; DDB depreciation, $12,187

Required

Prepare a table with the following column headings and page 340 compute depreciation for each year (and total depreciation of all years combined) for the machine under each depreciation method.

Year	Straight-Line	Units-of-Production	Double-Declining-Balance

---

Problem 8-3A

Asset cost allocation; straight-line depreciation

C1 P1

On January 1, Mitzu Co. pays a lump-sum amount of $2,600,000 for land, Building 1, Building 2, and Land Improvements 1. Building 1 has

no value and will be demolished. Building 2 will be an office and is appraised at $644,000, with a useful life of 20 years and a $60,000 salvage value. Land Improvements 1 is valued at $420,000 and is expected to last another 12 years with no salvage value. The land is valued at $1,736,000. The company also incurs the following additional costs.

Cost to demolish Building 1	$ 328,400	Cost of additional land grading	$175,400
Cost to construct Building 3, having a useful life of 25 years and a $392,000 salvage value	2,202,000	Cost of new Land Improvements 2, having a 20-year useful life and no salvage value	164,000

Required

1. Prepare a table with the following column headings: Land, Building 2, Building 3, Land Improvements 1, and Land Improvements 2. Allocate the costs incurred by Mitzu to the appropriate columns and total each column.

Check (1) Land costs, $2,115,800; Building 2 costs, $598,000

(3) Depr.—Land Improv. 1 and 2, $32,500 and $8,200

2. Prepare a single journal entry to record all the incurred costs assuming they are paid in cash on January 1.

3. Using the straight-line method, prepare the December 31 adjusting entries to record depreciation for the first year these assets were in use.

\

Problem 8-4A

Computing and revising depreciation; revenue and capital expenditures

C1 C2 C3

Champion Contractors completed the following transactions involving equipment.

Year 1

Jan. 1 Paid $287,600 cash plus $11,500 in sales tax and $1,500 in transportation (FOB shipping point) for a new loader. The loader

is estimated to have a four-year life and a $20,600 salvage value. Loader costs are recorded in the Equipment account.

3 Paid $4,800 to install air-conditioning in the loader to enable operations under harsher conditions. This increased the estimated salvage value of the loader by another $1,400.

Dec. 31 Recorded annual straight-line depreciation on the loader.

Year 2

Jan. 1 Paid $5,400 to overhaul the loader's engine, which increased the loader's estimated useful life by two years.

Feb. 17 Paid $820 for minor repairs to the loader after the operator backed it into a tree.

Dec. 31 Recorded annual straight-line depreciation on the loader.

Required

Prepare journal entries to record these transactions and events.

Check Dec. 31, Year 1: Dr. Depr. Expense—Equip., $70,850

Dec. 31, Year 2: Dr. Depr. Expense—Equip., $43,590

Problem 8-5A

Computing and revising depreciation; selling plant assets

C2 P1 P2

Yoshi Company completed the following transactions and events involving its delivery trucks.

Year 1

Jan. 1 Paid $20,515 cash plus $1,485 in sales tax for a new delivery truck estimated to have a five-year life and a $2,000 salvage value. Delivery truck costs are recorded in the Trucks account.

Dec. 31 Recorded annual straight-line depreciation on the truck.

Year 2

Dec. 31 The truck's estimated useful life was changed from five to fou years, and the estimated salvage value was increased to $2,400. Recorded annual straight-line depreciation on the truck.

Year 3

Dec. 31 Recorded annual straight-line depreciation on the truck.

31 Sold the truck for $5,300 cash.

Check Dec. 31, Year 2: Dr. Depr. Expense—Trucks, $5,200

Dec. 31, Year 3: Dr. Loss on Disposal of Trucks, $2,300

Required

Prepare journal entries to record these transactions and events.

Problem 8-6A

Disposal of plant assets

C1 P1 P2

page 341

Onslow Co. purchased a used machine for $178,000 cash on January 2. On January 3, Onslow paid $2,840 to wire electricity to the machine. Onslow paid an additional $1,160 on January 4 to secure the machine for operation. The machine will be used for six years and have a $14,000 salvage value. Straight-line depreciation is used. On December 31, at the end of its fifth year in operations, it is disposed of.

Required

1. Prepare journal entries to record the machine's purchase and the costs to ready it for use. Cash is paid for all costs incurred.
2. Prepare journal entries to record depreciation of the machine at December 31 of (*a*) its first year of operations and (*b*) the year of its disposal.
3. Prepare journal entries to record the machine's disposal under each separate situation: (*a*) it is sold for $15,000 cash and (*b*) it is sold for $50,000 cash.

Check (2b) Depr. Exp., $28,000

Problem 8-7A

Natural resources

P3

On July 23 of the current year, Dakota Mining Co. pays $4,715,000 for land estimated to contain 5,125,000 tons of recoverable ore. It installs and pays for machinery costing $410,000 on July 25. The company removes and sells 480,000 tons of ore during its first five months of operations ending on December 31. Depreciation of the machinery is in proportion to the mine's depletion as the machinery will be abandoned after the ore is mined.

Required

Check (*c*) Depletion, $441,600

(*d*) Depreciation, $38,400

Prepare entries to record (*a*) the purchase of the land, (*b*) the cost and installation of machinery, (*c*) the first five months' depletion assuming the land has a net salvage value of zero after the ore is mined, and (*d*) the first five months' depreciation on the machinery.

Analysis Component

(*e*) If the machine will be used at another site when extraction is complete, how would we depreciate this machine?

PROBLEM SET B

Problem 8-1B

Plant asset costs; depreciation methods

C1 P1

Nagy Company makes a lump-sum purchase of several assets on January 1 at a total cash price of $1,800,000. The estimated market values of the purchased assets are building, $890,000; land, $427,200; land improvements, $249,200; and five trucks, $213,600.

Required

1. Allocate the lump-sum purchase price to the separate assets purchased. Prepare the journal entry to record the purchase.
2. Compute the first-year depreciation expense on the building using the straight-line method, assuming a 12-year life and a $120,000 salvage value.
3. Compute the first-year depreciation expense on the land improvements assuming a 10-year life and double-declining-balance depreciation.

Analysis Component

4. Compared to straight-line depreciation, does accelerated depreciation result in payment of less total taxes over the asset's life?

Check (2) $65,000

(3) $50,400

Problem 8-2B

Depreciation methods

P1

On January 1, Manning Co. purchases and installs a new machine costing $324,000 with a five-year life and an estimated $30,000 salvage value. Management estimates the machine will produce 1,470,000 units of product during its life. Actual production of units is as follows: 355,600 in Year 1, 320,400 in Year 2, 317,000 in Year 3, 343,600 in Year 4, and 138,500 in Year 5. The total number of units produced by the end of Year 5 exceeds the original estimate—this difference was not predicted. Note: The machine cannot be depreciated below its estimated salvage value.

Required

Prepare a table with the following column headings and compute depreciation for each year (and total depreciation of all years combined) for the machine under each depreciation method.

Check DDB Depreciation, Year 3, $46,656; U-of-P Depreciation, Year 4, $68,720

Problem 8-3B

Asset cost allocation; straight-line depreciation

C1 P1

On January 1, ProTech Co. pays a lump-sum amount of $1,550,000 for land, Building A, Building B, and Land Improvements B. Building A has no value and will be demolished. Building B will be an office and is appraised at $482,800, with a useful life of 15 years and a $99,500 salvage value. Land Improvements B is valued at $142,000 and is expected to last another five years with no salvage value. The land is valued at $795,200. The company also incurs the following additional costs.

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Cost to demolish Building A	$ 122,000	Cost of additional land grading	$174,500
Cost to construct Building C, having a useful life of 20 years and a $258,000 salvage value	1,458,000	Cost of new Land Improvements C, having a 10-year useful life and no salvage value	103,500

Required

1. Prepare a table with the following column headings: Land, Building B, Building C, Land Improvements B, and Land Improvements C. Allocate the costs incurred by ProTech to the appropriate columns and total each column.

Check (1) Land costs, $1,164,500; Building B costs, $527,000

(3) Depr.—Land Improv. B and C, $31,000 and $10,350

2. Prepare a single journal entry to record all incurred costs assuming they are paid in cash on January 1.
3. Using the straight-line method, prepare the December 31 adjusting entries to record depreciation for the first year these assets were in use.

Problem 8-4B

Computing and revising depreciation; revenue and capital expenditures

C1 C2 C3

Mercury Delivery Service completed the following transactions involving equipment.

Year 1

Jan. 1 Paid $25,860 cash plus $1,810 in sales tax for a new delivery van that was estimated to have a five-year life and a $3,670 salvage value. Van costs are recorded in the Equipment account.

3 Paid $1,850 to install sorting racks in the van for more accurate and quicker delivery of packages. This increases the estimated salvage value of the van by another $230.

Dec. 31 Recorded annual straight-line depreciation on the van.

Year 2

Jan. 1 Paid $2,064 to overhaul the van's engine, which increased the van's useful life by two years.

May 10 Paid $800 for minor repairs to the van after the driver backed it into a loading dock.

Dec. 31 Recorded annual straight-line depreciation on the van.

Required

Prepare journal entries to record these transactions and events.

Check Dec. 31, Year 1: Dr. Depr. Expense—Equip., $5,124

Dec. 31, Year 2: Dr. Depr. Expense—Equip., $3,760

Problem 8-5B

Computing and revising depreciation; selling plant assets

C2 P1 P2

York Instruments completed the following transactions and events involving its machinery.

Year 1

Jan. 1 Paid $107,800 cash plus $6,470 in sales tax for a new machine. The machine is estimated to have a six-year life and a $9,720 salvage value.

Dec. 31 Recorded annual straight-line depreciation on the machinery.

Year 2

Dec. 31 The machine's estimated useful life was changed from six to four years, and the estimated salvage value was increased to $14,345. Recorded annual straight-line depreciation on the machinery.

Year 3

Dec. 31 Recorded annual straight-line depreciation on the machinery.

31 Sold the machine for $25,240 cash.

Required

Prepare journal entries to record these transactions and events.

Problem 8-6B

Disposal of plant assets

C1 P1 P2

On January 1, Walker purchased a used machine for $150,000. On January 4, Walker paid $3,510 to wire electricity to the machine. Walker paid an additional $4,600 on January 5 to secure the machine for operation. The machine will be used for seven years and have an $18,110 salvage value. Straight-line depreciation is used. On December 31, at the end of its sixth year of use, the machine is disposed of.

Required

1. Prepare journal entries to record the machine's purchase and the costs to ready it for use. Cash is paid for all costs incurred.

2. Prepare journal entries to record depreciation of the machine at December 31 of (*a*) its first year of operations and (*b*) the year of its disposal.

Check (2*b*) Depr. Exp., $20,000

3. Prepare journal entries to record the machine's disposal under each separate situation: (*a*) it is sold for $28,000 cash and (*b*) it is sold for $52,000 cash.

Problem 8-7B

Natural resources

P3

On February 19 of the current year, Quartzite Co. pays page 343 $5,400,000 for land estimated to contain 4 million tons of recoverable ore. It installs and pays for machinery costing $400,000 on March 21. The company removes and sells 254,000 tons of ore during its first nine months of operations ending on December 31. Depreciation of the machinery is in proportion to the mine's depletion as the machinery will be abandoned after the ore is mined.

Required

Prepare entries to record (*a*) the purchase of the land, (*b*) the cost and installation of the machinery, (*c*) the first nine months' depletion assuming the land has a net salvage value of zero after the ore is mined, and (*d*) the first nine months' depreciation on the machinery.

Check (*c*) Depletion, $342,900

(*d*) Depreciation, $25,400

Analysis Component

(*e*) If the machine will be used at another site when extraction is complete, how would we depreciate this machine?

SERIAL PROBLEM

Business Solutions

A1 P1

Serial problem began in Chapter 1. If previous chapter segments were not completed, the serial problem can begin at this point. It is available in ***Connect*** *with an algorithmic option.*

Alexander Image/Shutterstock

SP 8 Selected ledger account balances for **Business Solutions** follow.

	For Three Months Ended December 31, 2021	For Three Months Ended March 31, 2022
Office equipment	$ 8,000	$ 8,000
Accumulated depreciation—Office equipment	400	800
Computer equipment	20,000	20,000
Accumulated depreciation—Computer equipment	1,250	2,500
Total revenue	31,284	44,000
Total assets	83,460	120,268

Required

1. Assume that Business Solutions does not acquire additional office equipment or computer equipment in 2022. Compute amounts for *the year ended* December 31, 2022, for Depreciation Expense—Office Equipment and for Depreciation Expense—Computer Equipment (assume use of the straight-line method).

2. Given the assumptions in part 1, what is the book value of both the office equipment and the computer equipment as of December 31, 2022?

3. Compute the three-month total asset turnover for Business Solutions as of March 31, 2022. Use total revenue for the numerator and average the December 31, 2021, total assets and the March 31, 2022, total assets for the denominator. Interpret its total asset turnover if competitors average 2.5 for annual periods. (Round turnover to two decimals.)

Check (3) Three-month (annual) turnover = 0.43 (1.73 annual)

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA 8-1 Quick Study, Straight-line depreciation and book value, **P1**—similar to QS 8-4

Tableau DA 8-2 Exercise, Straight-line depreciation and sale of assets, **C2**, **P2**—similar to Exercises 8-13 and 8-17

Tableau DA 8-3 Mini-Case, Analyzing straight-line, units-of-production, and double-declining balance, **P1**—similar to Exercises 8-9 and 8-10

Accounting Analysis

connect

COMPANY ANALYSIS

A1

AA 8-1 Refer to **Apple**'s financial statements in Appendix A to answer the following.

1. What percent of the original cost of Apple's Property, Plant and Equipment account remains to be depreciated as of (*a*) September 28, 2019, and (*b*) September 29, 2018? Assume these assets have no salvage value and the entire account is depreciable. *Hint:* Accumulated Depreciation is listed under "Property, Plant and Equipment" in the notes to Apple's financial statements in Appendix A.
2. Much research and development are needed to create the next iPhone. Do companies capitalize and amortize research and development costs over the life of the product, or are research and development costs expensed as incurred?
3. Compute Apple's total asset turnover for the year ended (*a*) September 28, 2019, and (*b*) September 29, 2018. Total assets at September 30, 2017, are $375,319 ($ millions).
4. Using the results in part 3, is the change in Apple's asset turnover favorable or unfavorable?

COMPARATIVE ANALYSIS

A1

AA 8-2 Comparative figures for **Apple** and **Google** follow.

	Apple			Google		
$ millions	Current Year	One Year Prior	Two Years Prior	Current Year	One Year Prior	Two Years Prior
Total assets	$338,516	$365,725	$375,319	$275,909	$232,792	$197,295
Net sales	260,174	265,595	229,234	161,857	136,819	110,855

Required

1. Compute total asset turnover for the most recent two years for Apple and Google using the data shown.
2. In the current year, which company is more efficient in generating net sales given total assets? page 344
3. Does asset turnover underperform or outperform the 0.5 industry asset turnover for (*a*) Apple and (*b*) Google?

EXTENDED ANALYSIS

A1

AA 8-3 Comparative figures for **Samsung**, **Apple**, and **Google** follow.

$ millions	Samsung			Apple		Google	
	Current Year	Prior Year	Two Years Prior	Current Year	Prior Year	Current Year	Prior Year
Total assets . . .	$302,511	$291,179	$274,268	$338,516	$365,725	$275,909	$232,792
Net sales	197,691	209,163	217,755	260,174	265,595	161,857	136,819

Required

1. Compute total asset turnover for the most recent two years for Samsung using the data shown.
2. Is the change in Samsung's asset turnover favorable or unfavorable?
3. For the current year, is Samsung's asset turnover better or worse than the asset turnover for (*a*) Apple and (*b*) Google?

Discussion Questions

1. What characteristics of a plant asset make it different from other assets?
2. What is the general rule for cost inclusion for plant assets?
3. What is different between land and land improvements?
4. Why is the cost of a lump-sum purchase allocated to the individual assets acquired?
5. Does the balance in the Accumulated Depreciation—Machinery account represent funds to replace the machinery when it wears out? If not, what does it represent?
6. Why is the Modified Accelerated Cost Recovery System not generally accepted for financial accounting purposes?

7. What is the difference between ordinary repairs and extraordinary repairs? How should each be recorded?
8. Identify events that might lead to disposal of a plant asset.
9. What is the process of allocating the cost of natural resources to expense as they are used?
10. Is the declining-balance method an acceptable way to compute depletion of natural resources? Explain.
11. What are the characteristics of an intangible asset?
12. What general procedures are applied in accounting for the acquisition and potential cost allocation of intangible assets?
13. When do we know that a company has goodwill? When can goodwill appear in a company's balance sheet?
14. Assume that a company buys another business and pays for its goodwill. If the company plans to incur costs each year to maintain the value of the goodwill, must it also amortize this goodwill?
15. How is total asset turnover computed? Why would a financial statement user be interested in total asset turnover?
16. Identify the main difference between (*a*) plant assets and current assets, (*b*) plant assets and inventory, and (*c*) plant assets and long-term investments.

Beyond the Numbers

page 345

ETHICS CHALLENGE

C1

BTN 8-1 Flo Choi owns a small business and manages its accounting. Her company just finished a year in which a large amount of borrowed funds was invested in a new building addition as well as in equipment and fixture additions. Choi's banker requires her to submit semiannual financial statements so he can monitor the financial health of her business. He has warned her that if profit margins erode, he might raise the interest rate on the borrowed

funds to reflect the increased loan risk from the bank's point of view. Choi knows profit margin is likely to decline this year. As she prepares year-end adjusting entries, she decides to apply the following depreciation rule: All asset additions are considered to be in use on the first day of the following month. (The previous rule assumed assets are in use on the first day of the month nearest to the purchase date.)

Required

1. Identify decisions that managers like Choi must make in applying depreciation methods.
2. Is Choi's rule an ethical violation, or is it a legitimate decision in computing depreciation?
3. How will Choi's new depreciation rule affect the profit margin of her business?

COMMUNICATING IN PRACTICE

A1

BTN 8-2 Teams are to select an industry, and each team member is to select a different company in that industry. Each team member is to acquire the financial statements (Form 10-K) of the company selected—see the company's website or the SEC's EDGAR database (**SEC.gov**). Use the financial statements to compute total asset turnover. Communicate with teammates via a meeting, e-mail, or telephone to discuss the meaning of this ratio, how different companies compare to each other, and the industry norm. The team must prepare a one-page report that describes the ratios for each company and identifies the conclusions reached during the team's discussion.

TEAMWORK IN ACTION

P1

BTN 8-3 Each team member is to become an expert on one depreciation method to facilitate teammates' understanding of that

method. Follow these procedures:

a. Each team member is to select an area of expertise from one of the following depreciation methods: straight-line, units-of-production, or double-declining-balance.

b. Expert teams are to be formed from those who have selected the same area of expertise. The instructor will identify the location where each expert team meets.

c. Using the following data, expert teams are to collaborate and develop a presentation answering the requirements. Expert team members must write the presentation in a format they can show to their learning teams.

Data and Requirements On January 8, 2020, Whitewater Riders purchases a van to transport rafters back to the point of departure at the conclusion of the rafting adventures. The cost of the van is $44,000. It has an estimated salvage value of $2,000 and is expected to be used for four years and driven 60,000 miles. The van is driven 12,000 miles in 2020; 18,000 miles in 2021; 21,000 miles in 2022; and 10,000 miles in 2023.

1. Compute the annual depreciation expense for each year of the van's estimated useful life.

2. Explain when and how annual depreciation is recorded.

3. Explain the impact on income of this depreciation method versus others over the van's life.

4. Identify the van's book value for each year of its life and illustrate the reporting of this amount for any one year.

d. Re-form original learning teams. In rotation, experts are to present to their teams the results from part *c*. Experts are to encourage and respond to questions.

Point: This activity can follow an overview of each method. Step *a* allows for three areas of expertise. Larger teams will have some duplication of areas, but the straight-line choice should not be duplicated. Expert teams can use the book and consult with the instructor.

ENTREPRENEURIAL DECISION

A1

BTN 8-4 Review the chapter's opening feature involving Elon Musk and **SpaceX**. Assume that the company currently has net sales of $8,000,000 and that it is planning an expansion that will increase net sales by $4,000,000. To accomplish this expansion, the company must increase its average total assets from $2,500,000 to $3,000,000.

Required

1. Compute the company's total asset turnover under (*a*) current conditions and (*b*) proposed conditions.
2. Evaluate and comment on the merits of the proposal given the analysis in part 1. Identify any concerns we would express about the proposal.

9 Accounting for Current Liabilities

Chapter Preview

KNOWN LIABILITIES

C1 Reporting liabilities

C2 Sales taxes payable

Unearned revenues

P1 Short-term notes

NTK 9-1

PAYROLL LIABILITIES

P2 Employee payroll and deductions

P3 Employer payroll taxes

Multi-period liabilities

NTK 9-2

ESTIMATED LIABILITIES

P4 Reporting for:

- Health and pension
- Vacation benefits
- Bonus plans
- Warranty liabilities

NTK 9-3

CONTINGENCIES AND ANALYSIS

C3 Accounting for contingencies:

- Probable
- Possible
- Remote

A1 Times interest earned

NTK 9-4

Learning Objectives

CONCEPTUAL

C1 Describe current and long-term liabilities and their characteristics.

C2 Identify and describe known current liabilities.

C3 Explain how to account for contingent liabilities.

analytical

A1 Compute the times interest earned ratio and use it to analyze liabilities.

PROCEDURAL

P1 Prepare entries to account for short-term notes payable.

P2 Compute and record *employee* payroll deductions and liabilities.

P3 Compute and record *employer* payroll expenses and liabilities.

P4 Account for estimated liabilities, including warranties and bonuses.

P5 *Appendix 9A*—Identify and describe the details of payroll reports, records, and procedures.

P6 *Appendix 9B*—Account for corporate income taxes.

Song and Dance

page 347

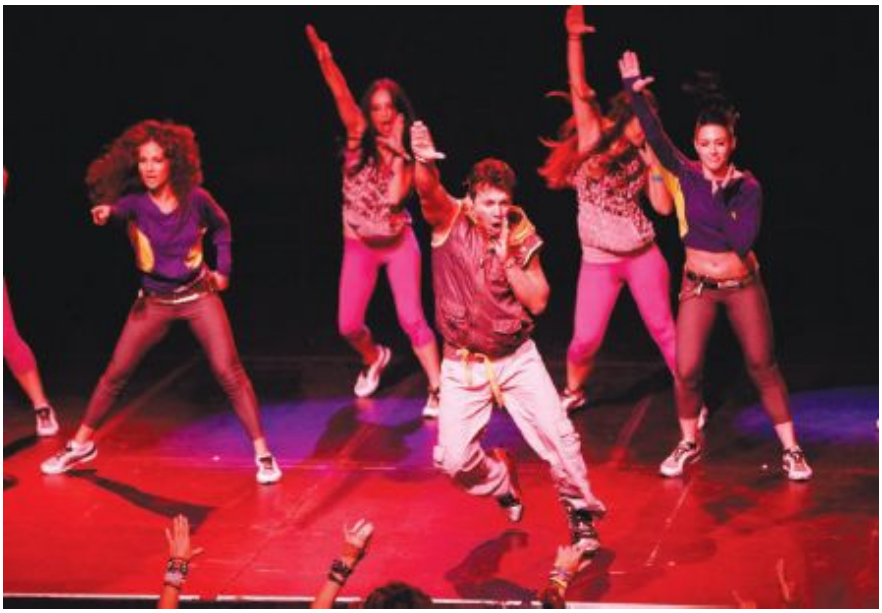
"Make people smile"—BETO PBEREZ

HALLANDALE, FL—Beto Perez, the 16-year-old son of a single mother, took a job as a fitness instructor. When Beto accidentally forgot his aerobics notes at home, he made up a dance workout with Latin music. "They loved it," recalls Beto. He then, along with Alberto Perlman and Alberto Aghion, launched **Zumba** (Zumba.com), a fitness program combined with Latin music.

Success soon followed. Today, Zumba is in over 180 countries with more than 200,000 locations. Its Zumba Instructor Network has expanded Beto's reach. "I work hard to bring our instructors new rhythms, choreography, and a really good mix of music," declares Beto. "I want to create something [special]."

Yet, Zumba demands good business decisions. These include finding good employees and managing the payroll of a growing business. Zumba has more than 200 employees. Beto stresses that effective management of liabilities, especially payroll and employee benefits, is crucial to success.

Beto is optimistic. He is especially excited about potential uses of accounting analytics in predicting client purchasing preferences. “We’re launching lots of new technology,” explains Beto. He hopes that analytics can guide retail success based on client histories. Beto adds: “You can get 80% of your daily recommended steps in one Zumba class!”



Tiffany Rose/WireImage/Getty Images

Sources: *Zumba website,* January 2021; *Miami Herald,* August 2018; *Inc.,* August 2017; *CNBC.com,* September 2017; *Entrepreneur.wiki,* January 2020

KNOWN LIABILITIES

Characteristics of Liabilities

This section discusses characteristics of liabilities and how liabilities are classified.

C1

Describe current and long-term liabilities and their characteristics.

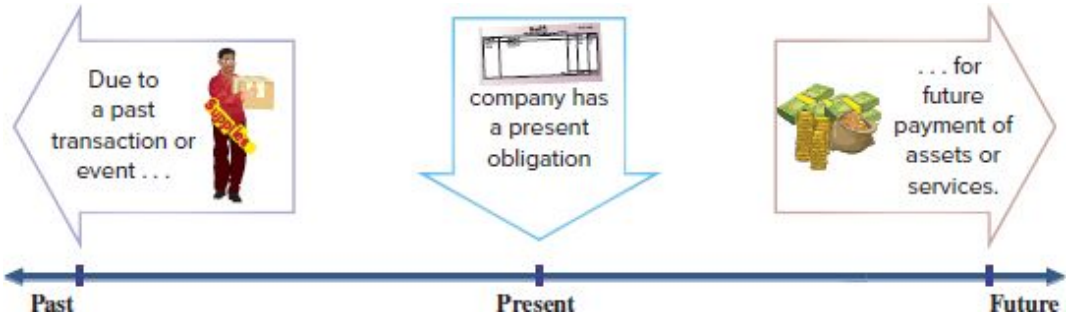


EXHIBIT 9.1

Characteristics of a Liability

Defining Liabilities A *liability* is a probable future payment of assets or services that a company is presently obligated to make as a result of past transactions or events. This definition includes three elements that are shown in Exhibit 9.1. No liability is reported when one or more of those elements are missing. For example, companies expect to pay wages in future years, but these future payments are *not* liabilities because no past event such as employee work resulted in a present obligation. Instead, liabilities are recorded when employees perform work and earn wages.

Classifying Liabilities Liabilities are classified as either current or long term.

Current Liabilities **Current liabilities,** or *short-term liabilities,* **are liabilities due within one year** (or the company's operating cycle if longer). Most are paid using current assets or by creating other current liabilities. Common examples are accounts payable, short-term notes payable, wages payable, warranty liabilities, and taxes payable. Some liabilities do not have a fixed due date but instead are payable on the creditor's demand. These are reported as current liabilities because of the possibility of payment in the near term.

Current liabilities differ across companies because they depend on the type of company operations. For example, **MGM Resorts** reports casino outstanding chip liability. **Harley-**

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Davidson reports different current liabilities such as warranty, recall, and dealer incentive liabilities. Exhibit 9.2 shows current liabilities as a percentage of total liabilities for selected companies.

Point: Most liability accounts use payable or unearned in their titles.

Long-Term Liabilities **Long-term liabilities** **are obligations due after one year** (or the company's operating cycle if longer). They include long-term notes payable, warranty liabilities, lease liabilities, and bonds payable. For example, **Domino's Pizza** reports long-term liabilities of $4,344 million. A single liability can be divided between the current and noncurrent sections if a company expects to make payments toward it in both the short and long term. Domino's reports long-term debt of $4,071 million and current portion of long-term debt of $43 million. The current portion is reported in current liabilities.

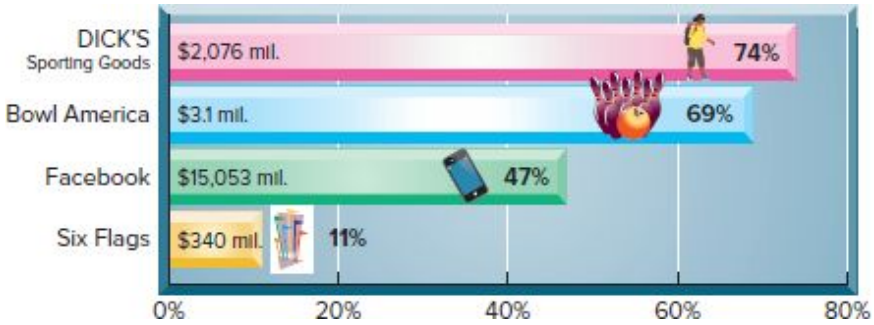

EXHIBIT 9.2

Current Liabilities as a Percentage of Total Liabilities

Uncertainty in Liabilities Accounting for liabilities involves answering three important questions: Whom to pay? When to pay? How much to pay? Answers are usually decided when a liability is incurred. For example, if a company has a $100 account payable to a firm, payable on March 15, the answers are clear. However, answers to one or more of these three questions are uncertain for some liabilities.

Uncertainty in Whom to Pay Liabilities can involve uncertainty in whom to pay. For example, a company can create a liability with a known amount when issuing a note that is payable to its holder. In this case, a specific amount is payable to the note's holder at a specified date, but the company does not know who the holder is until

that date. Despite this uncertainty, the company reports this liability on its balance sheet.

Uncertainty in When to Pay A company can have an obligation of a specific amount to a known creditor but not know when it must be paid. For example, a law firm can accept fees in advance from a client who plans to use the firm's services in the future. The law firm has aliability (unearned revenue) that it settles by providing services at an unknown future date. Although uncertainty exists, the law firm's balance sheet must report this liability. These types of obligations are reported as current liabilities because they are likely to be settled in the short term.

Uncertainty in How Much to Pay A company can be aware of an obligation but not know how much it will be required to pay. For example, a company using electrical power is billed only after the meter has been read. This cost is incurred and the liability created before a bill is received. A liability to the power company is reported as an estimated amount if the balance sheet is prepared before a bill arrives.

Examples of Known Liabilities

C2

Identify and describe known current liabilities.

Known liabilities are measurable obligations arising from agreements, contracts, or laws. Known liabilities include accounts payable, notes payable, payroll obligations, sales taxes, and unearned revenues.

Accounts Payable

Accounts payable, or trade accounts payable, are amounts owed to suppliers for products or services purchased on credit. Accounts payable are a focus of the merchandising chapter.

Sales Taxes Payable

Nearly all states and many cities levy taxes on retail sales. Sales taxes are shown as a percent of selling prices. The seller collects sales taxes from customers when sales occur and sends these collections to the government. Because sellers currently owe these collections to the government, this amount is a current liability. If **Home Depot** sells materials on August 31 for $6,000 cash that are subject to a 5% sales tax, the revenue portion of this transaction is recorded as follows. Later, when Home Depot sends the $300 collected to the government, it debits Sales Taxes Payable and credits Cash.

Aug. 31	Cash	6,300	
	Sales		6,000
	Sales Taxes Payable ($6,000 × 0.05)		300
	*Record cash sales and 5% sales tax.**		
	*We also Dr. Cost of Sales and Cr. Inventory for cost of sales.		

Assets	=	Liabilities	+	Equity
+6,300		+300		+6,000

Unearned Revenues

Unearned revenues, or *deferred revenues,* are amounts received in advance from customers for future products or services. Unearned revenues arise with airline ticket sales, magazine subscriptions, construction projects, hotel reservations, gift card sales, and custom orders. Advance ticket sales for sporting events or concerts are other

examples. If **Selena Gomez** sells $900,000 in tickets for three concerts, the entry is

Momcilog/iStock/Getty Images

June 30	Cash	900,000	
	Unearned Ticket Revenue		900,000
	Record sale of tickets for three concerts.		

Assets = Liabilities + Equity
+900,000 +900,000

Unearned Ticket Revenue is reported as a current liability. As each concert is played, 1/3 of the liability is satisfied and 1/3 of the revenue is recorded—this entry follows.

Oct. 31	Unearned Ticket Revenue	300,000	
	Ticket Revenue		300,000
	Record concert revenues ($900,000 × 1/3).		

Assets = Liabilities + Equity
−300,000 +300,000

Short-Term Notes Payable

P1

Prepare entries to account for short-term notes payable.

A **short-term note payable** is a written promise to pay a specified amount on a stated future date within one year. Notes can be sold or transferred. Most notes payable bear interest. The written documentation with notes is helpful in resolving legal disputes. We describe two transactions that create notes payable.

Note Given to Extend Credit Period A company can replace an account payable with a note payable. A common example is a creditor that requires an interest-bearing note for an overdue account payable. Assume that on August 23, Brady asks to extend its past-due $600 account payable to McGraw. After negotiations, McGraw

agrees to accept $100 cash and a 60-day, 12%, $500 note payable to replace the account payable. Brady records the following.

Aug. 23	Accounts Payable—McGraw	600	
	Cash		100
	Notes Payable—McGraw		500
	Sent cash and a note for payment on account.		

Assets = Liabilities + Equity
−100 −600
+500

Signing the note changes Brady's debt from an account payable to a note payable. McGraw prefers the note payable over the account payable because it earns interest and it is written documentation of the debt's existence, term, and amount. When the note comes due on its maturity date, Brady pays the note plus interest (called *maturity value*) to McGraw and records this entry.

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Oct. 22	Notes Payable—McGraw	500	
	Interest Expense	10	
	Cash		510
	Paid note with interest ($500 × 12% × 60/360).		

Point: Excel for accrued interest.

	A	B
1	Principal	$500
2	Rate	12%
3	Issue date	8/23
4	Days	60
5	Accrued interest	

=ACCRINTM(B3,B3+B4,B2,B1,2)=$10

Assets = Liabilities + Equity
−510 −500 −10

Point: Firms commonly compute interest using a 360-day year, called the banker's rule.

Interest expense is computed by multiplying the principal of the note ($500) by the annual interest rate (12%) for the fraction of the year the note is outstanding (60 days⁄360 days).

Note Given to Borrow from Bank A bank requires a borrower to sign a note when making a loan. When the note comes due, the borrower repays the note with an amount larger than the amount borrowed. The difference between the amount borrowed and the

amount repaid is *interest*. The amount borrowed is called *principal* or *face value* of the note. Assume that a company borrows $2,000 from a bank at 12% annual interest. The loan is made on September 30, 2021, and is due in 60 days. The note says: *"I promise to pay $2,000 plus interest at 12% within 60 days after September 30."* The borrower records its receipt of cash and the new liability with this entry.

Sep. 30	Cash	2,000	
	Notes Payable		2,000
	Borrow $2,000 cash with 60-day, 12%, $2,000 note.		

Assets = Liabilities + Equity
+2,000 +2,000

Point: Excel for accrued interest.

	A	B
1	Principal	$2,000
2	Rate	12%
3	Issue date	9/30
4	Days	60
5	Accrued interest	

=ACCRINTM(B3,B3+B4,B2,B1,2)=$40

Assets = Liabilities + Equity
−2,040 −2,000 −40

When principal and interest are paid, the borrower records payment with this entry.

Nov. 29	Notes Payable	2,000	
	Interest Expense	40	
	Cash		2,040
	Paid note with interest ($2,000 × 12% × 60/360).		

When Note Extends over Two Periods When a note is issued in one period but paid in the next, interest expense is recorded in each period based on the number of days the note extends over each period. Assume a company borrows $2,000 cash on December 16, 2021, at 12% annual interest. This 60-day note matures on February 14, 2022, and the company's fiscal year ends on December 31. This means 15 of the 60 days are in 2021 and 45 of the 60 days are in 2022. Interest for these two periods is:

- 12/16/2021 to 12/31/2021 = 15 days. Interest expense = $2,000 × 12% × 15/360 = $10.
- 01/01/2022 to 02/14/2022 = 45 days. Interest expense = $2,000 × 12% × 45/360 = $30.

The borrower records the 2021 expense with the following adjusting entry.

Assets = Liabilities + Equity
+10 −10

Dec. 31, 2021	Interest Expense	10	
	Interest Payable		10
	Record accrued interest ($2,000 × 12% × 15/360).		

When this note is paid on February 14, the borrower records 45 days of interest expense in 2022 and removes the balances of the two liability accounts.

Feb. 14, 2022	Interest Expense*	30	
	Interest Payable	10	
	Notes Payable	2,000	
	Cash		2,040
	*Paid note with interest. *$2,000 × 12% × 45/360*		

Assets = Liabilities + Equity
−2,040 −10 −30
−2,000

Decision Insight

Oksana Mizina/Shutterstock

A High Note Franchisors such as **Pizza Hut** and **Domino's** use notes to help entrepreneurs acquire their own franchises, including notes to pay for the franchise fee and equipment. Payments on these notes are usually collected monthly and often are secured by the franchisees' assets. For example, a **McDonald's** franchise can cost from under $200,000 to over $2 million, depending on the type selected. ■

need-to-know

NEED-TO-KNOW 9-1

Accounting for Known Liabilities

C2 P1

Part 1. A retailer sells merchandise for $500 cash on June 30 (cost of merchandise is $300). The retailer collects 7% sales tax. Record the entry for the $500 sale and its applicable sales tax. Also record the entry that shows the taxes collected being sent to the government on July 15.

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Part 2. A ticket agency receives $40,000 cash in advance ticket sales for Haim's upcoming four-date tour. Record the advance ticket sales on April 30. Record the revenue earned for the first concert date of May 15, assuming it represents one-fourth of the advance ticket sales.

Part 3. On November 25 of the current year, a company borrows $8,000 cash by signing a 90-day, 5% note payable with a face value of $8,000. (a) Compute the accrued interest payable on December 31 of the current year, (b) prepare the journal entry to record the accrued interest expense at December 31 of the current year, and (c) prepare the journal entry to record payment of the note at maturity.

Solution—Part 1

June 30	Cash	535	
	Sales		500
	Sales Taxes Payable		35
	Record cash sales and 7% sales tax.		
June 30	Cost of Goods Sold	300	
	Merchandise Inventory		300
	Record cost of June 30 sales.		
July 15	Sales Taxes Payable	35	
	Cash		35
	Record sales taxes sent to govt.		

Solution—Part 2

Apr. 30	Cash	40,000	
	Unearned Ticket Revenue		40,000
	Record sales in advance of concerts.		
May 15	Unearned Ticket Revenue	10,000	
	Ticket Revenue		10,000
	Record concert revenues ($40,000 × 1/4).		

Solution—Part 3

a.

Computation of interest payable at December 31:	
Days from November 25 to December 31	36 days
Accrued interest (5% × $8,000 × 36/360)	$40

b.

Dec. 31	Interest Expense	40	
	Interest Payable		40
	Record accrued interest (5% × $8,000 × 36/360).		

c.

Feb. 23	Interest Expense	60	
	Interest Payable	40	
	Notes Payable	8,000	
	Cash		8,100
	Record payment of note plus interest		
	(5% × $8,000 × 90/360 = $100 total interest)		
	(5% × $8,000 × 54/360 = $60 interest expense).		

Excel: Accrued interest, 11/25–12/31.

	A	B
1	Principal	$8,000
2	Rate	5%
3	Issue date	11/25
4	Days	36
5	Accrued interest	

=ACCRINTM(B3,B3+B4,B2,B1,2)=$40

Excel: Accrued Interest, 1/1–2/23.

	A	B
1	Principal	$8,000
2	Rate	5%
3	Issue date	11/25
4	Days	54
5	Accrued interest	

=ACCRINTM(B3,B3+B4,B2,B1,2) = $60

Do More: QS 9-2, QS 9-3, QS 9-4, QS 9-5, E 9-2, E 9-3, E 9-4, E 9-5, E 9-6

PAYROLL LIABILITIES

Payroll liabilities are from salaries and wages, employee benefits, and payroll taxes levied on the employer. For example, **Boston Beer** reports current payroll liabilities of more than $14 million from accrued "employee wages, benefits and reimbursements."

P2

Compute and record *employee* payroll deductions and liabilities.

Employee Payroll and Deductions

Gross pay is the total compensation an employee earns including wages, salaries, commissions, bonuses, and any compensation earned before deductions such as taxes. *Wages* usually refer to payments to employees at an hourly rate. *Salaries* usually refer to payments to employees at a monthly or yearly rate. **Net pay**, or *take-home pay,* is gross pay minus all deductions. **Payroll deductions**, or *withholdings,* are amounts withheld from an employee's gross pay, either required or voluntary. Required deductions result from laws and include income taxes and Social Security taxes. Voluntary deductions, at an employee's option, include pension and health contributions, health and life insurance premiums, union dues, and donations.

Point: Deductions at some companies, such as those for insurance coverage, are "required" under labor contracts.

Exhibit 9.3 shows typical employee payroll deductions. The employer withholds payroll deductions from employees' pay and sends this money to the designated group or government. The employer records payroll deductions as current liabilities until these amounts are sent. This section covers major payroll deductions.

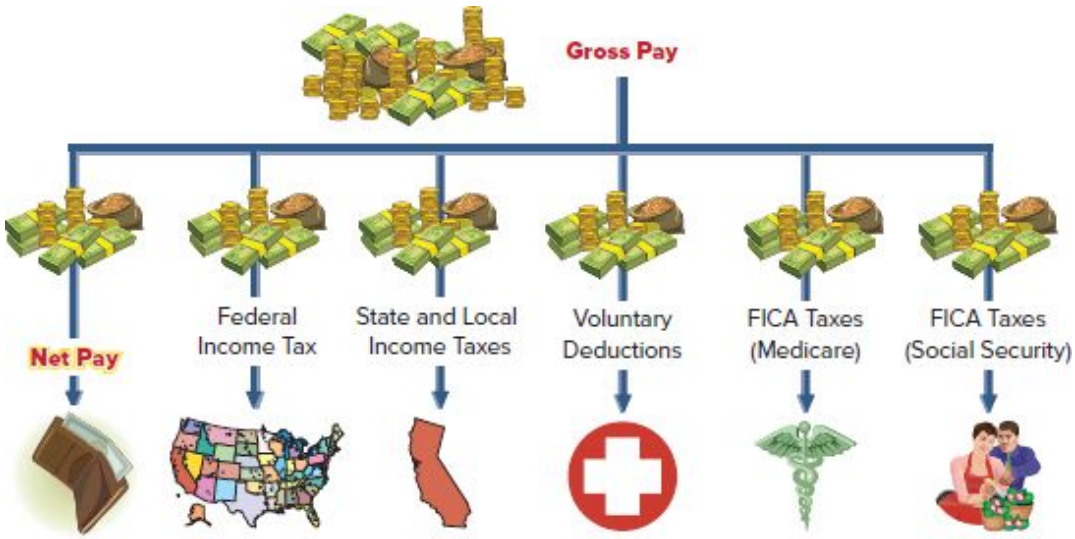

EXHIBIT 9.3

Payroll Deductions

Employee FICA Taxes Employers withhold **Federal Insurance Contributions Act (FICA) taxes** from employees' pay. Employers separate FICA taxes into two groups.

1. **Social Security taxes**—withholdings to cover retirement, disability, and survivorship.
2. **Medicare taxes**—withholdings to cover medical benefits.

Taxes for Social Security and Medicare are computed separately. For 2020, the amount withheld from each employee's pay for Social Security tax is 6.2% of the first $137,700 the employee earns in the calendar year. The Medicare tax is 1.45% of *all* amounts the employee earns; there is no maximum limit to Medicare tax. A 0.9%

Additional Medicare Tax is imposed on the high-income employee for pay usually in excess of $200,000 (this additional tax is *not* imposed on the employer, whereas the others are). Until the taxes are sent to the Internal Revenue Service (IRS), they are included in employers' current liabilities. For any changes in rates or earnings levels, check **IRS.gov** or **SSA.gov**.

Point: Sources of U.S. tax receipts:

50% Personal income tax

35% FICA and FUTA taxes

10% Corporate income tax

5% Other taxes

Employee Income Tax Most employers withhold federal income tax from each employee's paycheck. The amount withheld is computed using IRS tables. The amount depends on the employee's income and the number of *withholding allowances* the employee claims. Allowances reduce taxes owed to the government. Employees can claim allowances for themselves and their dependents. Until the government is paid, withholdings are reported as a current liability on the employer's balance sheet.

Employee Voluntary Deductions Voluntary deduction withholdings come from employee requests, contracts, unions, or other agreements. They include charitable giving, medical and life insurance premiums, pension contributions, and union dues. Until they are paid, voluntary withholdings are reported as part of employers' current liabilities.

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Employee Payroll Recording Employers accrue payroll expenses and liabilities at the end of each pay period. Assume that an employee earns a salary of $2,000 per month. At the end of January, the employer's entry to accrue payroll expenses and liabilities for this employee is

Jan. 31	Salaries Expense	2,000	
	FICA—Social Security Taxes Payable (6.2%)		124
	FICA—Medicare Taxes Payable (1.45%)		29
	Employee Federal Income Taxes Payable*		213
	Employee Medical Insurance Payable*		85
	Employee Union Dues Payable*		25
	Salaries Payable		1,524
	Record accrued payroll for January.		
	*Amounts taken from employer's accounting records.		

Assets = Liabilities + Equity
+124 −2,000
+29
+213
+85
+25
+1,524

Salaries Expense shows that the employee earns a gross salary of $2,000. The first five payables show the liabilities the employer owes on behalf of this employee to cover FICA taxes, income taxes, medical insurance, and union dues. The Salaries Payable account records the $1,524 net pay the employee receives from the $2,000 gross pay earned. The February 1 entry to record cash payment to this employee is

Feb. 1	Salaries Payable	1,524	
	Cash		1,524
	Record payment of payroll.		

Assets = Liabilities + Equity
−1,524 −1,524

Employer Payroll Taxes

Employers must pay payroll taxes in addition to those required of employees. Employer taxes include FICA and unemployment taxes.

P3

Compute and record *employer* payroll expenses and liabilities.

Employer FICA Tax Employers must pay FICA taxes on their payroll. For 2020, the employer must pay Social Security tax of 6.2% on the first 137,700 earned by each employee and 1.45% Medicare tax on all earnings of each employee. An employer's tax is credited to the same FICA Taxes Payable accounts used to record the Social Security and Medicare taxes withheld from employees.

Point: A self-employed person must pay both the employee and employer FICA taxes.

Employer Unemployment Taxes The federal government works with states in a joint federal and state unemployment insurance program. Each state has its own program. These programs provide unemployment benefits to qualified workers.

Federal Unemployment Tax Act (FUTA) Employers must pay a federal unemployment tax on wages and salaries earned by their employees. For the recent year, employers were required to pay FUTA taxes of as much as 6.0% of the first $7,000 earned by each employee. This federal tax can be reduced by a credit of up to 5.4% for taxes paid to a state program. As a result, the net federal unemployment tax is often 0.6%.

State Unemployment Tax Act (SUTA) All states fund their unemployment insurance programs by placing a payroll tax on employers. (A few states require employees to make a contribution. In the book's assignments, we assume this tax is only levied on the employer.) In most states, the base rate for SUTA taxes is 5.4% of the first $7,000 earned by each employee (the dollar level varies by state). This base rate is adjusted according to an employer's merit rating. The state assigns a **merit rating** based on a company's stability in employing workers. A good rating reflects stability in employment and means an employer can pay less than the 5.4% base rate. A low rating means high turnover or seasonal hirings and layoffs.

Recording Employer Payroll Taxes Employer payroll taxes are an added expense beyond the wages and salaries earned by employees. These taxes are often recorded in an entry separate from the one recording payroll expenses and deductions. Assume that the $2,000 recorded salaries expense from the previous example is earned by an employee whose earnings have not yet reached $5,000 for the year. This means the entire salaries expense for this period is subject to tax because year-to-date pay is under $7,000. Consequently, the FICA portion of the employer's tax is $153, computed by multiplying both the 6.2% and 1.45% by the $2,000 gross pay. Assume that the federal unemployment tax rate is 0.6% and the state unemployment tax rate is 5.4%. This means state unemployment (SUTA) taxes are $108 (5.4% of the $2,000 gross

page 354

pay) and federal unemployment (FUTA) taxes are $12 (0.6% of $2,000). The entry to record the employer's payroll tax expense and related liabilities is

Assets = Liabilities + Equity
+124 −273
+29
+108
+12

Jan. 31	Payroll Taxes Expense	273	
	FICA—Social Security Taxes Payable (6.2%)		124
	FICA—Medicare Taxes Payable (1.45%)		29
	State Unemployment Taxes Payable		108
	Federal Unemployment Taxes Payable		12
	Record employer payroll taxes.		

Employee and Employer Payroll Taxes Summary

Year-to-Date Pay Bracket (Set Yearly)	Employee Taxes	Employer Taxes
$0 to $7,000	FICA—Medicare FICA—Social Security State & Federal Income Tax	FICA—Medicare FICA—Social Security FUTA SUTA
$7,000 to $137,700	FICA—Medicare FICA—Social Security State & Federal Income Tax	FICA—Medicare FICA—Social Security
Above $137,700	FICA—Medicare State & Federal Income Tax	FICA—Medicare

Internal Control of Payroll

Internal controls are crucial for payroll because of a high risk of fraud and error. Exhibit 9.4 identifies and explains four key areas of payroll activities that we aim to *separate and monitor*.

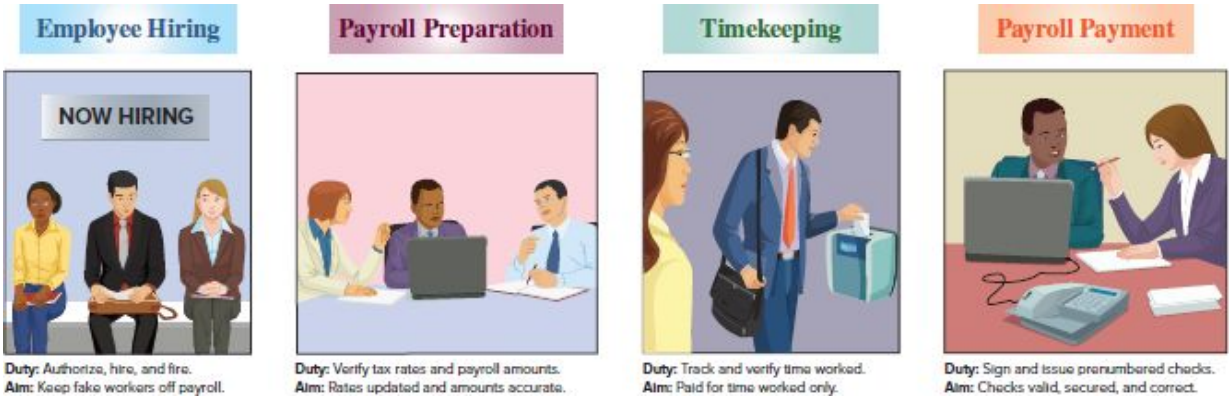


EXHIBIT 9.4

Internal Controls in Payroll

Multi-Period Known Liabilities

Many known liabilities extend over multiple periods. These often include unearned revenues and notes payable. For example, if **Sports Illustrated** sells a three-year digital magazine subscription, it records amounts received for this subscription in an Unearned Subscription Revenues account. Amounts in this account are liabilities, but are they current or long term? They are *both.* The portion of the Unearned Subscription Revenues account that will be fulfilled in the next year is reported as a current liability. The remaining portion is reported as a long-term liability.

The same analysis applies to notes payable. For example, a borrower reports a three-year note payable as a long-term liability in the first two years it is outstanding. In the third year, the borrower reclassifies this note as a current liability because it is due within one year. The **current portion of long-term debt** is that part of long-term debt due within one year. Long-term debt is reported under long-term liabilities, but the *current portion due* is reported under current liabilities. Assume that a $7,500 debt is paid in installments of $1,500 per year for five years. The $1,500 due within the year is reported as a current liability. We classify the amounts for debt as either current or long term when the balance sheet is prepared.

Dirty Work Probably the greatest number of frauds involve payroll. Controls include proper approvals and processes for employee additions, deletions, and pay rate changes. A common fraud is a manager adding a fictitious employee to the payroll and then cashing the fictitious employee's check. A study reports that 42% of employees in operations and service areas witnessed violations of employee wage, overtime, or benefit rules in the past year. Another 33% observed falsifying of time and expense reports (KPMG). ■

Ceridian Connection reports: 8.5% of fraud is tied to payroll; $72,000 is the median loss per payroll fraud; and 24 months is the median time to uncover payroll fraud.

NEED-TO-KNOW 9-2

Payroll Liabilities

P2 P3

A company's first weekly pay period of the year ends on January 8. Sales employees earned $30,000 and office employees earned $20,000 in salaries. The employees are to have withheld from their salaries FICA Social Security taxes at the rate of 6.2%, FICA Medicare taxes at the rate of 1.45%, $9,000 of federal income taxes, $2,000 of medical insurance deductions, and $1,000 of pension contributions. No employee earned more than $7,000 in the first pay period.

Part 1. Prepare the journal entry to record the company's January 8 (employee) payroll expenses and liabilities.

Part 2. Prepare the journal entry to record the company's (employer) payroll taxes resulting from the January 8 payroll. Its state unemployment tax rate is 5.4% on the first $7,000 paid to each employee. The federal unemployment tax rate is 0.6%.

Solution—Part 1

Jan. 8	Sales Salaries Expense	30,000	
	Office Salaries Expense	20,000	
	FICA—Social Security Taxes Payable*		3,100
	FICA—Medicare Taxes Payable†		725
	Employee Fed. Income Taxes Payable		9,000
	Employee Med. Insurance Payable		2,000
	Employee Pensions Payable		1,000
	Salaries Payable		34,175
	Record payroll for period.		
	*$50,000 × 6.2% = $3,100		
	†$50,000 × 1.45% = $725		

Solution—Part 2

Jan. 8	Payroll Taxes Expense	6,825	
	FICA—Social Security Taxes Payable		3,100
	FICA—Medicare Taxes Payable		725
	State Unemployment Taxes Payable*		2,700
	Federal Unemployment Taxes Payable†		300
	Record employer payroll taxes.		
	*$50,000 × 5.4% = $2,700		
	†$50,000 × 0.6% = $300		

Do More: QS 9-6, QS 9-7, QS 9-8, E 9-7, E 9-8, E 9-9, E 9-10, E 9-11

ESTIMATED LIABILITIES

P4

Account for estimated liabilities, including warranties and bonuses.

An **estimated liability** is a known obligation of an uncertain amount that can be reasonably estimated. Common examples are employee benefits such as pensions, health care, and vacation pay, and warranties offered by a seller.

Health and Pension Benefits

Many companies provide **employee benefits.** An employer often pays all or part of medical, dental, life, and disability insurance. Many employers also contribute to *pension plans,* which are agreements by employers to provide payments to employees after retirement. Many companies also provide medical care and insurance benefits to their retirees. Assume an employer agrees to (1) pay $8,000 for medical insurance and (2) contribute an additional 10% of the employees' $120,000 gross salaries to a retirement program. The entry to record these accrued benefits is

Assets = Liabilities + Equity
+8,000 −20,000
+12,000

Dec. 31	Employee Benefits Expense	20,000	
	Employee Medical Insurance Payable		8,000
	Employee Retirement Program Payable		12,000
	Record costs of employee benefits.		

Vacation Benefits

Many employers offer paid vacation benefits, or *paid absences.* Vacation benefits are estimated and expensed in the period when employees earn them. Assume that salaried employees earn 2 weeks' paid vacation per year. The year-end adjusting entry to record $3,200 of accrued vacation benefits follows.

Assets = Liabilities + Equity
+3,200 −3,200

Dec. 31	Vacation Benefits Expense	3,200	
	Vacation Benefits Payable		3,200
	Record vacation benefits accrued.		

Point: An accrued expense is an unpaid expense and is also called an accrued liability.

Vacation Benefits Expense is an operating expense, and Vacation Benefits Payable is a current liability. When an employee takes a vacation, the employer reduces (debits) Vacation Benefits Payable and credits Cash.

Assets = Liabilities + Equity
−400 −400

Jan. 20	Vacation Benefits Payable	400	
	Cash		400
	Record vacation benefits taken.		

Bonus Plans

Many companies offer bonuses to employees, and many of the bonuses depend on net income. Assume that an employer gives a bonus to its employees based on the company's annual net income (to be equally shared by all). The year-end adjusting entry to record a $10,000 bonus is

Assets = Liabilities + Equity
+10,000 −10,000

Dec. 31	Employee Bonus Expense	10,000	
	Bonus Payable		10,000
	Record expected bonus costs.		

Warranty Liabilities

A **warranty** is a seller's obligation to replace or fix a product or service that fails to perform as expected within a specified period. For example, a new **Jeep** is sold with a warranty covering parts for a specified period of time. The seller reports the expected warranty expense in the period when revenue from the sale of the product or service is reported. The seller reports this warranty liability, even though the existence, amount, payee, and date of future payments are uncertain. This is because warranty costs are probable and the amount can be estimated using past experience.

Assume a dealer sells a car for $16,000 on December 1, page 357 2021, with a one-year or 12,000-mile warranty covering parts. Experience shows that warranty expense is 4% of a car's selling price, or $640 in this case ($16,000 × 4%). The dealer records the estimated expense and liability related to this sale with this end-of-period adjustment.

Dec. 31	Warranty Expense	640	
	Estimated Warranty Liability		640
	Record estimated warranty expense.		

Assets = Liabilities + Equity
+640 −640

This entry alternatively could be made at the time of sale. Either way, the estimated warranty expense is reported on the 2021 income statement and the warranty liability on the 2021 balance sheet. Continuing this example, assume the customer brings the car in for warranty repairs on January 9, 2022. The dealer fixes the car by replacing parts costing $200. The entry to record the repair is

Jan. 9	Estimated Warranty Liability	200	
	Parts Inventory		200
	Record costs of warranty repairs.		

Assets = Liabilities + Equity
−200 −200

This entry reduces the balance of the Estimated Warranty Liability account, but no expense is recorded in 2022 for the repair. Warranty expense was previously recorded in 2021, the year the car was sold with the warranty. Finally, what happens if total warranty expenses are more or less than the estimated 4%, or $640? The answer is that management should monitor actual warranty expenses to see if a 4% rate is accurate. If not, the rate is changed for future periods.

Multi-Period Estimated Liabilities

Estimated liabilities can be both current and long term. For example, pension liabilities to employees are long term to workers who will not retire within the next year. For employees who are retired or will retire within the next year, a portion of pension liabilities is current. Other examples include employee health benefits and warranties.

Imac/Alamy Stock Photo

Decision Insight

Out of Play **Major League Baseball** was the first pro sport to set up a pension, originally up to $100 per month depending on years played. Many former players now take home six-figure pensions. Cal Ripken Jr.'s pension at age 62 is estimated at $180,000 per year (he played 21 seasons). The same applies to Ichiro Suzuki, who played 18 seasons—see photo. The requirement is 43 games for a full pension and just one game for full medical benefits for life. ■

NEED-TO-KNOW 9-3

Estimated Liabilities

P4

Part 1. A company's salaried employees earn two weeks' vacation per year. The company estimated and must expense $9,000 of accrued vacation benefits for the year. (a) Prepare the December 31 year-end adjusting entry to record accrued vacation benefits. (b) Prepare the entry on May 1 of the next year when an employee takes a one-week vacation and is paid $450 cash for that week.

Part 2. For the current year ended December 31, a company has implemented an employee bonus program based on its net income, which employees share equally. Its bonus expense is $40,000. (a) Prepare the journal entry at December 31 of the current year to record the bonus due. (b) Prepare the journal entry at January 20 of the following year to record payment of that bonus to employees.

Part 3. On December 11 of the current year, a retailer sells a trimmer for $400 with a one-year warranty that covers parts. Warranty expense is estimated at 5% of sales. On March 24 of the

next year, the trimmer is brought in for repairs covered under the warranty requiring $15 in materials taken from the Parts Inventory. Prepare the (a) December 11 entry to record the trimmer sale—ignore the cost of sales part of this sales entry, (b) December 31 adjusting entry for estimated warranty liability, and (c) March 24 entry to record warranty repairs.

Solution—Part 1

a.

Dec. 31	Vacation Benefits Expense	9,000	
	Vacation Benefits Payable		9,000
	Record vacation benefits accrued.		

b.

May 1	Vacation Benefits Payable.....	450	
	Cash.....		450
	Record vacation benefits taken.		

Solution—Part 2

a.

Dec. 31	Employee Bonus Expense	40,000	
	Bonus Payable		40,000
	Record expected bonus costs.		

b.

Jan. 20	Bonus Payable	40,000	
	Cash.....		40,000
	Record payment of bonus.		

Solution—Part 3

Dec. 11	Cash	400	
	Sales		400
	Record trimmer sales.		
Dec. 31	Warranty Expense	20	
	Estimated Warranty Liability		20
	Record estimated warranty expense ($400 × 5%).		
Mar. 24	Estimated Warranty Liability	15	
	Parts Inventory		15
	Record cost of warranty repairs.		

Do More: QS 9-11 through QS 9-14, E 9-12, E 9-13, E 9-14, E 9-15, E 9-16

CONTINGENT LIABILITIES

C3

Explain how to account for contingent liabilities.

A **contingent liability** is a potential obligation that depends on a future event arising from a past transaction or event. An example is a pending lawsuit. Here, a past transaction or event leads to a lawsuit whose financial outcome depends on the result of the suit.

Accounting for Contingent Liabilities

Accounting for contingent liabilities depends on the likelihood that a future event will occur and the ability to estimate the future amount owed if this event occurs. Three different possibilities are shown in Exhibit 9.5: record liability with a journal entry, disclose in notes to financial statements, or no disclosure.

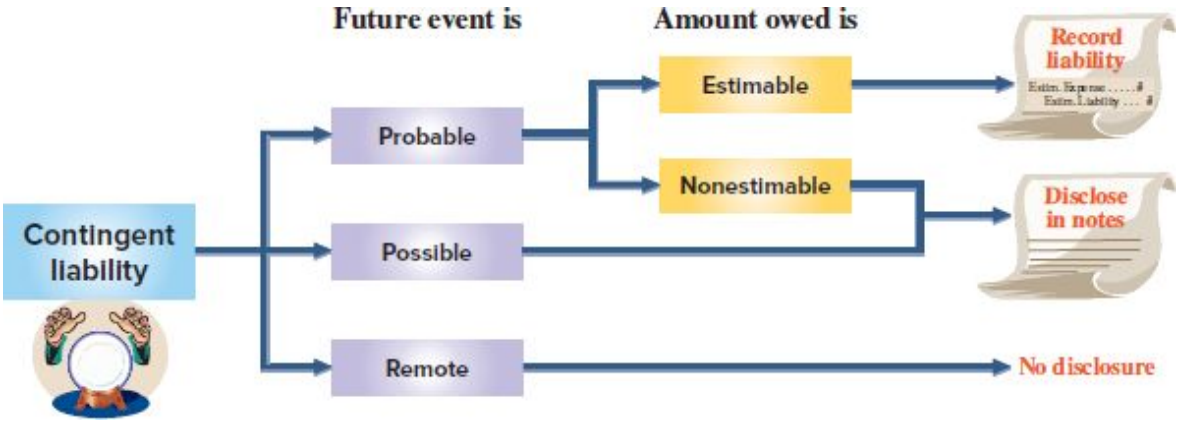


EXHIBIT 9.5

Contingent Liabilities

The conditions that determine each of these three possibilities follow.

1. **Record liability.** The future event is *probable* (likely) and the amount owed can be *reasonably estimated.* Examples are warranties, vacation pay, and income taxes.
2. **Disclose in notes.** The future event is *reasonably possible* (could occur).
3. **No disclosure.** The future event is *remote* (unlikely).

Point: A contingency is an if. Namely, if a future event occurs, then financial consequences are likely for the entity.

Applying Rules of Contingent Liabilities

This section covers common contingent liabilities.

Potential Legal Claims Many companies are sued or at risk of being sued. The accounting issue is whether the defendant records a liability or discloses a contingent liability in its notes while a lawsuit is outstanding and not yet settled. The answer is that a potential claim is recorded *only* if payment for damages is probable and the amount can be reasonably estimated. If the potential claim cannot be reasonably estimated but is reasonably possible, it is disclosed. For example, **Ford** includes the following note in its annual report:

"Various legal actions, proceedings, and claims are pending . . . arising out of alleged defects in our products."

Debt Guarantees Sometimes a company guarantees the payment of debt owed by a supplier, customer, or another company. The guarantor usually discloses the guarantee in its financial statement notes as a contingent liability. If it is probable that the debtor will default, the guarantor reports the guarantee as a liability. The **Boston Celtics** report a unique guarantee: "Contracts provide for guaranteed payments which must be paid even if the employee [player] is injured or terminated."

Other Contingencies Other examples of contingencies include environmental damages, possible tax assessments, insurance losses, and government investigations. **Chevron**, for example, reports that it "is subject to loss contingencies . . . related to environmental matters. . . . The amount of additional future costs are not fully determinable." Many of Chevron's contingencies are revealed only in notes.

Uncertainties That Are Not Contingencies

All organizations face uncertainties from future events such as natural disasters and new technologies. These uncertainties are not contingent liabilities because they are future events *not* arising from past transactions. Accordingly, they are not disclosed.

Decision Insight

On the Safe Side When we purchase a new laptop at **Best Buy**, a sales clerk commonly asks: *"Do you want the Geek Squad Protection Plan?"* Best Buy earns about a 60% profit margin on such warranty contracts, and those contracts are a large part of its profit—see table (*BusinessWeek*). ■

Warranties as a percent of sales	4%
Warranties as a percent of operating profit	45%

NEED-TO-KNOW 9-4

Contingent Liabilities

C3

The following legal claims exist for a company. Identify the accounting treatment for each claim as either (a) a liability that is recorded or (b) an item described in notes to its financial statements.

1. The company (defendant) estimates that a pending lawsuit could result in damages of $500,000; it is reasonably possible that the plaintiff will win the case.
2. The company faces a probable loss on a pending lawsuit; the amount is not reasonably estimable.
3. The company estimates environmental damages in a pending case at $900,000 with a high probability of losing the case.

Solution

1. (b); reason—is reasonably estimated but not a probable loss.
2. (b); reason—probable loss but cannot be reasonably estimated.
3. (a); reason—can be reasonably estimated and loss is probable.

Do More: QS 9-15, E 9-17

Decision Analysis Times Interest Earned Ratio

A1

Compute the times interest earned ratio and use it to analyze liabilities.

Interest expense is often called a *fixed expense* because it usually does not vary due to short-term changes in sales or other operating

activities. While fixed expenses can be good when a company is growing, they create risk. The risk is that a company might be unable to pay fixed expenses if sales decline. Consider Diego Co.'s results for 2021 and two possible outcomes for year 2022 in Exhibit 9.6. Expenses excluding interest are expected to remain at 75% of sales. Expenses that change with sales volume are *variable expenses.* Interest expense is fixed at $60 per year.

		2022 Projections	
$ millions	2021	Sales Increase	Sales Decrease
Sales	$600	$900	$300
Expenses (75% of sales)	450	675	225
Income before interest	150	225	75
Interest expense (fixed)	60	60	60
Net income	$ 90	$165	$ 15

EXHIBIT 9.6

Actual and Projected Results

The Sales Increase column of Exhibit 9.6 shows that Diego's net income increases by 83% to $165 if sales increase by 50% to $900. The Sales Decrease column shows that net income decreases by 83% if sales decline by 50%. These results show that the amount of fixed interest expense affects a company's risk of its ability to pay interest. One measure of "ability to pay" is the **times interest earned** ratio in Exhibit 9.7.

$$\text{Times interest earned} = \frac{\text{Income before interest expense and income taxes}}{\text{Interest expense}}$$

EXHIBIT 9.7

Times Interest Earned

For 2021, Diego's times interest earned is computed as $150/$60, or 2.5 times. This ratio means that Diego has low to moderate risk because its sales must decline sharply before it is unable to pay its interest expenses. If times interest earned falls below around 1.5, a company will likely be at risk of not being able to pay its liabilities.

Decision Maker

Entrepreneur You wish to invest in a franchise for either one of two national chains. Each franchise has an expected annual net income *after* interest and taxes of $100,000. Net income for the first franchise includes a regular fixed interest charge of $200,000. The fixed interest charge for the second franchise is $40,000. Which franchise is riskier to you if sales forecasts are not met? ■ *Answer:* Times interest earned for the first franchise is 1.5 [($100,000 + $200,000)/$200,000], whereas it is 3.5 for the second [($100,000 + $40,000)/$40,000]. This shows the first franchise is more at risk of incurring a loss if its sales decline.

NEED-TO-KNOW 9-5

COMPREHENSIVE

Accounting for Current Liabilities Including Warranties, Notes, Contingencies, Payroll, and Income Taxes

The following transactions took place at Kern Co. during its recent calendar-year reporting period.

a. In September, Kern sold $140,000 of merchandise covered by a 180-day warranty. Prior experience shows that costs of the warranty equal 5% of sales. Compute September's warranty expense and prepare the adjusting journal entry for the warranty liability as recorded at September 30. Also prepare the journal entry on October 8 to record a $300 cash payment to provide warranty service on an item sold in September.

b. On October 12, Kern replaced an overdue $10,000 account payable by paying $2,500 cash and signing a note for $7,500. The note matures in 90 days and has a 12% interest rate. Prepare the entries recorded on October 12, December 31, and January 10.

c. In late December, Kern is facing a product liability suit filed by an unhappy customer. Kern's lawyer says it will probably suffer

a loss from the lawsuit, but the amount is impossible to estimate.

d. Sally Bline works for Kern. For the pay period ended November 30, her gross earnings are $3,000. Bline has $800 deducted for federal income taxes and $200 for state income taxes from each paycheck. Additionally, a $35 premium for health insurance and a $10 donation to United Way are deducted. Bline pays FICA Social Security taxes at a rate of 6.2% and FICA Medicare taxes at a rate of 1.45%. She has not earned enough this year to be exempt from any FICA taxes. Journalize the accrual of salaries expense for Bline by Kern.

e. On November 1, Kern borrows $5,000 cash from a bank in return for a 60-day, 12%, $5,000 note. Record the note's issuance on November 1 and its repayment with interest on December 31.

f.[B] *(Part f covers Appendix 9B.)* Kern has estimated and recorded its quarterly income tax payments. In reviewing its year-end tax adjustments, it identifies an additional $5,000 of income taxes expense that should be recorded. A portion of this additional expense, $1,000, is deferred to future years. Record this year-end income taxes expense adjusting entry.

SOLUTION

a. Warranty expense = 5% x $140,000 = $7,000

Sep. 30	Warranty Expense	7,000	
	Estimated Warranty Liability		7,000
	Record warranty expense.		
Oct. 8	Estimated Warranty Liability	300	
	Cash		300
	Record cost of warranty service.		

b. Interest expense for current year = 12% x $7,500 x 80/360 = $200 Interest expense for following year = 12% x $7,500 x 10/360 = $25

Oct. 12	Accounts Payable	10,000	
	Notes Payable		7,500
	Cash		2,500
	Paid $2,500 cash and gave a 90-day, 12% note to extend due date on the account.		
Dec. 31	Interest Expense	200	
	Interest Payable		200
	Accrue interest on note payable.		
Jan. 10	Interest Expense	25	
	Interest Payable	200	
	Notes Payable	7,500	
	Cash		7,725
	Paid note with interest, including accrued interest payable.		

c. Disclose the pending lawsuit in the financial statement notes. Although the loss is probable, no liability is accrued because the loss cannot be reasonably estimated. page 361

d.

Nov. 30	Salaries Expense	3,000.00	
	FICA—Social Security Taxes Payable (6.2%)		186.00
	FICA—Medicare Taxes Payable (1.45%)		43.50
	Employee Federal Income Taxes Payable		800.00
	Employee State Income Taxes Payable		200.00
	Employee Medical Insurance Payable		35.00
	Employee United Way Payable		10.00
	Salaries Payable		1,725.50
	Record Bline's accrued payroll.		

e.

Nov. 1	Cash	5,000	
	Notes Payable		5,000
	Borrowed cash with a 60-day, 12% note.		

When the note and interest are paid 60 days later, Kern Co. records this entry.

Dec. 31	Notes Payable	5,000	
	Interest Expense	100	
	Cash		5,100
	Paid note with interest ($5,000 × 12% × 60/360).		

e.[B]

Dec. 31	Income Taxes Expense	5,000	
	Income Taxes Payable		4,000
	Deferred Income Tax Liability		1,000
	Record added income taxes expense and the deferred tax liability.		

APPENDIX

9A

P5

Identify and describe the details of payroll reports, records, and procedures

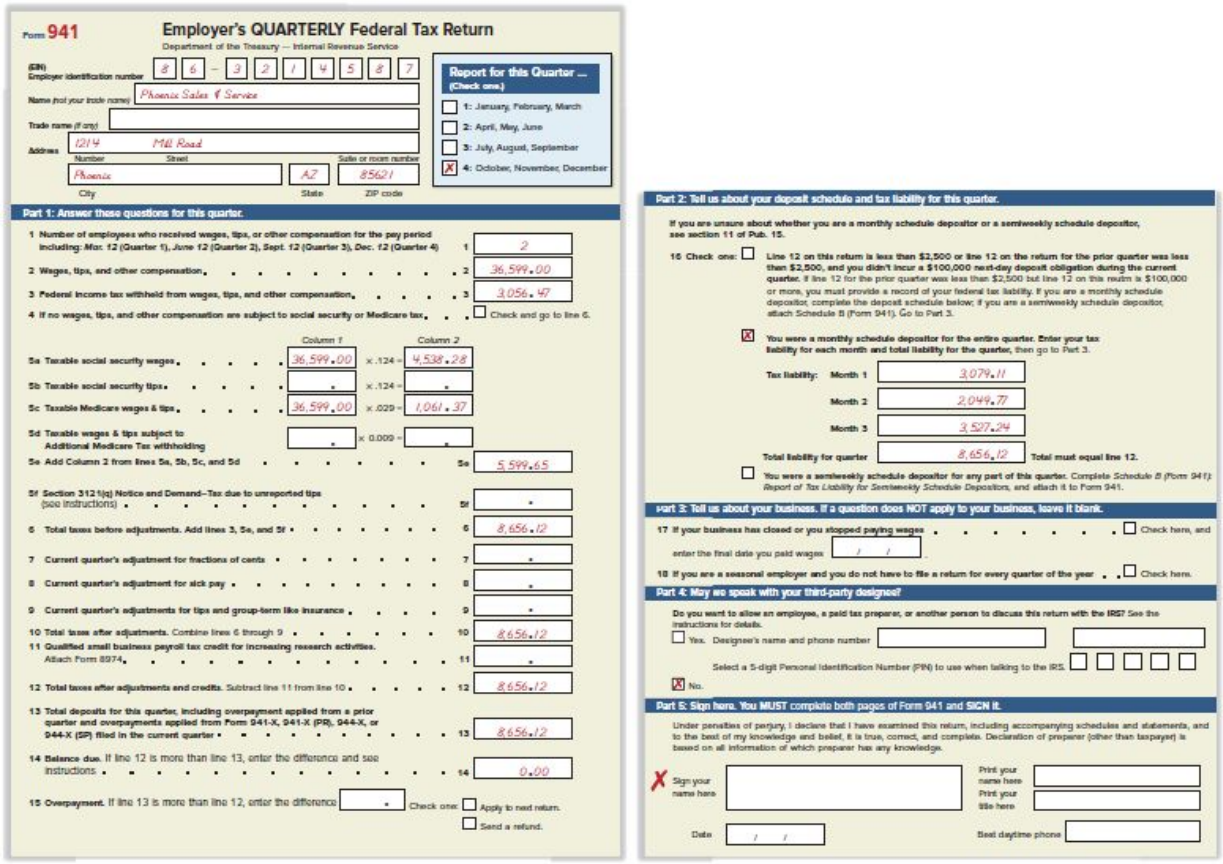
Payroll Reports, Records,and Procedures

page 362

This appendix focuses on payroll accounting reports, records, and procedures.

Payroll Reports Most employees and employers are required to pay local, state, and federal payroll taxes. Payroll expenses are liabilities to individual employees, to federal and state governments, and to other organizations such as insurance companies. Employers are required to prepare and submit reports explaining how they computed these payments.

Reporting FICA Taxes and Income Taxes The Federal Insurance Contributions Act (FICA) requires each employer to file an Internal Revenue Service (IRS) **Form 941,** the *Employer's Quarterly Federal Tax Return,* within one month after the end of each calendar quarter. A sample Form 941 is shown in Exhibit 9A.1 for Phoenix Sales & Service, a landscape design company. Accounting information and software are helpful in tracking payroll transactions and reporting the accumulated information on Form 941. Specifically, the employer reports total wages subject to income tax withholding on line 2 of Form 941. (For simplicity, this appendix uses *wages* to refer to both wages and salaries.) The income tax withheld is reported on line 3. The combined amount of employee and employer FICA (Social Security) taxes for Phoenix Sales & Service is reported on line 5a (taxable Social Security wages, $36,599 × 12.4% = $4,538.28). The 12.4% is the sum of the Social Security tax withheld, computed as 6.2% tax withheld from the employee wages for the quarter, plus the 6.2% tax levied on the employer. The combined amount of employee Medicare wages is reported on line 5c. The 2.9% is the sum of 1.45% withheld from employee wages for the quarter plus 1.45% tax levied on the employer. Total FICA taxes are reported on line 5e and are added to the total income taxes withheld of $3,056.47 to yield a total of $8,656.12. For this year, assume that income up to $137,700 is subject to Social Security tax. There is no income limit on amounts subject to Medicare tax. Congress sets rates owed for Social Security tax (and it typically changes each year).



Form 941 Employer's QUARTERLY Federal Tax Return
Department of the Treasury — Internal Revenue Service

(EIN) Employer identification number: 86-3214587
Name (not your trade name): Phoenix Sales & Service
Trade name (if any):
Address: 1214 Mill Road
Number Street Suite or room number
Phoenix AZ 85621
City State ZIP code

Report for this Quarter ... (Check one.)
☐ 1: January, February, March
☐ 2: April, May, June
☐ 3: July, August, September
☒ 4: October, November, December

Part 1: Answer these questions for this quarter.

1 Number of employees who received wages, tips, or other compensation for the pay period including: Mar. 12 (Quarter 1), June 12 (Quarter 2), Sept. 12 (Quarter 3), Dec. 12 (Quarter 4) 1 2
2 Wages, tips, and other compensation 2 36,599.00
3 Federal income tax withheld from wages, tips, and other compensation 3 3,056.47
4 If no wages, tips, and other compensation are subject to social security or Medicare tax ☐ Check and go to line 6.

	Column 1		Column 2
5a Taxable social security wages	36,599.00	× .124 =	4,538.28
5b Taxable social security tips		× .124 =	
5c Taxable Medicare wages & tips	36,599.00	× .029 =	1,061.37
5d Taxable wages & tips subject to Additional Medicare Tax withholding		× 0.009 =	

5e Add Column 2 from lines 5a, 5b, 5c, and 5d 5e 5,599.65
5f Section 3121(q) Notice and Demand—Tax due to unreported tips (see instructions) 5f
6 Total taxes before adjustments. Add lines 3, 5e, and 5f 6 8,656.12
7 Current quarter's adjustment for fractions of cents 7
8 Current quarter's adjustment for sick pay 8
9 Current quarter's adjustments for tips and group-term life insurance 9
10 Total taxes after adjustments. Combine lines 6 through 9 10 8,656.12
11 Qualified small business payroll tax credit for increasing research activities. Attach Form 8974 11
12 Total taxes after adjustments and credits. Subtract line 11 from line 10 12 8,656.12
13 Total deposits for this quarter, including overpayment applied from a prior quarter and overpayments applied from Form 941-X, 941-X (PR), 944-X, or 944-X (SP) filed in the current quarter 13 8,656.12
14 Balance due. If line 12 is more than line 13, enter the difference and see instructions 14 0.00
15 Overpayment. If line 13 is more than line 12, enter the difference Check one: ☐ Apply to next return. ☐ Send a refund.

Part 2: Tell us about your deposit schedule and tax liability for this quarter.

If you are unsure about whether you are a monthly schedule depositor or a semiweekly schedule depositor, see section 11 of Pub. 15.

16 Check one:
☐ Line 12 on this return is less than $2,500 or line 12 on the return for the prior quarter was less than $2,500, and you didn't incur a $100,000 next-day deposit obligation during the current quarter. If line 12 for the prior quarter was less than $2,500 but line 12 on this return is $100,000 or more, you must provide a record of your federal tax liability. If you are a monthly schedule depositor, complete the deposit schedule below; if you are a semiweekly schedule depositor, attach Schedule B (Form 941). Go to Part 3.
☒ You were a monthly schedule depositor for the entire quarter. Enter your tax liability for each month and total liability for the quarter, then go to Part 3.

Tax liability: Month 1 3,079.11
Month 2 2,049.77
Month 3 3,527.24
Total liability for quarter 8,656.12 Total must equal line 12.

☐ You were a semiweekly schedule depositor for any part of this quarter. Complete Schedule B (Form 941): Report of Tax Liability for Semiweekly Schedule Depositors, and attach it to Form 941.

Part 3: Tell us about your business. If a question does NOT apply to your business, leave it blank.

17 If your business has closed or you stopped paying wages ☐ Check here, and enter the final date you paid wages / /
18 If you are a seasonal employer and you do not have to file a return for every quarter of the year ☐ Check here.

Part 4: May we speak with your third-party designee?

Do you want to allow an employee, a paid tax preparer, or another person to discuss this return with the IRS? See the instructions for details.
☐ Yes. Designee's name and phone number
Select a 5-digit Personal Identification Number (PIN) to use when talking to the IRS.
☒ No.

Part 5: Sign here. You MUST complete both pages of Form 941 and SIGN it.

Under penalties of perjury, I declare that I have examined this return, including accompanying schedules and statements, and to the best of my knowledge and belief, it is true, correct, and complete. Declaration of preparer (other than taxpayer) is based on all information of which preparer has any knowledge.

✗ Sign your name here
Print your name here
Print your title here
Date / /
Best daytime phone

EXHIBIT 9.A1

Form 941

Point: Line 5a shows the matching nature of FICA tax as 6.2% × 2, or 12.4%, which is shown as 0.124.

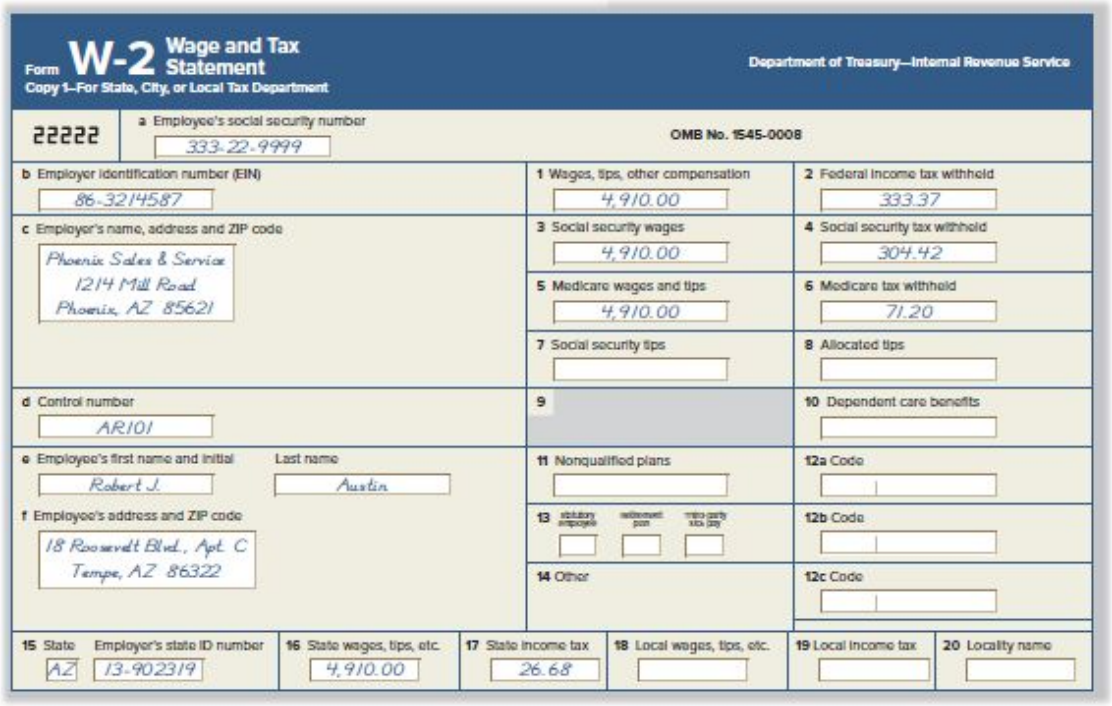
Point: Auditors rely on the four 941 Forms filed during a year when auditing a company's annual wages and salaries expense account.

Federal depository banks are authorized to accept page 363 deposits of amounts payable to the federal government. Deposit requirements depend on the amount of tax owed. For example, when the sum of FICA taxes plus the employee income taxes is less than $2,500 for a quarter, the taxes can be paid when Form 941 is filed.

Reporting FUTA Taxes and SUTA Taxes An employer's federal unemployment taxes (FUTA) are reported on an annual basis by filing an *Annual Federal Unemployment Tax Return,* IRS **Form 940.** It must be mailed on or before January 31 following the end of each tax year.

Ten more days are allowed if all required tax deposits are filed on a timely basis and the full amount of tax is paid on or before January 31. FUTA payments are made quarterly to a federal depository bank if the total amount due exceeds $500. If $500 or less is due, the taxes are remitted annually. Requirements for paying and reporting state unemployment taxes (SUTA) vary depending on the laws of each state. Most states require quarterly payments and reports.

Reporting Wages and Salaries Employers are required to give each employee an annual report of his or her wages subject to FICA and federal income taxes along with the amounts of these taxes withheld. This report is called a *Wage and Tax Statement,* or **Form W-2.** It must be given to employees before January 31 following the year covered by the report. Exhibit 9A.2 shows Form W-2 for one of the employees at Phoenix Sales & Service. Copies of Form W-2 must be sent to the Social Security Administration, where the amount of the employee's wages subject to FICA taxes and FICA taxes withheld are posted to each employee's Social Security account. These posted amounts become the basis for determining an employee's retirement and survivors' benefits. The Social Security Administration also transmits to the IRS the amount of each employee's wages subject to federal income taxes and the amount of taxes withheld.



Form **W-2** Wage and Tax Statement
Copy 1–For State, City, or Local Tax Department

Department of Treasury—Internal Revenue Service

22222

a Employee's social security number: 333-22-9999

OMB No. 1545-0008

b Employer identification number (EIN): 86-3214587

1 Wages, tips, other compensation: 4,910.00

2 Federal income tax withheld: 333.37

c Employer's name, address and ZIP code:
Phoenix Sales & Service
1214 Mill Road
Phoenix, AZ 85621

3 Social security wages: 4,910.00

4 Social security tax withheld: 304.42

5 Medicare wages and tips: 4,910.00

6 Medicare tax withheld: 71.20

7 Social security tips:

8 Allocated tips:

d Control number: AR101

9

10 Dependent care benefits:

e Employee's first name and initial: Robert J.

Last name: Austin

11 Nonqualified plans:

12a Code:

f Employee's address and ZIP code:
18 Roosevelt Blvd., Apt. C
Tempe, AZ 86322

13 statutory employee, retirement plan, third-party sick pay

12b Code:

14 Other

12c Code:

15 State	Employer's state ID number	16 State wages, tips, etc.	17 State income tax	18 Local wages, tips, etc.	19 Local income tax	20 Locality name
AZ	13-902319	4,910.00	26.68			

EXHIBIT 9A.2

Form W-2

Payroll Records Employers must keep payroll records in addition to reporting and paying taxes. These records usually include a payroll register and an individual earnings report for each employee.

Payroll Register A **payroll register** usually shows the pay period dates, hours worked, gross pay, deductions, and net pay of each employee for each pay period. Exhibit 9A.3 shows a payroll register for Phoenix Sales & Service. It is organized into nine columns:

Col. A Employee Identification (ID); Employee name; page 364 Social Security number (SS No.); Reference (check number); and Date (date check issued)

Col. B Pay Type (regular and overtime)

Col. C Pay Hours (number of hours worked as regular and overtime)

Col. D Gross Pay (amount of gross pay)

Col. E FIT (federal income taxes withheld); FUTA (federal unemployment taxes)

Col. F SIT (state income taxes withheld); SUTA (state unemployment taxes)

Col. G FICA-SS_EE (Social Security taxes withheld, employee); FICA-SS_ER (Social Security taxes, employer)

Col. H FICA-Med_EE (Medicare tax withheld, employee); FICA-Med_ER (Medicare tax, employer)

Col. I Net Pay (gross pay less amounts withheld from employees)

Net pay for each employee is computed as gross pay minus the items on the first line of columns E through H. The employer's payroll tax for each employee is computed as the sum of items on the third line of columns E through H. A payroll register includes all data necessary to record payroll. In some software programs, the entries to record payroll are made in a special *payroll journal.*

A	B	C	D	E	F	G	H	I
Phoenix Sales & Service Payroll Register For Week Ended Jan. 8, 2021								
Employee ID Employee SS No. Refer., Date	**Gross Pay**			**FIT [blank] FUTA**	**SIT [blank] SUTA**	**FICA-SS_EE [blank] FICA-SS_ER**	**FICA-Med_EE [blank] FICA-Med_ER**	**Net Pay**
	Pay Type	**Pay Hours**	**Gross Pay**					
AR101 Robert Austin 333-22-9999 9001, 1/8/21	Regular Overtime	40.00 0.00	400.00 0.00 400.00	–28.99 –2.40	–2.32 –10.80	–24.80 –24.80	–5.80 –5.80	338.09
CJ102 Judy Cross 299-11-9201 9002, 1/8/21	Regular Overtime	40.00 1.00	560.00 21.00 581.00	–52.97 –3.49	–4.24 –15.69	–36.02 –36.02	–8.42 –8.42	479.35
DJ103 John Diaz 444-11-9090 9003, 1/8/21	Regular Overtime	40.00 2.00	560.00 42.00 602.00	–48.33 –3.61	–3.87 –16.25	–37.32 –37.32	–8.73 –8.73	503.75
KK104 Kay Keife 909-11-3344 9004, 1/8/21	Regular Overtime	40.00 0.00	560.00 0.00 560.00	–68.57 –3.36	–5.49 –15.12	–34.72 –34.72	–8.12 –8.12	443.10
ML105 Lee Miller 444-56-3211 9005, 1/8/21	Regular Overtime	40.00 0.00	560.00 0.00 560.00	–34.24 –3.36	–2.74 –15.12	–34.72 –34.72	–8.12 –8.12	480.18
SD106 Dale Sears 909-33-1234 9006, 1/8/21	Regular Overtime	40.00 0.00	560.00 0.00 560.00	–68.57 –3.36	–5.49 –15.12	–34.72 –34.72	–8.12 –8.12	443.10
Totals	Regular Overtime	240.00 3.00	3,200.00 63.00 3,263.00	–301.67 –19.58	–24.15 –88.10	–202.30 –202.30	–47.31 –47.31	2,687.57

EXHIBIT 9A.3

Payroll Register

Point: Gross Pay column shows regular hours worked on the first line multiplied by regular pay rate. Overtime hours multiplied by the overtime premium rate equals overtime pay on the second line. For this company, workers earn 150% of their regular rate for hours in excess of 40 per week.

Payroll Check Payment of payroll is usually done by check or electronic funds transfer. Exhibit 9A.4 shows a *payroll check* for a Phoenix employee. This check includes a detachable *statement of earnings* (at top) showing gross pay, deductions, and net pay.

EMPLOYEE NO.	EMPLOYEE NAME	SOCIAL SECURITY NO.	PAY PERIOD END	CHECK DATE
AR101	Robert Austin	333-22-9999	1/8/21	1/8/21

ITEM	RATE	HOURS	TOTAL
Regular	10.00	40.00	400.00
Overtime	15.00		

ITEM	THIS CHECK	YEAR TO DATE
Gross	400.00	400.00
Fed. Income tax	-28.99	-28.99
FICA-Soc. Sec.	-24.80	-24.80
FICA-Medicare	-5.80	-5.80
State Income tax	-2.32	-2.32

HOURS WORKED	GROSS THIS PERIOD	GROSS YEAR TO DATE	NET CHECK	CHECK NO.
40.00	400.00	400.00	$338.09	9001

(Detach and retain for your records)

PHOENIX SALES & SERVICE
1214 Mill Road
Phoenix, AZ 85621
602-555-8900

Phoenix Bank and Trust
Phoenix, AZ 85621
3312-87044

No. 9001

DATE January 8, 20 21

Check No. 9001

Amount Three Hundred Thirty-Eight and 9/100 Dollars

$ **********$338.09

Pay to the order of
Robert Austin
18 Roosevelt Blvd., Apt C
Tempe, AZ 86322

Mary Wills
AUTHORIZED SIGNATURE

EXHIBIT 9A.4

Check and Statement of Earnings

Phoenix Sales & Service Employee Earnings Report For Month Ended Dec. 31, 2021							
Employee ID Employee SS No.	Date Reference	Gross Pay	FIT [blank] FUTA	SIT [blank] SUTA	FICA-SS_EE [blank] FICA-SS_ER	FICA-Med_EE [blank] FICA-Med_ER	Net Pay
Beginning balance for Robert Austin	11/26/21 (balance)	2,910.00	–188.42	–15.08	–180.42	–42.20	2,483.88
			–17.46	–78.57	–180.42	–42.20	
AR101 Robert Austin 333-22-9999	12/03/21 9049	400.00	–28.99	–2.32	–24.80	–5.80	338.09
			–2.40	–10.80	–24.80	–5.80	
AR101 Robert Austin 333-22-9999	12/10/21 9055	400.00	–28.99	–2.32	–24.80	–5.80	338.09
			–2.40	–10.80	–24.80	–5.80	
AR101 Robert Austin 333-22-9999	12/17/21 9061	400.00	–28.99	–2.32	–24.80	–5.80	338.09
			–2.40	–10.80	–24.80	–5.80	
AR101 Robert Austin 333-22-9999	12/24/21 9067	400.00	–28.99	–2.32	–24.80	–5.80	338.09
			–2.40	–10.80	–24.80	–5.80	
AR101 Robert Austin 333-22-9999	12/31/21 9073	400.00	–28.99	–2.32	–24.80	–5.80	338.09
			–2.40	–10.80	–24.80	–5.80	
Total 5-wk month thru 12/31/21		2,000.00	–144.95	–11.60	–124.00	–29.00	1,690.45
			–12.00	–54.00	–124.00	–29.00	
Year-to-date total for Robert Austin	12/31/21 (balance)	4,910.00	–333.37	–26.68	–304.42	–71.20	4,174.33
			–29.46	–132.57	–304.42	–71.20	

EXHIBIT 9A.5

Employee Earnings Report

Point: Year-end balances agree with W-2.

Employee Earnings Report An **employee earnings report** is a cumulative record of an employee's hours worked, gross earnings, deductions, and net pay. Payroll information on this report is taken from the payroll register. The employee earnings report for R. Austin at Phoenix Sales & Service is shown in Exhibit 9A.5. An employee earnings report accumulates information that can show when an employee's earnings reach the tax-exempt points for FICA, FUTA, and SUTA taxes. It also gives data an employer needs to prepare Form W-2.

Payroll Procedures Employers must be able to compute page 365 federal income tax for payroll purposes. This section explains how we compute this tax and how to use a payroll bank account.

Computing Federal Income Taxes To compute the amount page 366 of taxes withheld from each employee's wages, we need to determine both the employee's wages earned and the employee's number of *withholding allowances.* Each employee records the number of withholding allowances claimed on a withholding allowance certificate, **Form W-4,** filed with the employer. When the number of withholding allowances increases, the amount of income taxes withheld decreases.

Form **W-4**

Department of the Treasury
Internal Revenue Service

Employee's Withholding Certificate

- Complete Form W-4 so that your employer can withhold the correct federal income tax from your pay.
- Give Form W-4 to your employer.
- Your withholding is subject to review by the IRS.

OMB No. 1545-0074
20__

Step 1: Enter Personal Information

(a) First name and middle initial: Robert J.
Last name: Austin
(b) Social security number: 333-22-9999
Address: 18 Roosevelt Blvd., Apt. C
City or town, state, and ZIP code: Tempe, AZ 86322
▸ Does your name match the name on your social security card? If not, to ensure you get credit for your earnings, contact SSA at 800-772-1213 or go to www.ssa.gov.

(c) ☒ Single or Married filing separately ☐ Married filing jointly (or Qualifying widow(er))
☐ Head of household (Check only if you're unmarried and pay more than half the costs of keeping up a home for yourself and a qualifying individual.)

Complete Steps 2–4 ONLY if they apply to you; otherwise, skip to Step 5. See page 2 for more information on each step, who can claim exemption from withholding, when to use the online estimator, and privacy.

Step 2: Multiple Jobs or Spouse Works

Complete this step if you (1) hold more than one job at a time, or (2) are married filing jointly and your spouse also works. The correct amount of withholding depends on income earned from all of these jobs.

Do **only one** of the following.

(a) Use the estimator at *www.irs.gov/W4App* for most accurate withholding for this step (and Steps 3–4); **or**

(b) Use the Multiple Jobs Worksheet on page 3 and enter the result in Step 4(c) below for roughly accurate withholding; **or**

(c) If there are only two jobs total, you may check this box. Do the same on Form W-4 for the other job. This option is accurate for jobs with similar pay; otherwise, more tax than necessary may be withheld ▸ ☐

TIP: To be accurate, submit a Form W-4 for all other jobs. If you (or your spouse) have self-employment income, including as an independent contractor, use the estimator.

Complete Steps 3–4(b) on Form W-4 for only ONE of these jobs. Leave those steps blank for the other jobs. (Your withholding will be most accurate if you complete Steps 3–4(b) on the Form W-4 for the highest paying job.)

Step 3: Claim Dependents

If your income will be $200,000 or less ($400,000 or less if married filing jointly):

Multiply the number of qualifying children under age 17 by $2,000 ▸ $
Multiply the number of other dependents by $500 ▸ $
Add the amounts above and enter the total here — 3 $

Step 4 (optional): Other Adjustments

(a) **Other income (not from jobs).** If you want tax withheld for other income you expect this year that won't have withholding, enter the amount of other income here. This may include interest, dividends, and retirement income — 4(a) $

(b) **Deductions.** If you expect to claim deductions other than the standard deduction and want to reduce your withholding, use the Deductions Worksheet on page 3 and enter the result here — 4(b) $

(b) **Extra withholding.** Enter any additional tax you want withheld each pay period — 4(b) $

Step 5: Sign Here

Under penalties of perjury, I declare that this certificate, to the best of my knowledge and belief, is true, correct, and complete.

▸ Robert J. Austin — **Employee's signature** (This form is not valid unless you sign it.)
▸ January 1 — **Date**

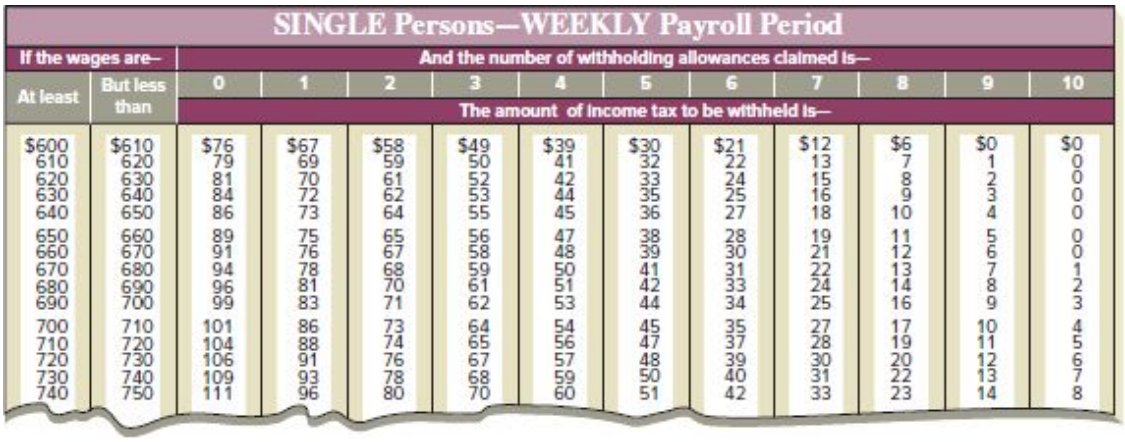
Employers Only

Employer's name and address: Phoenix Sales & Service, 1214 Mill Rd, Phoenix, AZ 85621
First date of employment:
Employer identification number (EIN): 86-3214587

For Privacy Act and Paperwork Reduction Act Notice, see page 3. Cat. No. 10220Q Form **W-4**

Employers often use a **wage bracket withholding table** similar to the one shown in Exhibit 9A.6 to compute the **federal income taxes withheld** from each employee's gross pay. The table in Exhibit 9A.6 is for a single employee paid weekly. Tables also are provided for

married employees and for biweekly, semimonthly, and monthly pay periods (most payroll software includes these tables). When using a wage bracket withholding table to compute federal income tax withheld from an employee's gross wages, we need to locate an employee's wage bracket within the first two columns. We then find the amount withheld by looking in the withholding allowance column for that employee.



SINGLE Persons—WEEKLY Payroll Period

If the wages are—		And the number of withholding allowances claimed is—										
At least	But less than	0	1	2	3	4	5	6	7	8	9	10
		The amount of income tax to be withheld is—										
$600	$610	$76	$67	$58	$49	$39	$30	$21	$12	$6	$0	$0
610	620	79	69	59	50	41	32	22	13	7	1	0
620	630	81	70	61	52	42	33	24	15	8	2	0
630	640	84	72	62	53	44	35	25	16	9	3	0
640	650	86	73	64	55	45	36	27	18	10	4	0
650	660	89	75	65	56	47	38	28	19	11	5	0
660	670	91	76	67	58	48	39	30	21	12	6	0
670	680	94	78	68	59	50	41	31	22	13	7	1
680	690	96	81	70	61	51	42	33	24	14	8	2
690	700	99	83	71	62	53	44	34	25	16	9	3
700	710	101	86	73	64	54	45	35	27	17	10	4
710	720	104	88	74	65	56	47	37	28	19	11	5
720	730	106	91	76	67	57	48	39	30	20	12	6
730	740	109	93	78	68	59	50	40	31	22	13	7
740	750	111	96	80	70	60	51	42	33	23	14	8

EXHIBIT 9A.6

Wage Bracket Withholding Table

Payroll Bank Account Companies with few employees often pay them with checks drawn on the company's regular bank account. Companies with many employees often use a special **payroll bank account** to pay employees. When this account is used, a company either (1) draws one check for total payroll on the regular bank account and deposits it in the payroll bank account or (2) executes an *electronic funds transfer* to the payroll bank account. Individual payroll checks are then drawn on this payroll bank account. Because only one check for the total payroll is drawn on the regular bank account each payday, use of a special payroll bank account helps with internal control. It also helps in reconciling the regular bank account. When companies use a payroll bank account, they usually include check numbers in the payroll register. The payroll register in Exhibit 9A.3 shows check numbers in column A. For instance, Check No. 9001 is issued to Robert Austin. With this information, the payroll

register serves as a supplementary record of wages earned by and paid to employees.

Who Pays What Payroll Taxes and Benefits We page 367 conclude this appendix with the following table identifying who pays which payroll taxes and which common employee benefits such as medical, disability, pension, charitable, and union costs. Who pays which employee benefits, and what portion, is subject to agreements between companies and their workers. Also, self-employed workers must pay both the employer and employee FICA taxes for Social Security and Medicare.

Employer Payroll Taxes and Costs	Employee Payroll Deductions
• FICA—Social Security taxes	• FICA—Social Security taxes
• FICA—Medicare taxes	• FICA—Medicare taxes
• FUTA (federal unemployment taxes)	• Federal income taxes
• SUTA (state unemployment taxes)	• State and local income taxes
• Share of medical coverage, if any	• Share of medical coverage, if any
• Share of pension coverage, if any	• Share of pension coverage, if any
• Share of other benefits, if any	• Share of other benefits, if any

APPENDIX

9B

P6

Account for corporate income taxes.

Corporate Income Taxes

This appendix covers current liabilities for income taxes of C corporations. Income tax on sole proprietorships, partnerships, S corporations, and LLCs is computed on their owner's tax filings and is not covered here.

Income Tax Liabilities Corporations are subject to income taxes and must estimate their income tax liability when preparing financial statements. Because income tax expense is created by earning income, a liability is incurred when income is earned. This tax must be paid quarterly. Consider a corporation that prepares monthly financial statements. Based on its income in January, this corporation estimates that it owes income taxes of $12,100. The following adjusting entry records this estimate.

Jan. 31	Income Taxes Expense	12,100	
	Income Taxes Payable		12,100
	Accrue January income taxes.		

Assets = Liabilities + Equity
+12,100 −12,100

The tax liability is recorded each month until the first quarterly payment is made. If the company's estimated taxes for this first quarter total $30,000, the entry to record its payment is

Apr. 10	Income Taxes Payable	30,000	
	Cash		30,000
	Paid estimated first-quarter income taxes.		

Assets = Liabilities + Equity
−30,000 −30,000

This process of accruing and then paying estimated income taxes continues through the year. When annual financial statements are prepared at year-end, the corporation knows its actual total income and the actual amount of income taxes it must pay. This information allows it to accurately record income taxes expense for the fourth quarter so that the total of the four quarters' expense amounts equals the actual taxes paid to the government.

Deferred Income Tax Liabilities An income tax liability for corporations can arise when the amount of income before taxes that the corporation reports on its income statement is not the same as the amount of income reported on its income tax return. This difference occurs because income tax laws and GAAP measure income differently. Differences between tax laws and GAAP arise because Congress uses tax laws to generate receipts, stimulate the economy, and influence behavior, whereas GAAP is intended to provide financial information useful for business decisions. Also, tax accounting often follows the cash basis, whereas GAAP follows the accrual basis.

Some differences between tax laws and GAAP are temporary. *Temporary differences* arise when the tax return and the income statement report a revenue or expense in different years. As an example, companies are often able to deduct higher amounts of depreciation in the early years of an asset's life and smaller amounts in later years for tax reporting in comparison to GAAP. This means that in the early years, depreciation for tax reporting is often more than depreciation on the income statement. In later years, depreciation for tax reporting is often less than depreciation on the income statement. When temporary differences exist between taxable income on the tax return and the income before taxes on the income statement, corporations compute income taxes expense based on the income reported on the income statement. The result is that income taxes expense reported in the income statement is often different from the amount of income taxes payable to the government. This difference is the **deferred income tax liability**.

page 368

Point: For a temporary difference, if GAAP income exceeds taxable income, a deferred tax liability is created. If GAAP income is initially less than taxable income, a deferred tax asset is created.

Assume that in recording its usual quarterly income tax payments, a corporation computes $25,000 of income taxes expense. It also determines that only $21,000 is currently due and $4,000 is deferred to future years (a timing difference). The entry to record this end-of-period adjustment is

Assets	=	Liabilities	+	Equity
		+21,000		−25,000
		+4,000		

Dec. 31	Income Taxes Expense	25,000	
	Income Taxes Payable		21,000
	Deferred Income Tax Liability		4,000
	Record tax expense and deferred tax liability.		

The credit to Income Taxes Payable is the amount currently due to be paid. The credit to Deferred Income Tax Liability is tax payments deferred until future years when the temporary difference reverses.

Deferred Income Tax Assets Temporary differences also can cause a company to pay income taxes *before* they are reported on the

income statement. If so, the company reports a *Deferred Income Tax Asset* on its balance sheet.

Summary: Cheat Sheet

KNOWN LIABILITIES

Current liabilities (or short-term liabilities): Liabilities due *within* one year.

Long-term liabilities: Liabilities due *after* one year.

Sales tax collection:

Cash	6,300	
Sales		6,000
Sales Taxes Payable		300

Unearned revenues (or deferred revenues): Amount received in advance from customers for future products or services; to record cash received in advance.

Cash	900,000	
Unearned Revenue		900,000

Unearned revenue is earned: To record service or product delivered.

Unearned Revenue	300,000	
Revenue		300,000

Short-term note payable: A written promise to pay a specified amount on a stated future date within one year.

Note given to replace accounts payable (partial cash paid):

Accounts Payable	600	
Cash		100
Notes Payable		500

Note given to borrow cash:

Cash	2,000	
Notes Payable		2,000

Note and interest paid:

Notes Payable	500	
Interest Expense	10	
Cash		510

Interest expense incurred but not yet paid:

Interest Expense	10	
Interest Payable		10

Interest formula (year assumed to have 360 days):

$$\text{Principal of the note} \times \text{Annual interest rate} \times \text{Time expressed in fraction of year} = \text{Interest}$$

PAYROLL LIABILITIES

Gross pay: Total compensation an employee earns before deductions such as taxes.

Payroll deductions (or withholdings): Amounts withheld from an employee's gross pay, either required or voluntary.

FICA—Social Security taxes payable: Withholdings to cover retirement, disability, and survivorship. Social Security tax is 6.2% of the first $137,700 the employee earns for the year.

FICA—Medicare taxes payable: Withholdings to cover medical benefits. The Medicare tax is 1.45% of all amounts the employee earns; there is no maximum limit to Medicare tax.

Employee federal income taxes payable: Federal income tax withheld from each employee's paycheck.

Employee voluntary deductions: Voluntary withholdings for things such as union dues, charitable giving, and health insurance.

Employee payroll taxes:

Salaries Expense	2,000	
FICA—Social Security Taxes Payable (6.2%)		124
FICA—Medicare Taxes Payable (1.45%)		29
Employee Federal Income Taxes Payable		213
Employee Medical Insurance Payable		85
Employee Union Dues Payable		25
Salaries Payable		1,524

Payment of salary to employees:

Salaries Payable	1,524	
Cash		1,524

Federal Unemployment Tax Act (FUTA): Employers pay a federal unemployment tax on wages and salaries earned by their employees. FUTA taxes are between 0.6% and 6.0% of the first $7,000 earned by each employee.

State Unemployment Tax Act (SUTA): Employers pay a state unemployment tax on wages and salaries earned by their employees. SUTA taxes are up to 5.4% of the first $7,000 earned by each employee.

Employer payroll taxes expense:

Payroll Taxes Expense	273	
FICA—Social Security Taxes Payable (6.2%)		124
FICA—Medicare Taxes Payable (1.45%)		29
State Unemployment Taxes Payable		108
Federal Unemployment Taxes Payable		12

ESTIMATED LIABILITIES

Health and pension benefits:

Employee Benefits Expense	20,000	
Employee Medical Insurance Payable		8,000
Employee Retirement Program Payable		12,000

Accrual of vacation benefits (also called *paid absences*):

Vacation Benefits Expense	3,200	
Vacation Benefits Payable		3,200

Vacation benefits are used:

Vacation Benefits Payable	400	
Cash		400

Bonus plan accrued:

Employee Bonus Expense	10,000	
Bonus Payable		10,000

Warranty: A seller's obligation to replace or fix a product or service that fails to perform as expected within a specified period. Warranty expense is recorded in the period when revenue from the sale of the product or service is reported.

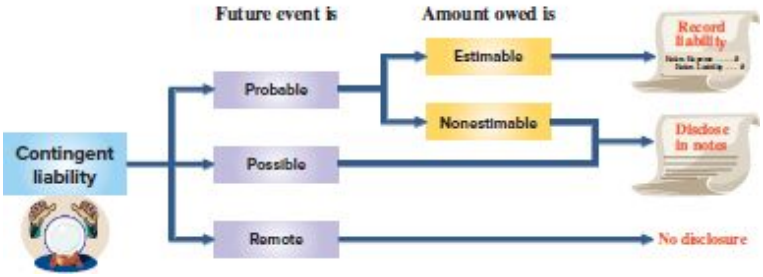
Warranty expense accrued:

Warranty Expense	640	
Estimated Warranty Liability		640

Warranty repairs and replacements:

Estimated Warranty Liability	200	
Parts Inventory		200

CONTINGENCIES AND ANALYSIS



Contingent liability: A potential liability that depends on a future event arising from a past transaction or event. An example is a pending lawsuit.

Key Terms

Contingent liability (358)

Current liabilities (347)

Current portion of long-term debt (355)

Deferred income tax liability (368)

Employee benefits (356)

Employee earnings report (365)

Estimated liability (355)

Federal depository bank (363)

Federal income taxes withheld (366)

Federal Insurance Contributions Act (FICA) taxes(352)

Federal Unemployment Tax Act (FUTA)(369)

Form 940 (363)

Form 941 (362)

Form W-2 (363)

Form W-4 (366)

Gross pay (352)

Known liabilities (348)

Long-term liabilities (348)

Merit rating (354)

Net pay (352)

Payroll bank account (366)

Payroll deductions (352)

Payroll register (364)

Short-term note payable (349)

State Unemployment Tax Act (SUTA)(369)

Times interest earned (360)

Wage bracket withholding table (366)

Warranty (356)

Multiple Choice Quiz

1. On December 1, a company signed a $6,000, 90-day, 5% note payable, with principal plus interest due on March 1 of the following year. What amount of interest expense should be accrued at December 31 on the note?

a. $300

b. $25

c. $100

d. $75

e. $0

2. An employee earned $50,000 during the year. FICA tax for Social Security is 6.2% and FICA tax for Medicare is 1.45%. The employer's share of FICA taxes is

a. $0; employee pay exceeds FICA limit.

b. $0; FICA is not an employer tax.

d. $725.

e. $3,825.

c. $3,100.

3. Assume the FUTA tax rate is 0.6% and the SUTA tax rate is 5.4%. Both taxes are applied to the first $7,000 of an employee's pay. What is the total unemployment tax an employer must pay on an employee's annual wages of $40,000?

a. $2,400

b. $420

c. $42

d. $378

e. $0; employee's wages exceed the $7,000 maximum.

4. A company sold 10,000 TVs in July and estimates warranty expense for these TVs to be $25,000. During July, 80 TVs were serviced under warranty at a cost of $18,000. The credit balance in the Estimated Warranty Liability account at July 1 was $26,000. What is the company's warranty expense for the month of July?

a. $51,000

b. $1,000

c. $25,000

d. $33,000

e. $18,000

5. AXE Co. is the defendant in a lawsuit. AXE reasonably estimates that this pending lawsuit will result in damages of $99,000. It is probable that AXE will lose the case. What should AXE do?

a. Record a liability

b. Disclose in notes

c. Have no disclosure

ANSWERS TO MULTIPLE CHOICE QUIZ

1. b; $6,000 × 0.05 × 30⁄360 = $25
2. e; $50,000 × (0.062 + 0.0145) = $3,825
3. b; $7,000 × (0.006 + 0.054) = $420
4. c; $25,000
5. a; Reason—it is reasonably estimated and is a probable loss. AXE would record an estimated legal expense and liability.

Superscript letter A or B denotes assignments based on Appendix 9A or 9B.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

QUICK STUDY

QS 9-1

Classifying liabilities

C1

Which of the following items are normally classified as current liabilities for a company that has a one-year operating cycle?

1. Portion of long-term note due in 10 months.
2. Note payable maturing in 2 years.
3. Note payable due in 18 months.
4. Accounts payable due in 11 months.
5. FICA taxes payable.
6. Salaries payable.

QS 9-2

Reporting current portion of long-term debt **C1**

The liabilities of Organic Foods are made up of $60,000 in notes payable as of its December 31 year-end. For those notes payable, $3,000 is due within the next year. Prepare the liabilities section of Organic Foods's December 31 year-end balance sheet.

QS 9-3

Accounting for sales taxes **C2**

Dextra Computing sells merchandise for $6,000 cash on September 30 (cost of merchandise is $3,900). Dextra collects 5% sales tax. (1) Record the entry for the $6,000 sale and its sales tax. (2) Record the entry that shows Dextra sending the sales tax on this sale to the government on October 15.

QS 9-4

Unearned revenue **C2**

Ticketsales, Inc., receives $5,000,000 cash in advance ticket sales for a four-date tour of Bon Jovi. Record the advance ticket sales on October 31. Record the revenue earned for the first concert date of November 5, assuming it represents one-fourth of the advance ticket sales.

QS 9-5

Interest-bearing note transactions **P1**

On November 7, Mura Company borrows $160,000 cash by signing a 90-day, 8%, $160,000 note payable. (1) Compute the accrued interest payable on December 31; (2) prepare the journal entry to record the accrued interest expense at December 31; and (3) prepare the journal entry to record payment of the note at maturity on February 5.

QS 9-6

Computing net pay

P2

At the end of the first pay period of the year, Sofia earned $4,000 of salary. Withholdings from Sofia's salary include FICA Social Security taxes at the rate of 6.2%, FICA Medicare taxes at the rate of 1.45%, $500 of federal income taxes, $160 of medical insurance deductions, and $10 of life insurance deductions. Compute Sofia's net pay for this first pay period.

QS 9-7

Recording employee payroll taxes **P2**

During the month of January, an employee earned $4,000 of salary. Withholdings from the employee's salary consist of FICA Social Security taxes of $248, FICA Medicare taxes of $58, federal income taxes of $426, and medical insurance deductions of $170. Prepare the journal entry to record the employer's salaries expense and related liabilities assuming these wages will be paid in early February.

QS 9-8

Recording employee payroll taxes

P2

On January 15, the end of the first pay period of the year, North Company's employees earned $35,000 of sales salaries. Withholdings from the employees' salaries include FICA Social Security taxes at the rate of 6.2%, FICA Medicare taxes at the rate of 1.45%, $6,500 of federal income taxes, $772.50 of medical insurance deductions, and $120 of union dues. No employee earned more than $7,000 in this first period. Prepare the journal entry to record North Company's January 15 salaries expense and related liabilities. (Round amounts to cents.)

QS 9-9

Recording employer payroll taxes **P3**

During the month of January, an employer incurred the following payroll taxes: FICA Social Security taxes of $372, FICA Medicare taxes of $87, FUTA taxes of $36, and SUTA taxes of $324. Prepare the journal entry to record the employer's payroll tax expense assuming these wages will be paid in early February.

QS 9-10

Recording employer payroll taxes **P3**

Merger Co. has 10 employees, each of whom earns $2,000 per month and has been employed since January 1. FICA Social Security taxes are 6.2% of the first $137,700 paid to each employee, and FICA Medicare taxes are 1.45% of gross pay. FUTA taxes are 0.6% and SUTA taxes are 5.4% of the first $7,000 paid to each employee. Prepare the March 31 journal entry to record the March payroll taxes expense.

QS 9-11

Accounting for bonuses **P4**

Noura Company offers an annual bonus to employees (to be shared equally) if the company meets certain net income goals. Prepare the journal entry to record a $15,000 bonus owed (but not yet paid) to its workers at calendar year-end.

QS 9-12

Accounting for vacations

P4

Chavez Co.'s salaried employees earn four weeks' vacation per year. Chavez estimated and must expense $8,000 of accrued vacation benefits for the year. (a) Prepare the December 31 year-end adjusting entry for accrued vacation benefits. (b) Prepare the entry on April 1 of

the next year when an employee takes a one-week vacation and is paid $500 cash for that week.

QS 9-13

Recording warranty repairs

P4

On December 1, Home Store sells a mower (that costs $200) for $500 cash with a one-year warranty that covers parts. Warranty expense is estimated at 8% of sales. On January 24 of the following year, the mower is brought in for repairs covered under the warranty requiring $35 in materials taken from the Parts Inventory. Prepare the December 1 entry to record the mower sale (and cost of sale), the December 31 adjusting entry for estimated warranty liability, and the January 24 entry to record the warranty repairs.

QS 9-14

Accounting for health and pension benefits **P4**

Riverrun Co. provides medical care and insurance benefits to its retirees. In the current year, Riverrun agrees to pay $5,500 for medical insurance and contribute an additional $9,000 to a retirement program. Record the entry for these accrued (but unpaid) benefits on December 31.

QS 9-15

Accounting for contingent liabilities

C3

Huprey Co. is the defendant in the following legal claims. For each of the following separate claims, indicate whether Huprey should (*a*) record a liability, (*b*) disclose in notes, or (*c*) have no disclosure.

1. Huprey can reasonably estimate that a pending lawsuit will result in damages of $1,250,000. It is probable that Huprey will lose the case.

2. It is reasonably possible that Huprey will lose a pending lawsuit. The loss cannot be estimated.

3. Huprey is being sued for damages of $2,000,000. It is very unlikely (remote) that Huprey will lose the case.

QS 9-16

Preparing liabilities section of balance sheet

C1 P2 P3

Selected accounts from Russel Co.'s adjusted trial balance for the year ended December 31 follow. Prepare the liabilities section of its classified balance sheet.

FICA—Social Security taxes payable	$1,600	Sales tax payable (due in 1 week)	$ 150
State unemployment taxes payable	800	Salaries payable	17,000
Current portion of long-term debt	2,000	Notes payable (due in 4 years)	6,000
Employee federal income taxes payable	5,000	FICA—Medicare taxes payable	300
Federal unemployment taxes payable	100	Accounts payable	2,600

QS 9-17

Times interest earned

A1

Park Company reports interest expense of $145,000 and income before interest expense and income taxes of $1,885,000. (1) Compute its times interest earned. (2) Park's competitor's times interest earned is 4.0. Is Park in a better or worse position than its competitor to make interest payments if the economy turns bad?

QS 9-18[A]

Federal income tax withholdings

P5

Organic Farmers Co-Op has three employees and pays them weekly. Using the withholding bracket table in Exhibit 9A.6, determine each employee's federal income tax withholding.

1. Maria earns $735 per week and claims three withholding allowances.
2. Jeff earns $607 per week and claims five withholding allowances.
3. Alicia earns $704 per week and does not claim any withholding allowances.

QS 9-19[A]

Net pay and tax computations

P5

The payroll records of Speedy Software show the following information about Marsha Gottschalk, an employee, for the weekly pay period ending September 30. Gottschalk is single and claims one allowance. Compute her Social Security tax (6.2%), Medicare tax (1.45%), federal income tax withholding (use the withholding table in Exhibit 9A.6), state income tax (1.0%), and net pay for the current pay period. Round tax amounts to the nearest cent.

Check Net pay, $579.99

Total (gross) earnings for current pay period	$740	Cumulative earnings of previous pay periods	$9,700

QS 9-20[B]

Recording deferred income tax liability **P6**

Sera Corporation has made and recorded its quarterly income tax payments. After a final review of taxes for the year, the company identifies an additional $40,000 of income tax expense that should be recorded. A portion of this additional expense, $6,000, is deferred for payment in future years. Record Sera's year-end adjusting entry for income tax expense.

EXERCISES

Exercise 9-1

Classifying liabilities

C1

The following items appear on the balance sheet of a company with a one-year operating cycle. Identify each item as a current liability, a long-term liability, or not a liability.

1. Notes payable (due in 13 to 24 months).
2. Notes payable (due in 6 to 11 months).
3. Notes payable (mature in five years).
4. Current portion of long-term debt.
5. Notes payable (due in 120 days).
6. FUTA taxes payable.
7. Accounts receivable.
8. Sales taxes payable.
9. Salaries payable.
10. Wages payable.

Exercise 9-2

Recording known current liabilities

C2

1. On July 15, Piper Co. sold $10,000 of merchandise (costing $5,000) for cash. The sales tax rate is 4%. On August 1, Piper sent the sales tax collected from the sale to the government. Record entries for the July 15 and August 1 transactions.

2. On November 3, the **Milwaukee Bucks** sold a six-game pack of advance tickets for $300 cash. On November 20, the Bucks played the first game of the six-game pack (this represented one-sixth of the advance ticket sales). Record the entries for the November 3 and November 20 transactions.

Exercise 9-3

Financial statement impact of current liability transactions **C2**

Analyze each separate transaction from Exercise 9-2 by showing its effects on the accounting equation—specifically, identify the accounts and amounts (including + or –) for each transaction.

Exercise 9-4

Accounting for note payable **P1**

Sylvestor Systems borrows $110,000 cash on May 15 by signing a 60-day, 12%, $110,000 note.

1. On what date does this note mature?

2. Prepare the entries to record (*a*) issuance of the note and (*b*) payment of the note at maturity.

Exercise 9-5

Interest-bearing notes payable with year-end adjustments **P1**

Keesha Co. borrows $200,000 cash on November 1 of the current year by signing a 90-day, 9%, $200,000 note.

1. On what date does this note mature?

2. How much interest expense is recorded in the current year? (Assume a 360-day year.)

3. How much interest expense is recorded in the following year? (Assume a 360-day year.)

4. Prepare journal entries to record (*a*) issuance of the note, (*b*) accrual of interest on December 31, and (*c*) payment of the note

at maturity.

Check (2) $3,000

(3) $1,500

Exercise 9-6

Note given to extend credit period **P1**

On March 1, LGE asks to extend its past-due $1,200 account payable to Tyson. Tyson agrees to accept $200 cash and a 180-day, 8%, $1,000 note payable to replace the account payable. (1) Prepare the March 1 entry for LGE. (2) Prepare the August 28 entry for LGE when it pays the note and interest to Tyson.

Exercise 9-7

Computing payroll taxes

P2 P3

BMX Company has one employee. FICA Social Security taxes are 6.2% of the first $137,700 paid to its employee, and FICA Medicare taxes are 1.45% of gross pay. For BMX, its FUTA taxes are 0.6% and SUTA taxes are 5.4% of the first $7,000 paid to its employee. Compute BMX's amounts for each of these four taxes as applied to the employee's gross earnings for September under each of three separate situations (*a*), (*b*), and (*c*). Round amounts to cents.

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	Gross Pay through August 31	Gross Pay for September
a.	$ 6,400	$ 800
b.	2,000	2,100
c.	131,400	8,000

Check (*a*) FUTA, $3.60; SUTA, $32.40

Exercise 9-8

Payroll-related journal entries **P2**

Using the data in *situation* (*a*) of Exercise 9-7, prepare the employer's September 30 journal entry to record salary expense and its related payroll liabilities for this employee. The employee's federal income taxes withheld by the employer are $80 for this pay period. Round amounts to cents.

Exercise 9-9

Payroll-related journal entries **P3**

Using the data in *situation* (*a*) of Exercise 9-7, prepare the employer's September 30 journal entry to record the *employer's* payroll taxes expense and its related liabilities. Round amounts to cents.

Exercise 9-10

Recording payroll

P2 P3

The following monthly data are taken from Ramirez Company at July 31: sales salaries, $200,000; office salaries, $160,000; federal income taxes withheld, $90,000; state income taxes withheld, $20,000; Social Security taxes withheld, $22,320; Medicare taxes withheld, $5,220; medical insurance premiums, $7,000; life insurance premiums, $4,000; union dues deducted, $1,000; and salaries subject to unemployment taxes, $50,000. The employee pays 40% of medical and life insurance premiums.

Prepare journal entries to record (1) accrued payroll, including employee deductions, for July; (2) cash payment of the net payroll (salaries payable) for July; (3) accrued employer payroll taxes, and other related employment expenses, for July—assume that FICA taxes are identical to those on employees and that SUTA taxes are 5.4% and FUTA taxes are 0.6%; and (4) cash payment of all liabilities related to the July payroll.

Exercise 9-11

Computing payroll taxes

P2 P3

Mest Company has nine employees. FICA Social Security taxes are 6.2% of the first $137,700 paid to each employee, and FICA Medicare taxes are 1.45% of gross pay. FUTA taxes are 0.6% and SUTA taxes are 5.4% of the first $7,000 paid to each employee. Cumulative pay for the current year for each of its employees follows.

Employee	Cumulative Pay	Employee	Cumulative Pay	Employee	Cumulative Pay
Ken S.	$ 6,000	Julie W.	$143,500	Christina S.	$140,200
Tim V.	40,400	Michael M.	106,900	Kitty O.	36,900
Steve S.	87,000	Zach R.	137,700	John W.	4,000

a. Prepare a table with the following six column headings. Compute the amounts in this table for each employee and then total the numerical columns.

Employee	Cumulative Pay	Pay Subject to FICA Social Security	Pay Subject to FICA Medicare	Pay Subject to FUTA Taxes	Pay Subject to SUTA Taxes

b. For the company, compute each total for FICA Social Security taxes, FICA Medicare taxes, FUTA taxes, and SUTA taxes. *Hint:* Remember to include in those totals any employee share of taxes that the company must collect. Round amounts to cents.

Exercise 9-12

Warranty expense and liability computations and entries

P4

Hitzu Co. sold a copier (that costs $4,800) for $6,000 cash with a two-year parts warranty to a customer on August 16 of Year 1. Hitzu expects warranty costs to be 4% of dollar sales. It records warranty expense with an adjusting entry on December 31. On January 5 of Year 2, the copier requires on-site repairs that are completed the same day. The repairs cost $209 for materials taken from the parts inventory. These are the only repairs required in Year 2 for this copier.

1. How much warranty expense does the company report for this copier in Year 1?
2. How much is the estimated warranty liability for this copier as of December 31 of Year 1?
3. How much is the estimated warranty liability for this copier as of December 31 of Year 2?
4. Prepare journal entries to record (*a*) the copier's sale; (*b*) the adjustment to recognize the warranty expense on December 31 of Year 1; and (*c*) the repairs that occur on January 5 of Year 2.

Check (1) $240

(3) $31

Exercise 9-13

Financial statement impact of warranty transactions **P4**

Analyze each of the following transactions from Exercise 9-12 page 374: (*a*) the copier's sale; (*b*) the adjustment to recognize the warranty expense on December 31 of Year 1; and (*c*) the repairs that occur on January 5 of Year 2. Show each transaction's effect on the accounting equation—specifically, identify the accounts and amounts (including + or –) for each.

Exercise 9-14

Recording bonuses

P4

For the year ended December 31, Lopez Company implements an employee bonus program based on company net income, which the employees share equally. Lopez's bonus expense is computed as $14,563.

1. Prepare the journal entry at December 31 to record the bonus due the employees.

2. Prepare the later journal entry at January 19 to record payment of the bonus to employees.

Exercise 9-15

Accounting for estimated liabilities

P4

Prepare adjusting entries at December 31 for Maxum Company's year-end financial statements for each of the following separate transactions.

1. Employees earn vacation pay at a rate of one day per month. Maxum estimated and must expense $13,000 of accrued vacation benefits for the year.
2. During December, Maxum Company sold 12,000 units of a product that carries a 60-day warranty. December sales for this product total $460,000. The company expects 10% of the units to need warranty repairs, and it estimates the average repair cost per unit will be $15.

Exercise 9-16

Accounting for health and pension benefits

P4

Vander Co. provides medical care and insurance benefits to its retirees. In the current year, Vander agrees to pay $9,500 for medical insurance and contribute an additional 5% of the employees' $200,000 gross salaries to a retirement program. (1) Record the entry for these accrued (but unpaid) benefits on December 31. (2) Assuming $5,000 of the retirement benefits are not to be paid for five years, how should this amount be reported on the current balance sheet?

Exercise 9-17

Accounting for contingent liabilities

C3

For each separate situation, indicate whether Cruz Company should (*a*) record a liability, (*b*) disclose in notes, or (*c*) have no disclosure.

1. xCruz Company guarantees the $100,000 debt of a supplier. It is not probable that the supplier will default on the debt.
2. A disgruntled employee is suing Cruz Company. Legal advisers believe that the company will likely need to pay damages, but the amount cannot be reasonably estimated.

Exercise 9-18

Preparing a balance sheet

C1 P2 P3

Selected accounts from Lue Co.'s adjusted trial balance for the year ended December 31 follow. Prepare a classified balance sheet.

Total equity	$30,000	Employee federal income taxes payable	$9,000
Equipment	40,000	Federal unemployment taxes payable	200
Salaries payable	34,000	FICA—Medicare taxes payable	725
Accounts receivable	5,100	FICA—Social Security taxes payable	3,100
Cash	50,000	Employee medical insurance payable	2,000
Current portion of long-term debt	4,000	State unemployment taxes payable	1,800
Notes payable (due in 6 years)	10,000	Sales tax payable (due in 2 weeks)	275

Exercise 9-19

Computing and interpreting times interest earned

A1

Use the following information from separate companies *a* through *d* to compute times interest earned. Which company indicates the strongest ability to pay interest expense as it comes due?

	Net Income (Loss)	Interest Expense	Income Taxes
a.	$119,000	$44,000	$35,000
b.	135,000	16,000	25,000
c.	138,000	12,000	30,000
d.	314,000	14,000	50,000

Exercise 9-20[A]

Computing gross and net pay **P5**

Lenny Florita, an unmarried employee, works 48 hours in the week ended January 12. His pay rate is $14 per hour, and his wages have deductions for FICA Social Security, FICA Medicare, and federal-income taxes. He claims two withholding allowances.

Compute his regular pay, overtime pay (Lenny earns $21 per hour for each hour over 40 per week), and gross pay. Then compute his FICA tax deduction (6.2% for the Social Security portion and 1.45% for the Medicare portion), income tax deduction (use the wage bracket withholding table from Exhibit 9A.6), total deductions, and net pay. Round tax amounts to the nearest cent.

Check Net pay, $596.30

Exercise 9-21[A]

Preparing payroll register and related entries

P5

Stark Company has five employees. Employees paid by the page 375
hour earn $10 per hour for the regular 40-hour workweek and $15 per hour beyond the 40 hours per week. Hourly employees are paid every two weeks, but salaried employees are paid monthly on the last biweekly payday of each month. FICA Social Security taxes are 6.2% of the first $137,700 paid to each employee, and FICA Medicare taxes are 1.45% of gross pay. FUTA taxes are 0.6% and SUTA taxes are 5.4% of the first $7,000 paid to each employee. The company has a benefits plan that includes medical insurance, life insurance, and retirement funding for employees. Under this plan, employees must

contribute 5% of their gross income as a payroll withholding, which the company matches with *double* the amount. Following is the partially completed payroll register for the biweekly period ending August 31, which is the last payday of August.

Employee	Cumulative Pay (Excludes Current Period)	Current-Period Gross Pay			FIT	FUTA	FICA-SS_EE	FICA-Med_EE	EE-Ben_Plan Withholding	Employee Net Pay (Current Period)
		Pay Type	Pay Hours	Gross Pay	SIT	SUTA	FICA-SS_ER	FICA-Med_ER	ER-Ben_Plan Expense	
Kathleen	$135,900.00	Salary	—	$7,000.00	$2,000.00					
					300.00					
Anthony	6,800.00	Salary	—	500.00	80.00				25.00	
					20.00				50.00	
Nichole	25,800.00	Regular	80		110.00					
		Overtime	8		25.00					
Zoey	6,500.00	Regular	80		100.00					
		Overtime	4		22.00					
Gracie	5,000.00	Regular	74	740.00	90.00					
		Overtime	0	0.00	21.00					
Totals	$180,000.00				2,380.00					
					388.00					

Note: Table abbreviations follow those in Exhibit 11A.3; "Ben_Plan" refers to employee (EE) withholding or the employer (ER) expense for the benefits plan.

a. Complete this payroll register by filling in all cells for the pay period ended August 31. *Hint:* See Exhibit 9A.5 for guidance. Round amounts to cents.

b. Prepare the August 31 journal entry to record the accrued biweekly payroll and related liabilities for deductions.

c. Prepare the August 31 journal entry to record the employer's cash payment of the net payroll of part *b.*

d. Prepare the August 31 journal entry to record the employer's payroll taxes including the contribution to the benefits plan.

e. Prepare the August 31 journal entry to pay all liabilities (except for the net payroll in part *c*) for this biweekly period.

Exercise 9-22[B]

Accounting for income taxes **P6**

Nishi Corporation prepares financial statements for each month-end. As part of its accounting process, estimated income taxes are accrued each month for 30% of the current month's net income. The

income taxes are paid in the first month of each quarter for the amount accrued for the prior quarter. The following information is available for the fourth quarter of the year just ended. When tax computations are completed on January 20 of the following year, Nishi determines that the quarter's Income Taxes Payable account balance should be $28,300 on December 31 of the year just ended (its unadjusted balance is $24,690).

October net income	$28,600	November net income	$19,100	December net income	$34,600

1. Determine the amount of the accounting adjustment (dated as of December 31) to get the correct ending balance in the Income Taxes Payable account.
2. Prepare journal entries to record (*a*) the December 31 adjustment to the Income Taxes Payable account and (*b*) the later January 20 payment of the fourth-quarter taxes.

Check (1) $3,610

PROBLEM SET A

Problem 9-1A

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Short-term notes payable transactions and entries

P1

Tyrell Co. entered into the following transactions involving short-term liabilities.

Year 1

Apr. 20	Purchased $40,250 of merchandise on credit from Locust, terms n/30.
May 19	Replaced the April 20 account payable to Locust with a 90-day, 10%, $35,000 note payable along with paying $5,250 in cash.
July 8	Borrowed $80,000 cash from NBR Bank by signing a 120-day, 9%, $80,000 note payable.
___?___	Paid the amount due on the note to Locust at the maturity date.
___?___	Paid the amount due on the note to NBR Bank at the maturity date.
Nov. 28	Borrowed $42,000 cash from Fargo Bank by signing a 60-day, 8%, $42,000 note payable.
Dec. 31	Recorded an adjusting entry for accrued interest on the note to Fargo Bank.

Year 2

___?___	Paid the amount due on the note to Fargo Bank at the maturity date.

Required

1. Determine the maturity date for each of the three notes described.
2. Determine the interest due at maturity for each of the three notes. Assume a 360-day year.

Check (2) Locust, $875

(3) $308

(4) $252

3. Determine the interest expense recorded in the adjusting entry at the end of Year 1.
4. Determine the interest expense recorded in Year 2.
5. Prepare journal entries for all the preceding transactions and events.

Problem 9-2A

Entries for payroll transactions

P2 P3

On January 8, the end of the first weekly pay period of the year, Regis Company's employees earned $22,760 of office salaries and $65,840 of sales salaries. Withholdings from the employees' salaries include FICA Social Security taxes at the rate of 6.2%, FICA Medicare taxes at the rate of 1.45%, $12,860 of federal income taxes,

$1,340 of medical insurance deductions, and $840 of union dues. No employee earned more than $7,000 in this first period.

Required

1. Calculate FICA Social Security taxes payable and FICA Medicare taxes payable. Prepare the journal entry to record Regis Company's January 8 *employee* payroll expenses and liabilities. Round amounts to cents.

Check (1) Cr. Salaries Payable, $66,782.10

(2) Dr. Payroll Taxes Expense, $12,093.90

2. Prepare the journal entry to record Regis's *employer* payroll taxes resulting from the January 8 payroll. Regis's state unemployment tax rate is 5.4% of the first $7,000 paid to each employee. The federal unemployment tax rate is 0.6%. Round amounts to cents.

Problem 9-3A

Payroll expenses, withholdings, and taxes

P2 P3

Paloma Co. has four employees. FICA Social Security taxes are 6.2% of the first $137,700 paid to each employee, and FICA Medicare taxes are 1.45% of gross pay. Also, for the first $7,000 paid to each employee, the company's FUTA taxes are 0.6% and SUTA taxes are 5.4%. The company is preparing its payroll calculations for the week ended August 25. Payroll records show the following information for the company's four employees.

	A	B	C	D
1			Current Week	
2	Name	Gross Pay through Aug. 18	Gross Pay	Income Tax Withholding
3	Dali	$136,600	$2,000	$284
4	Trey	136,800	900	145
5	Kiesha	6,900	450	39
6	Chee	1,250	400	30

In addition to gross pay, the company must pay two-thirds of the $60 per employee weekly health insurance; each employee pays the

remaining one-third. The company also contributes an extra 8% of each employee's gross pay (at no cost to employees) to a pension fund.

Required

Compute the following for the week ended August 25 (round amounts to the nearest cent):

1. Each employee's FICA withholdings for Social Security.
2. Each employee's FICA withholdings for Medicare.
3. Employer's FICA taxes for Social Security.
4. Employer's FICA taxes for Medicare.
5. Employer's FUTA taxes.
6. Employer's SUTA taxes.
7. Each employee's net (take-home) pay.
8. Employer's total payroll-related expense for each employee.

Check (3) $176.70

(4) $54.38

(5) $3.00

(7) Total net pay, $2,940.92

Problem 9-4A

Estimating warranty expense and liability

P4

On October 29, Lobo Co. began operations by purchasing page 377 razors for resale. The razors have a 90-day warranty. When a razor is returned, the company discards it and mails a new one from merchandise inventory to the customer. The company's cost per new razor is $20 and its retail selling price is $75. The company expects warranty costs to equal 8% of dollar sales. The following transactions occurred.

Nov. 11 Sold 105 razors for $7,875 cash.

30 Recognized warranty expense related to November sales with an adjusting entry.

Dec. 9 Replaced 15 razors that were returned under the warranty.

16 Sold 220 razors for $16,500 cash.

29 Replaced 30 razors that were returned under the warranty.

31 Recognized warranty expense related to December sales with an adjusting entry.

Jan. 5 Sold 150 razors for $11,250 cash.

17 Replaced 50 razors that were returned under the warranty.

31 Recognized warranty expense related to January sales with an adjusting entry.

Required

1. Prepare journal entries to record these transactions and adjustments.
2. How much warranty expense is reported for November and for December?
3. How much warranty expense is reported for January?
4. What is the balance of the Estimated Warranty Liability account as of December 31?

Check (3) $900

(4) $1,050 Cr.

(5) $950 Cr.

5. What is the balance of the Estimated Warranty Liability account as of January 31?

Problem 9-5A

Computing and analyzing times interest earned

A1

Shown here are condensed income statements for two different companies (assume no income taxes).

Miller Company	
Sales	$1,000,000
Variable expenses (80%)	800,000
Income before interest	200,000
Interest expense (fixed)	60,000
Net income	$ 140,000

Weaver Company	
Sales	$1,000,000
Variable expenses (60%)	600,000
Income before interest	400,000
Interest expense (fixed)	260,000
Net income	$ 140,000

Required

1. Compute times interest earned for Miller Company and for Weaver Company.
2. What happens to each company's net income if sales increase by 30%?

Check (2) Miller net income, $200,000 (43% increase)

(4) Weaver net income, $100,000 (29% decrease)

3. What happens to each company's net income if sales increase by 50%?
4. What happens to each company's net income if sales decrease by 10%?
5. What happens to each company's net income if sales decrease by 40%?

Analysis Component

6. Which company would have a greater ability to pay interest expense if sales were to decrease?

Problem 9-6A[A]

Entries for payroll transactions

P5

Francisco Company has 10 employees, each of whom earns $2,800 per month and is paid on the last day of each month. All 10 have been employed continuously at this amount since January 1. On March 1, the following accounts and balances exist in its general ledger.

a. FICA—Social Security Taxes Payable, $3,472; FICA—Medicare Taxes Payable, $812. (The balances of these accounts represent total liabilities for *both* the employer's and employees' FICA taxes for the February payroll only.)

b. Employees' Federal Income Taxes Payable, $4,000 (liability for February only).

c. Federal Unemployment Taxes Payable, $336 (liability for January and February together).

d. State Unemployment Taxes Payable, $3,024 (liability for January and February together).

The company had the following payroll transactions.

Mar. 15 Issued check payable to Swift Bank, a federal depository bank authorized to accept employers' payments of FICA taxes and employee income tax withholdings. The $8,284 check is in payment of the February FICA and employee income taxes.

31 Recorded the journal entry for the March salaries payable. Then recorded the cash payment of the March payroll (the company issued checks payable to each employee in payment of the March payroll). The payroll register shows the following summary totals for the March pay period.

31 Recorded the employer's payroll taxes resulting from the March payroll. The company has a state unemployment tax rate of 5.4% on the first $7,000 paid to each employee. The federal rate is 0.6%.

Salaries					
Office Salaries	Shop Salaries	Gross Pay	FICA Taxes*	Federal Income Taxes	Net Pay
$11,200	$16,800	$28,000	$1,736 $ 406	$4,000	$21,858

*FICA taxes are Social Security and Medicare, respectively.

March 31: Dr. Payroll Taxes Expense, $2,982

April 15: Cr. Cash, $8,284 (Swift Bank)

Apr. 15 Issued check to Swift Bank in payment of the March FICA and employee income taxes.

15 Issued check to the State Tax Commission for the January, February, and March state unemployment taxes. Filed the check and the first-quarter tax return with the Commission.

30 Issued check payable to Swift Bank in payment of the employer's FUTA taxes for the first quarter of the year.

30 Filed Form 941 with the IRS, reporting the FICA taxes and the employees' federal income tax withholdings for the first quarter.

Required

Prepare journal entries to record these transactions and events.

PROBLEM SET B

Problem 9-1B

Short-term notes payable transactions and entries

P1

Warner Co. entered into the following transactions involving short-term liabilities.

Year 1

Year 1

Apr. 22	Purchased $5,000 of merchandise on credit from Fox-Pro, terms n/30.
May 23	Replaced the April 22 account payable to Fox-Pro with a 60-day, 15%, $4,600 note payable along with paying $400 in cash.
July 15	Borrowed $12,000 cash from Spring Bank by signing a 120-day, 10%, $12,000 note payable.
___?___	Paid the amount due on the note to Fox-Pro at maturity.
___?___	Paid the amount due on the note to Spring Bank at maturity.
Dec. 6	Borrowed $8,000 cash from City Bank by signing a 45-day, 9%, $8,000 note payable.
31	Recorded an adjusting entry for accrued interest on the note to City Bank.

Year 2

___?___	Paid the amount due on the note to City Bank at maturity.

Required

1. Determine the maturity date for each of the three notes described.
2. Determine the interest due at maturity for each of the three notes. Assume a 360-day year.

Check (2) Fox-Pro, $115

(3) $50

(4) $40

3. Determine the interest expense recorded in the adjusting entry at the end of Year 1.
4. Determine the interest expense recorded in Year 2.
5. Prepare journal entries for all the preceding transactions and events.

Problem 9-2B

Entries for payroll transactions

P2 P3

Tavella Company's first weekly pay period of the year ends on January 8. On that date, Tavella's sales employees earned $34,745, office employees earned $21,225, and delivery employees earned $1,030 in salaries. The employees are to have withheld from their salaries FICA Social Security taxes at the rate of 6.2%, FICA Medicare taxes at the rate of 1.45%, $8,625 of federal income taxes,

$1,160 of medical insurance deductions, and $138 of union dues. No employee earned more than $7,000 in the first pay period.

Required

1. Calculate FICA Social Security taxes payable and FICA Medicare taxes payable. Prepare the journal entry to record Tavella Company's January 8 *employee* payroll expenses and liabilities. Round amounts to cents.

Check (1) Cr. Salaries Payable, $42,716.50

(2) Dr. Payroll Taxes Expense, $7,780.50

2. Prepare the journal entry to record Tavella's *employer* payroll taxes resulting from the January 8 payroll. Tavella's state unemployment tax rate is 5.4% of the first $7,000 paid to each employee. The federal unemployment tax rate is 0.6%. Round amounts to cents.

Problem 9-3B

Payroll expenses, withholdings, and taxes

P2 P3

page 379

Fishing Guides Co. has four employees. FICA Social Security taxes are 6.2% of the first $137,700 paid to each employee, and FICA Medicare taxes are 1.45% of gross pay. Also, for the first $7,000 paid to each employee, the company's FUTA taxes are 0.6% and SUTA taxes are 5.4%. The company is preparing its payroll calculations for the week ended September 30. Payroll records show the following information for the company's four employees.

	A	B	C	D
1			Current Week	
2	Name	Gross Pay through Sep. 23	Gross Pay	Income Tax Withholding
3	Ahmed	$136,100	$2,500	$198
4	Carlos	136,185	1,515	182
5	Jun	6,650	475	32
6	Marie	23,700	1,000	68

In addition to gross pay, the company must pay 60% of the $50 per employee weekly health insurance; each employee pays the remaining 40%. The company also contributes an extra 5% of each employee's gross pay (at no cost to employees) to a pension fund.

Required

Compute the following for the week ended September 30 (round amounts to the nearest cent):

1. Each employee's FICA withholdings for Social Security.
2. Each employee's FICA withholdings for Medicare.
3. Employer's FICA taxes for Social Security.
4. Employer's FICA taxes for Medicare.
5. Employer's FUTA taxes.
6. Employer's SUTA taxes.
7. Each employee's net (take-home) pay.
8. Employer's total payroll-related expense for each employee.

Check (3) $284.58

(4) $79.61

(5) $2.10

(7) Total net pay, $4,565.81

Problem 9-4B

Estimating warranty expense and liability

P4

On November 10, Lee Co. began operations by purchasing coffee grinders for resale. The grinders have a 60-day warranty. When a grinder is returned, the company discards it and mails a new one from merchandise inventory to the customer. The company's cost per new grinder is $24 and its retail selling price is $50. The company

expects warranty costs to equal 10% of dollar sales. The following transactions occurred.

Nov. 16 Sold 50 grinders for $2,500 cash.

30 Recognized warranty expense related to November sales with an adjusting entry.

Dec. 12 Replaced six grinders that were returned under the warranty.

18 Sold 200 grinders for $10,000 cash.

28 Replaced 17 grinders that were returned under the warranty.

31 Recognized warranty expense related to December sales with an adjusting entry.

Jan. 7 Sold 40 grinders for $2,000 cash.

21 Replaced 36 grinders that were returned under the warranty.

31 Recognized warranty expense related to January sales with an adjusting entry.

Required

1. Prepare journal entries to record these transactions and adjustments.
2. How much warranty expense is reported for November and for December?
3. How much warranty expense is reported for January?
4. What is the balance of the Estimated Warranty Liability account as of December 31?
5. What is the balance of the Estimated Warranty Liability account as of January 31?

Check (3) $200

(4) $698 Cr.

(5) $34 Cr.

Problem 9-5B

Computing and analyzing times interest earned

A1

Shown here are condensed income statements for two different companies (assume no income taxes).

Ellis Company	
Sales	$240,000
Variable expenses (50%)	120,000
Income before interest	120,000
Interest expense (fixed)	90,000
Net income	$ 30,000

Seidel Company	
Sales	$240,000
Variable expenses (75%)	180,000
Income before interest	60,000
Interest expense (fixed)	30,000
Net income	$ 30,000

Required

1. Compute times interest earned for Ellis Company and for Seidel Company.
2. What happens to each company's net income if sales increase by 10%?
3. What happens to each company's net income if sales increase by 40%?

Check (3) Ellis net income, $78,000 (160% increase)

(4) Seidel net income, $18,000 (40% decrease)

4. What happens to each company's net income if sales decrease by 20%?
5. What happens to each company's net income if sales decrease by 50%?

Analysis Component

6. Which company would have a greater ability to pay interest expense if sales were to decrease?

Problem 9-6B[A]

Entries for payroll transactions

P5

MLS Company has five employees, each of whom earns page 380 $1,600 per month and is paid on the last day of each month. All five have been employed continuously at this amount since January 1. On June 1, the following accounts and balances exist in its general ledger.

a. FICA—Social Security Taxes Payable, $992; FICA—Medicare Taxes Payable, $232. (The balances of these accounts represent total liabilities for *both* the employer's and employees' FICA taxes for the May payroll only.)

b. Employees' Federal Income Taxes Payable, $1,050 (liability for May only).

c. Federal Unemployment Taxes Payable, $66 (liability for April and May together).

d. State Unemployment Taxes Payable, $594 (liability for April and May together).

The company had the following payroll transactions.

June 15 Issued check payable to Security Bank, a federal depository bank authorized to accept employers' payments of FICA taxes and employee income tax withholdings. The $2,274 check is in payment of the May FICA and employee income taxes.

30 Recorded the journal entry for the June salaries payable. Then recorded the cash payment of the June payroll (the company issued checks payable to each employee in payment of the June payroll). The payroll register shows the following summary totals for the June pay period.

Salaries					
Office Salaries	Shop Salaries	Gross Pay	FICA Taxes*	Federal Income Taxes	Net Pay
$3,800	$4,200	$8,000	$496 $116	$1,050	$6,338

*FICA taxes are Social Security and Medicare, respectively.

30 Recorded the employer's payroll taxes resulting from the June payroll. The company has a state unemployment tax rate of 5.4% on the first $7,000 paid to each employee. The federal rate is 0.6%.

Check June 30: Cr. Salaries Payable, $6,338

July 15 Issued check payable to Security Bank in payment of the June FICA and employee income taxes.

15 Issued check to the State Tax Commission for the April, May, and June state unemployment taxes. Filed the check and the second-quarter tax return with the State Tax Commission.

31 Issued check payable to Security Bank in payment of the employer's FUTA taxes for the first quarter of the year.

31 Filed Form 941 with the IRS, reporting the FICA taxes and the employees' federal income tax withholdings for the second quarter.

Check June 30: Dr. Payroll Taxes Expense, $612

July 15: Cr. Cash, $2,274 (Security Bank)

Required

Prepare journal entries to record the transactions and events.

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connect

SERIAL PROBLEM

Business Solutions

C2 P2 P3

Serial problem began in Chapter 1. If previous chapter segments were not completed, the serial problem can begin at this point. It is available in Connect with an algorithmic option.

page 381

SP 9 Review the February 26 and March 25 transactions for **Business Solutions** (SP 5) from Chapter 5.

Feb. 26 The company paid cash to Lyn Addie for eight days' work at $125 per day.

Mar. 25 The company sold merchandise with a $2,002 cost for $2,800 on credit to Wildcat Services, invoice dated March 25.

Alexander Image/Shutterstock

Required

1. Assume that Lyn Addie is an unmarried employee. Her $1,000 of wages have deductions for FICA Social Security taxes, FICA Medicare taxes, and federal income taxes. Her federal income taxes for this pay period total $159. Compute her net pay for the eight days' work paid on February 26. Round amounts to the nearest cent.

2. Record the journal entry to reflect the payroll payment to Lyn Addie as computed in part 1.

3. Record the journal entry to reflect the (employer) payroll tax expenses for the February 26 payroll payment. Assume Lyn Addie has not met earnings limits for FUTA and SUTA (the FUTA rate is

0.6% and the SUTA rate is 5.4% for the company). Round amounts to the nearest cent.

4. Record the entry(ies) for the merchandise sold on March 25 if a 4% sales tax rate applies.

COMPREHENSIVE PROBLEM

Comprehensive Problem *is available in* ***Connect*** *with an algorithmic option.*

Bug-Off Exterminators

(Review of Chapters 1–9)

CP 9 Bug-Off Exterminators provides pest control services and sells extermination products manufactured by other companies. The following six-column table contains the company's unadjusted trial balance as of December 31, 2021.

December 31, 2021	Unadjusted Trial Balance		Adjustments		Adjusted Trial Balance	
Cash	$ 17,000					
Accounts receivable	4,000					
Allowance for doubtful accounts		$ 828				
Merchandise inventory	11,700					
Trucks	32,000					
Accum. depreciation—Trucks		0				
Equipment	45,000					
Accum. depreciation—Equipment		12,200				
Accounts payable		5,000				
Estimated warranty liability		1,400				
Unearned services revenue		0				
Interest payable		0				
Long-term notes payable		15,000				
Common stock		20,000				
Retained earnings		39,700				
Dividends	10,000					
Extermination services revenue		60,000				
Interest revenue		872				
Sales (of merchandise)		71,026				
Cost of goods sold	46,300					
Depreciation expense—Trucks	0					
Depreciation expense—Equipment	0					
Wages expense	35,000					
Interest expense	0					
Rent expense	9,000					
Bad debts expense	0					
Miscellaneous expense	1,226					
Repairs expense	8,000					
Utilities expense	6,800					
Warranty expense	0					
Totals	$226,026	$226,026				

The following information in *a* through *h* applies to the company at the end of the current year.

a. The bank reconciliation as of December 31, 2021, includes the following facts.

Cash balance per bank	$15,100	Deposit in transit	$2,450
Cash balance per books	17,000	Interest earned (on bank account)	52
Outstanding checks	1,800	Bank service charges (miscellaneous expense)	15

Reported on the bank statement is a canceled check that page 382 the company failed to record. (Information from the bank

reconciliation allows you to determine the amount of this check, which is a payment on an account payable.)

b. An examination of customers' accounts shows that accounts totaling $679 should be written off as uncollectible. Using an aging of receivables, the company determines that the ending balance of the Allowance for Doubtful Accounts should be $700.

c. A truck is purchased and placed in service on January 1, 2021. Its cost is being depreciated with the straight-line method using the following facts and estimates.

Original cost.	$32,000	Expected salvage value	$8,000	Useful life (years)	4

d. Two items of equipment (a sprayer and an injector) were purchased and put into service in early January 2019. They are being depreciated with the straight-line method using these facts and estimates.

	Sprayer	Injector
Original cost	$27,000	$18,000
Expected salvage value	$ 3,000	$ 2,500
Useful life (years)	8	5

e. On August 1, 2021, the company is paid $3,840 cash in advance to provide monthly service for an apartment complex for one year. The company began providing the services in August. When the cash was received, the full amount was credited to the Extermination Services Revenue account.

f. The company offers a warranty for the services it sells. The expected cost of providing warranty service is 2.5% of the extermination services revenue of $57,760 for 2021. No warranty expense has been recorded for 2021. All costs of servicing warranties in 2021 were properly debited to the Estimated Warranty Liability account.

g. The $15,000 long-term note is an 8%, five-year, interest-bearing note with interest payable annually on December 31. The note was signed with First National Bank on December 31, 2021.

h. The ending inventory of merchandise is counted and determined to have a cost of $11,700. Bug-Off uses a perpetual inventory system.

Required

1. Use the preceding information to determine amounts for the following items.

- **a.** Correct (reconciled) ending balance of Cash; and the amount of the omitted check.
- **b.** Adjustment needed to obtain the correct ending balance of the Allowance for Doubtful Accounts.
- **c.** Depreciation expense for the truck used during year 2021.
- **d.** Depreciation expense for the two items of equipment used during year 2021.
- **e.** The adjusted 2021 ending balances of the Extermination Services Revenue and Unearned Services Revenue accounts.
- **f.** The adjusted 2021 ending balances of the Warranty Expense and the Estimated Warranty Liability accounts.
- **g.** The adjusted 2021 ending balances of the Interest Expense and the Interest Payable accounts. (Round amounts to nearest whole dollar.)

2. Use the results of part 1 to complete the six-column table by first entering the appropriate adjustments for items *a* through *g* and then completing the Adjusted Trial Balance columns. *Hint:* Item *b* requires two adjustments.

3. Prepare journal entries to record the adjustments that are entered on the six-column table. Assume Bug-Off's adjusted balance for Merchandise Inventory matches the year-end physical count.

4. Prepare a single-step income statement, a statement of retained earnings (cash dividends during 2021 were $10,000), and a classified balance sheet.

Check (1*a*) Reconciled cash bal., $15,750

(1*b*) $551 credit

(1*f*) Estimated Warranty Liability, $2,844 Cr.

(2) Adjusted trial balance totals, $238,207

(4) Net income, $9,274; Total assets, $82,771

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA 9-1 Quick Study, Computing warranty expense, **P4**—similar to QS 9-13

Tableau DA 9-2 Exercise, Warranty expense and liability computations and entries, **P4**—similar to Exercise 9-12

Tableau DA 9-3 Mini-Case, Analyzing warranty liabilities, **P4**—similar to Exercise 9-13

GENERAL LEDGER

General Ledger (GL) Assignments expose students to general ledger software similar to that in practice. GL is part of Connect, and GL assignments are auto-gradable and have algorithmic options.

GL 9-1 focuses on transactions related to accounts and notes payable; it highlights the impact each transaction has on interest expense, if any.

Accounting Analysis

COMPANY ANALYSIS

A1 P4

	Appraisal Value	%	Total Cost	Allocated
Land	$175,000	50%	$326,000	$163,000
Land improvements	70,000	20	326,000	65,200
Building	105,000	30	326,000	97,800
Totals	$350,000			$326,000

AA 9-1 Use the table below and **Apple**'s financial statements in Appendix A to answer the following.

1. Compute times interest earned for each of the three years shown.
2. Is Apple in a good or bad position to pay interest obligations? Assume an industry average of 10.

COMPARATIVE ANALYSIS

A1

AA 9-2 Key figures for **Apple** and **Google** follow.

$ millions	Apple			Google		
	Current Year	One Year Prior	Two Years Prior	Current Year	One Year Prior	Two Years Prior
Net income	$55,256	$59,531	$48,351	$34,343	$30,736	$12,662
Income taxes	10,481	13,372	15,738	5,282	4,177	14,531
Interest expense	3,576	3,240	2,323	100	114	109

Required

1. Compute times interest earned for the three years' data shown for each company.
2. In the current year, and using times interest earned, which company appears better able to pay interest obligations?
3. In the current year, and using times interest earned, is the company in a good or bad position to pay interest obligations for (*a*) Apple and (*b*) Google? Assume an industry average of 10.

EXTENDED ANALYSIS

A1

AA 9-3 Comparative figures for **Samsung**, **Apple**, and **Google** follow.

In millions	Samsung		Apple		Google	
	Current Year	Prior Year	Current Year	Prior Year	Current Year	Prior Year
Net Income	$18,653	$38,049	$55,256	$59,531	$34,343	$30,736
Income taxes	7,459	14,428	10,481	13,372	5,282	4,177
Interest expense	577	567	3,576	3,240	100	114

Required

1. Compute the times interest earned ratio for the most recent two years for Samsung using the data shown.
2. Is the change in Samsung's times interest earned ratio favorable or unfavorable?

3. In the current year, is Samsung's times interest earned ratio better or worse than the same ratio for (*a*) Apple and (*b*) Google?

Discussion Questions

1. What is the difference between a current and a long-term liability?
2. What is an estimated liability?
3. What are the three important questions concerning the uncertainty of liabilities?
4. What is the combined amount (in percent) of the employee and employer Social Security tax rate? (Assume wages do not exceed $137,700 per year.)
5. What is the current Medicare tax rate? This rate is applied to what maximum level of salary and wages?
6. Which payroll taxes are the employee's responsibility and which are the employer's responsibility?
7. What determines the amount deducted from an employee's wages for federal income taxes?
8. What is an employer's unemployment merit rating? How are these ratings assigned to employers?
9. Why are warranty liabilities usually recognized on the balance sheet as liabilities even when they are uncertain?
10. Suppose a company has a facility located where disastrous weather conditions often occur. Should it report a probable loss from a future disaster as a liability on its balance sheet? Explain.
11. .A What is a wage bracket withholding table?
12. .A What amount of income tax is withheld from the salary of an employee who is single with two withholding allowances and

earns $725 per week? What if the employee earns $625 and has no withholding allowances? (Use Exhibit 9A.6.)

Beyond the Numbers

ETHICS CHALLENGE

P4

BTN 9-1 Cameron Bly is a sales manager for an automobile dealership. He earns a bonus each year based on revenue from the number of autos sold in the year less related warranty expenses. Actual warranty expenses have varied over the prior 10 years from a low of 3% of an automobile's selling price to a high of 10%. In the past, Bly has tended to estimate warranty expenses on the high end to be conservative. He must work with the dealership's accountant at year-end to arrive at the warranty expense accrual for cars sold each year.

1. Does the warranty accrual decision create any ethical dilemma for Bly?
2. Because warranty expenses vary, what percent do you think Bly should choose for the current year? Justify your response.

COMMUNICATING IN PRACTICE

C3

BTN 9-2 Dusty Johnson is the accounting and finance manager for a manufacturer. At year-end, he must determine how to account for the company's contingencies. His manager, Tom Pretti, objects to Johnson's proposal to recognize an expense and a liability for warranty service on units of a new product introduced in the fourth quarter. Pretti comments, "There's no way we can estimate this warranty cost. We don't owe anyone anything until a product fails and it is returned. Let's report an expense if and when we do any warranty work."

Required

Prepare a one-page memorandum for Johnson to send to Pretti defending his proposal.

TAKING IT TO THE NET

C1 A1

BTN 9-3 Access the February 22, 2019, filing of the December 31, 2018, annual 10-K report of **McDonald's Corporation** (ticker: MCD), which is available from **SEC.gov**.

Required

1. Identify the current liabilities on McDonald's balance sheet as of December 31, 2018.
2. Use the consolidated statement of income for the year ended December 31, 2018, to compute McDonald's times interest earned ratio. Comment on the result. Assume an industry average of 5.0.

TEAMWORK IN ACTION

C2 P1

BTN 9-4 Assume that your team is in business and you must borrow $6,000 cash for short-term needs. You have been shopping banks for a loan, and you have the following two options.

A. Sign a $6,000, 90-day, 10% interest-bearing note dated June 1.

B. Sign a $6,000, 120-day, 8% interest-bearing note dated June 1.

Required

page 385

1. Discuss these two options and determine the better choice. Ensure that all teammates concur with the decision and understand the rationale.
2. Each member of the team is to prepare *one* of the following journal entries.
   a. Option A—at date of issuance.

b. Option B—at date of issuance.

c. Option A—at maturity date.

d. Option B—at maturity date.

3. In rotation, each member is to explain to the team the entry he or she prepared in part 2. Ensure that all team members concur with and understand the entries.

4. Assume that the funds are borrowed on December 1 (instead of June 1) and your business operates on a calendar-year reporting period. Each member of the team is to prepare *one* of the following entries.

   a. Option A—the year-end adjustment.

   b. Option B—the year-end adjustment.

   c. Option A—at maturity date.

   d. Option B—at maturity date.

5. In rotation, each member is to explain to the team the entry he or she prepared in part 4. Ensure that all team members concur with and understand the entries.

ENTREPRENEURIAL DECISION

A1

BTN 9-5 Review the chapter's opening feature about Beto Perez and **Zumba**. Assume the company is considering expanding to Europe and that the current abbreviated income statement appears as follows.

Income Statement For Year Ended December 31	
Sales	$1,000,000
Operating expenses (55%)	550,000
Net income	$ 450,000

Assume also that the company currently has no interest-bearing debt. If it expands to Europe, it will require a $300,000 loan. The

company has found a bank that will loan it the money on a 7% note payable. The company believes that, at least for the first few years, sales in Europe will equal $250,000 and that all expenses at both locations will continue to equal 55% of sales.

Required

1. Prepare an income statement (showing three separate columns for current operations, European, and total) for the company assuming that it borrows the funds and expands to Europe. Annual revenues for current operations are expected to remain at $1,000,000.
2. Compute the company's times interest earned under the expansion assumptions in part 1.
3. Assume sales in Europe are $400,000. Prepare an income statement (with columns for current operations, European, and total) for the company and compute times interest earned.
4. Assume sales in Europe are $100,000. Prepare an income statement (with columns for current operations, European, and total) for the company and compute times interest earned.
5. Comment on your results from parts 1 through 4.

10 Accounting for Long-Term Liabilities

page 386

Chapter Preview

BOND BASICS

A1 Bond financing

Bond trading

P1 Par bonds

NTK 10-1

DISCOUNT BONDS

Discount or premium

P2 Bond payments

Amortize discount

Straight-line

NTK 10-2

PREMIUM BONDS

P3 Bond payments

Amortize premium

Straight-line

P4 Bond retirement

NTK 10-3

LONG-TERM NOTES

C1 Recording notes

DEBT ANALYSIS

A2 Debt features

Debt-to-equity

NTK 10-4

Learning Objectives

CONCEPTUAL

C1 Explain the types of notes and prepare entries to account for notes.

C2 *Appendix 10A* —Explain and compute bond pricing.

C3 *Appendix 10C* —Describe accounting for leases and pensions.

ANALYTICAL

A1 Compare bond financing with stock financing.

A2 Analyze the debt-to-equity ratio and assess debt features.

PROCEDURAL

P1 Account for par bonds.

P2 Account for discount bonds.

P3 Account for premium bonds.

P4 Record the retirement of bonds.

P5 *Appendix 10B* —Amortization using effective interest method.

Get a Room

"Never assume you can't" **—BRIAN CHESKY**

SAN FRANCISCO—Brian Chesky and Joe Gebbia had just graduated from design school and were struggling to pay rent. "Joe tells me the rent is $1,150," recalls Brian. "I have $1,000." To get extra money, Brian and Joe rented out an extra room for a couple nights. "We pulled these three air beds out of a closet," says Brian. "We called it the Air Bed and Breakfast." This idea led Brian, Joe, and their friend Nathan Blecharczyk to launch a website and app connecting travelers and hosts called **Airbnb (airbnb.com)** .

One of their greatest hurdles involved financing Airbnb. They were especially unprepared to manage liabilities. They explain how, in the beginning, their financing came from "$40,000 in maxed out credit cards." Not the best strategy. This met their financing needs, but it came with high interest costs.

As Airbnb grew, so did their need for more financing. They studied the advantages and disadvantages of debt versus equity financing. This led to their decision to carry a mix of both debt and equity financing—with liabilities rising to $1 billion from bank loans.

Their decision not to give up too much equity in financing Airbnb was a wise one. The equity they kept is worth billions. Admits Brian, "It ended up being the best thing that ever happened to me."

Jim Wilson/The New York Times/Redux

Sources: *Airbnb.com,* January 2021; *Startups.com,* January 2017

BASICS OF BONDS

A1

Compare bond financing with stock financing.

This section explains bonds and reasons for issuing them. Bonds are issued by both for-profit and nonprofit companies, as well as governmental units, such as nations, states, cities, and schools. There are nearly 5 million individual U.S. bond issues, compared to about 12,000 individual U.S. stocks.

Bond Financing

Projects often are financed with bonds. A **bond** is its issuer's written promise to pay the par value of the bond with interest. The **par value of a bond** , or *face value,* is paid at a stated future date called the *maturity date.* Most bonds require the issuer to make semiannual (twice a year) interest payments. Interest is computed by multiplying the par value by the bond's contract rate.

Advantages of Bonds There are three main advantages of bond financing.

1. *Bonds do not affect owner control*. Equity affects ownership in a company, but bonds do not. A person who contributes $1,000 of a company's $10,000 equity financing typically controls one-tenth of the company. A person who owns a $1,000, 11%, 20-year bond has no ownership.
2. *Interest on bonds is tax deductible*. Bond interest payments are tax deductible, but distributions (dividends) to owners are not.
3. *Bonds can increase return on equity*. A company that earns a higher return with borrowed funds than it pays in interest on those funds increases its return on equity. This process is called *financial leverage,* or *trading on the equity* .

To demonstrate the third point, consider Magnum Co., which has $1,000 in equity and is planning a $500 expansion ($ millions). Magnum predicts the expansion will increase income by $125 before paying interest. It currently earns $100 per year and has no interest expense. Magnum is considering three plans. Plan A is to not expand. Plan B is to expand and raise $500 from equity financing. Plan C is to expand and issue $500 of bonds that pay 10% annual interest ($50). Exhibit 10.1 shows how these plans affect net income, equity, and return on equity (Net income/Equity). Magnum earns a higher return on equity under Plan C to issue bonds. Income under Plan C ($175) is smaller than under Plan B ($225), but the return on equity is larger because of less equity investment.

EXHIBIT 10.1

Bonds versus Equity

$ millions	Plan A: Do Not Expand	Plan B: Equity Financing	Plan C: Bond Financing
Income before interest expense	$ 100	$ 225	$ 225
Interest expense	—	—	(50)
Net income	**$ 100**	**$ 225**	**$ 175**
Equity	$1,000	$1,500	$1,000
Return on equity	**10.0%**	**15.0%**	**17.5%**

Disadvantages of Bonds There are two main disadvantages of bond financing. page 388

1. *Bonds can decrease return on equity*. When a company earns a lower return with the borrowed funds than it pays in interest, it decreases return on equity. This is more likely when a company has low income or losses.
2. *Bonds require payment of both periodic interest and the par value at maturity*. Bond payments are a burden when income and cash flow are low. Equity does not require payments to owners because distributions are optional.

Bond Issuing

Bond issuances state the number of bonds authorized, their par value, and the contract interest rate. The legal contract between the issuer and the bondholders is called the **bond indenture** . A bondholder may receive a **bond certificate** , which is evidence of the company's debt —see Exhibit 10.2.

EXHIBIT 10.2

Bond Certificate

RBC Wealth Management

Bond Trading

A bond *issue* is the sale of bonds, usually in denominations of $1,000 or $5,000. After bonds are issued, they often are bought and sold among investors, meaning that a bond probably has had many owners before it matures. When bonds are bought and sold, they have a market value (price). Bond market values are shown as a percent of par (face) value. For example, a $1,000 bond trading at $103\frac{1}{2}$ is bought or sold for $1,035 ($1,000 × 1.035). The same bond trading at 95 is bought or sold at $950 ($1,000 × 0.95).

Decision Insight

Bonds	Rate	Mat	Yld	Vol	Close	Chg
IBM	4	42	3.81	110	103.08	+0.73%

What Price? The **IBM** bond quote here is interpreted (left to right) as **Bonds,** issuer name; **Rate,** contract interest rate (4%);**Mat,** matures in year 2042 when principal is paid; **Yld,** yield rate (3.81%) of bond at current price;**Vol,** dollar worth ($110,000) of trades (in 1,000s); **Close,** closing price (103.08) for the day as percentage of par value;**Chg,** change (+ 0.73%) in closing price from prior day's close. ■

PAR BONDS

P1

Account for par bonds.

Bonds issued at par value are called **par bonds.** Assume **Nike** issues $100,000 of 8%, two-year bonds dated December 31, 2021, that mature on December 31, 2023, and pay interest semiannually each June 30 and December 31. If all bonds are sold at par value, Nike records the sale as follows.Nike records the first semiannual interest payment as follows. The same entry is made *every* six months, including at the maturity date.

Assets = Liabilities + Equity
+100,000 +100,000

Dec. 31, 2021	Cash	100,000	
	Bonds Payable		100,000
	Sold bonds at par.		

June 30, 2022	Bond Interest Expense	4,000	
	Cash		4,000
	Paid semiannual interest (8% × $100,000 × 1/2 year).		

Assets = Liabilities + Equity
−4,000 −4,000

When the bonds mature, Nike records its payment of principal page 389 as follows.

Dec. 31, 2023	Bonds Payable	100,000	
	Cash		100,000
	Paid bond principal at maturity.		

Assets = Liabilities + Equity
−100,000 −100,000

NEED-TO-KNOW 10-1

Recording Par Value Bonds

P1

A company issues 8%, two-year bonds on December 31, 2021, with a par value of $7,000 and semiannual interest payments. On the issue date, the annual market rate for these bonds is 8%, which implies a selling price of $7,000. Prepare journal entries to record (a) the issuance of bonds on December 31, 2021; (b) the first through fourth interest payments on each June 30 and December 31; and (c) the maturity of the bonds on December 31, 2023.

Solution

a.

Dec. 31, 2021	Cash	7,000	
	Bonds Payable		7,000
	Sold bonds at par.		

b. Entry is made for each of the four interest payments.

2022–2023 June 30 and Dec. 31	Bond Interest Expense	280	
	Cash		280
	Pay semiannual interest ($7,000 × 8% × 1/2).		

c.

Dec. 31, 2023	Bonds Payable	7,000	
	Cash		7,000
	Record maturity and payment of bonds.		

Do More: QS 10-2, QS 10-3, QS 10-4, E 10-2, E 10-3

DISCOUNT BONDS

Bond Discount or Premium

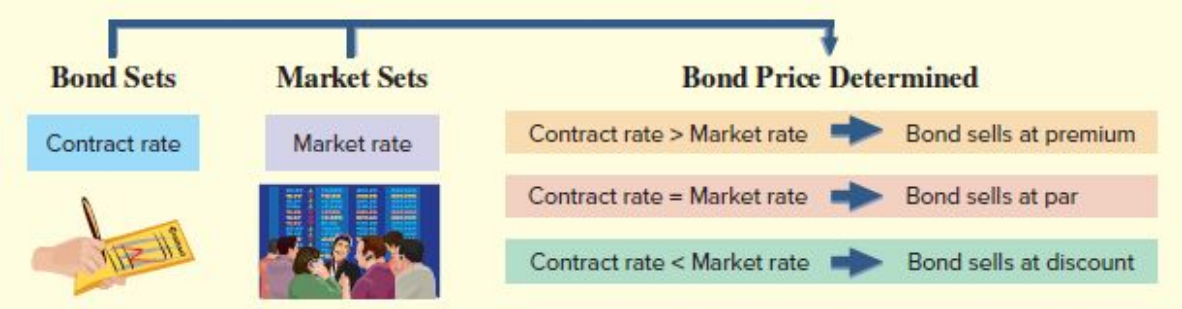
The bond issuer pays the bond interest rate, called the **contract rate** (also called *coupon rate, stated rate,* or *nominal rate*). The annual interest paid is computed by multiplying the bond par value by the contract rate. The contract rate is usually stated on an annual basis, even if interest is paid semiannually. For example, a $1,000, 8% bond paying interest semiannually pays annual interest of $80 (8% × $1,000) in two semiannual payments of $40 each.

The contract rate sets the interest paid in *cash,* which is not necessarily the *bond interest expense* for the issuer. Bond interest expense depends on the bond's market value at issuance. The bond's **market rate** of interest is the rate that borrowers are willing to pay and lenders are willing to accept for a bond and its risk level. As bond risk increases, the market rate increases to compensate bond purchasers.

Exhibit 10.3 shows the relation between the contract rate, the market rate, and a bond's issue price.

EXHIBIT 10.3

Relation between Bond Issue Price, Contract Rate, and Market Rate



- When the contract rate and market rate are equal, a bond sells at par value.
- When the contract rate is lower than the market rate, a bond sells at a *discount;* this occurs when the contract rate (and coupon payment) is less than what lenders expect for that bond's risk.
- When the contract rate is higher than the market rate, a bond sells at a *premium;* this occurs when the contract rate (and coupon payment) is higher than what lenders expect for that bond's risk.

Issuing Bonds at a Discount

P2

Account for discount bonds.

This section covers bond issuances *below par,* called **discount bonds.** A **discount on bonds payable** occurs when a company issues bonds with a contract rate less than the market rate. This means the issue price is less than par value—the issuer gets less money at issuance than what the issuer must pay back at maturity. Assume **Fila** issues bonds with a $100,000 par value, an 8% annual contract rate (paid semiannually), and a two-year life. These bonds sell at a discount price of 96.400 (meaning 96.400% of par value, or $96,400); we show how to compute bond prices in Appendix 10A.

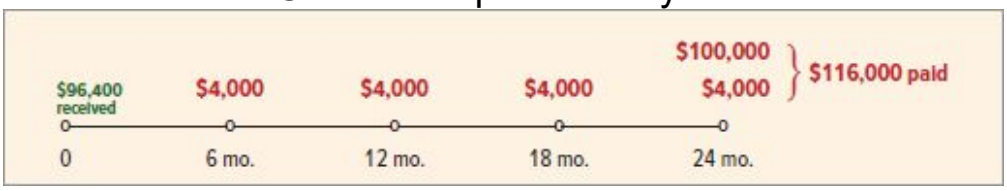
Cash Payments with Discount Bonds These bonds require Fila to pay

1. Par value of $100,000 cash at the end of the bonds' two-year life.
2. Semiannual cash interest payments of $4,000 ($100,000 × 8% × 1/2 year).

Cash receipts (in green) and cash payments (in red) are shown in Exhibit 10.4.

EXHIBIT 10.4

Discount Bond Cash Receipts and Payments



Recording Issuance of Discount Bonds When Fila accepts $96,400 cash for its bonds on the issue date of December 31, 2021, it records the sale as follows.

Assets	=	Liabilities	+	Equity
+96,400		+100,000		
		−3,600		

Dec. 31, 2021	Cash	96,400	
	Discount on Bonds Payable	3,600	
	Bonds Payable		100,000
	Sold bonds at a discount on their issue date.		

Point: Book value at issuance always equals the issuer's cash borrowed.

Bonds payable are reported as a long-term liability on Fila's December 31, 2021, balance sheet as in Exhibit 10.5. A discount is subtracted from par value to get the **carrying (book) value of bonds**. **Discount on Bonds Payable is a contra liability account with a normal debit balance.**

EXHIBIT 10.5

Balance Sheet Presentation of Bond Discount

Long-term liabilities			
Bonds payable	$100,000		
Less discount on bonds payable	3,600	$96,400	← Carrying (book) value

Amortizing Discount Bonds Fila receives $96,400 for its bonds; in return it must pay bondholders $100,000 when the bonds mature in two years (plus four interest payments). Part A in Exhibit 10.6 shows that the four $4,000 interest payments plus the $3,600 bond discount equals total bond interest expense of $19,600.

EXHIBIT 10.6

Interest Computation and Entry for Discount Bonds

Bonds Payable

	12/31/2021 100,000
	6/30/2022 —
	12/31/2022 —
	6/30/2023 —
12/31/2023 100,000	
	12/31/2023 0

Discount on Bonds Payable

12/31/2021 3,600	
	6/30/2022 900
	12/31/2022 900
	6/30/2023 900
	12/31/2023 900
	12/31/2023 0

Part A: Interest Computations

Four payments of $4,000 (4 pymts × [$100,000 × 0.08 × 1/2 yr])	$ 16,000
Plus discount	3,600
Total bond interest expense	$19,600

$$\text{Bond interest expense (per interest period)} = \frac{\text{Total bond interest expense}}{\text{Number of interest periods}} = \frac{\$19{,}600}{4} = \$4{,}900$$

Part B: Record Semiannual Interest Payment and Amortization

2022–2023 June 30 and Dec. 31	Bond Interest Expense	4,900	
	Discount on Bonds Payable		900 ← Discount ÷ Periods
	Cash		4,000 ← Par value × ½ × Contract rate
	Record interest and discount amortization.		

Point: Another way to compute bond interest expense: (1) Divide the $3,600 discount by 4 periods to get $900 amortized each period. (2) Add $900 to the $4,000 cash payment to get bond interest expense of $4,900 per period.

The total $19,600 bond interest expense is allocated over the four semiannual periods in the bonds' life, and the bonds' carrying value is

updated at each balance sheet date. This is done using the straight-line method (or the effective interest method in Appendix 10B). Both methods reduce the bond discount to zero over the bond life. This process is called *amortizing a bond discount*. Amortization always gets the carrying value of a bond closer to its par value.

Straight-Line Method

Straight-line bond amortization page 391 allocates equal bond interest expense to each interest period. We divide the total bond interest expense of $19,600 by 4 (number of semiannual periods in bonds' life). This gives a bond interest expense of $4,900 per period. Part B of Exhibit 10.6 shows how the issuer records bond interest expense and updates the bond liability account at the end of *each* of the four semiannual interest periods (June 30, 2022, through December 31, 2023).

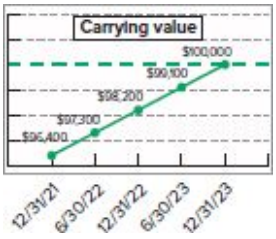
Exhibit 10.7 shows the pattern of decreases in the Discount on Bonds Payable account and the pattern of increases in the bonds' carrying value. Three points summarize the discount bonds' straight-line amortization.

EXHIBIT 10.7

Straight-Line Amortization of Bond Discount

Semiannual Period-End	Unamortized Discount	Carrying Value
(0) 12/31/2021	$3,600	$ 96,400
(1) 6/30/2022	2,700	97,300
(2) 12/31/2022	1,800	98,200
(3) 6/30/2023	900	99,100
(4) **12/31/2023**	**0**	**100,000**

The columns always sum to par value for discount bonds.



- At issuance, the $96,400 carrying value equals the $100,000 par value minus the $3,600 unamortized discount on bonds payable.

- During the bonds' life, the unamortized discount on bonds payable decreases each period by the $900 amortization ($3,600/4), and carrying value (par value less unamortized discount) increases each period by $900.
- At maturity, unamortized discount on bonds payable equals zero, and carrying value equals the $100,000 par value that the issuer pays the bondholder.

Decision Insight

Make the Grade Many bond buyers rely on rating services such as **Standard & Poor's** , **Moody's** , and **Fitch** to assess bond risk. These services analyze financial statements and other factors in setting ratings. Standard & Poor's ratings, from best quality to default, are AAA, AA, A, BBB, BB, B, CCC, CC, C, and D. Bonds rated in the A and B range are referred to as *investment grade;* lower-rated bonds are considered riskier. ■

NEED-TO-KNOW 10-2

Recording Discount Bonds

P2

A company issues 8%, two-year bonds on December 31, 2021, with a par value of $7,000 and semiannual interest payments. On the issue date, the annual market rate for these bonds is 10%, which implies a selling price of 96.46, or $6,752. (a) Prepare an amortization table like Exhibit 10.7 for these bonds; use the straight-line method to amortize the discount. Then prepare journal entries to record (b) the issuance of bonds on December 31, 2021; (c) the first through fourth interest payments on each June 30 and December 31; and (d) the maturity of the bonds on December 31, 2023.

Solution

page 392

a.

Semiannual Period-End		Unamortized Discount	Carrying Value
(0)	12/31/2021	$248	$6,752
(1)	6/30/2022	186	6,814
(2)	12/31/2022	124	6,876
(3)	6/30/2023	62	6,938
(4)	12/31/2023	0	7,000

Interest computations for solutions *a*, *b*, and *c*

Four interest payments of $280 (4 pymts × [$7,000 × 0.08 × 1/2 yr])	$1,120
Plus discount	248
Total bond interest expense	$1,368
Divided by number of periods	÷ 4
Bond interest expense per period	$ 342

b.

Dec. 31, 2021	Cash	6,752	
	Discount on Bonds Payable	248	
	Bonds Payable		7,000
	Sold bonds at discount.		

c.

2022–2023 June 30 and Dec. 31	Bond Interest Expense	342	
	Discount on Bonds Payable*		62
	Cash†		280
	Pay semiannual interest and record amortization.		

*$248/4 †$7,000 × 8% × 1/2

Entry is made for each of the four interest payments.

d.

Dec. 31, 2023	Bonds Payable	7,000	
	Cash		7,000
	Record maturity and payment of bonds.		

Point: Straight-line amortization is GAAP compliant when the effect of using it approximates effective interest amortization.

Bonds Payable

		12/31/2021	7,000
		6/30/2022	—
		12/31/2022	—
		6/30/2023	—
12/31/2023	7,000		
		12/31/2023	0

Discount on Bonds Payable

12/31/2021	248		
		6/30/2022	62
		12/31/2022	62
		6/30/2023	62
		12/31/2023	62
		12/31/2023	0

Do More: QS 10-6, QS 10-7, QS 10-9, QS 10-10, E 10-4, E 10-5, E 10-6, P 10-1

PREMIUM BONDS

P3

Account for premium bonds.

This section covers bond issuances *above par,* called **premium bonds.**

Issuing Bonds at a Premium

When the contract rate is higher than the market rate, the bonds sell at a price higher than par value—the issuer gets more money at issuance than what the issuer must pay back at maturity. The amount by which the bond price exceeds par value is the **premium on bonds** . Assume **Adidas** issues bonds with a $100,000 par value, a 12% annual contract rate, semiannual interest payments, and a two-year life. The Adidas bonds sell at a premium price of 103.600 (meaning 103.600% of par value, or $103,600); we show how to compute bond prices in Appendix 10A.

Cash Payments with Premium Bonds These bonds require Adidas to pay

1. Par value of $100,000 cash at the end of the bonds' two-year life.
2. Semiannual cash interest payments of $6,000 ($100,000 × 12% × 1⁄2 year).

Point: Contract rate *yields* cash interest payment. **Market** rate *yields* interest expense.

The pattern of cash receipts (in green) and payments (in red) is shown in Exhibit 10.8.

EXHIBIT 10.8

Premium Bond Cash Receipts and Payments

Recording Issuance of Premium Bonds When Adidas page 393 receives $103,600 cash for its bonds on the issue date of December 31, 2021, it records this as follows.

Dec. 31, 2021	Cash	103,600	
	Premium on Bonds Payable		3,600
	Bonds Payable		100,000
	Sold bonds at a premium on their issue date.		

Assets	=	Liabilities	+	Equity
+103,600		+100,000		
		+3,600		

Bonds payable are reported as a long-term liability on Adidas's December 31, 2021, balance sheet as in Exhibit 10.9. A premium is added to par value to get the carrying (book) value of bonds. **Premium on Bonds Payable is an adjunct ("add-on") liability account with a normal credit balance.**

EXHIBIT 10.9

Balance Sheet Presentation of Bond Premium

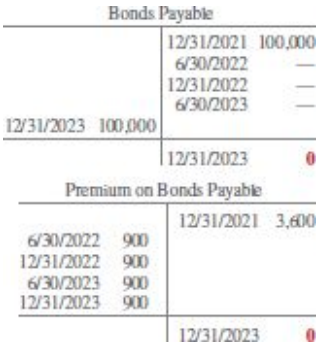
Long-term liabilities		
Bonds payable	$100,000	
Plus premium on bonds payable	3,600	$103,600

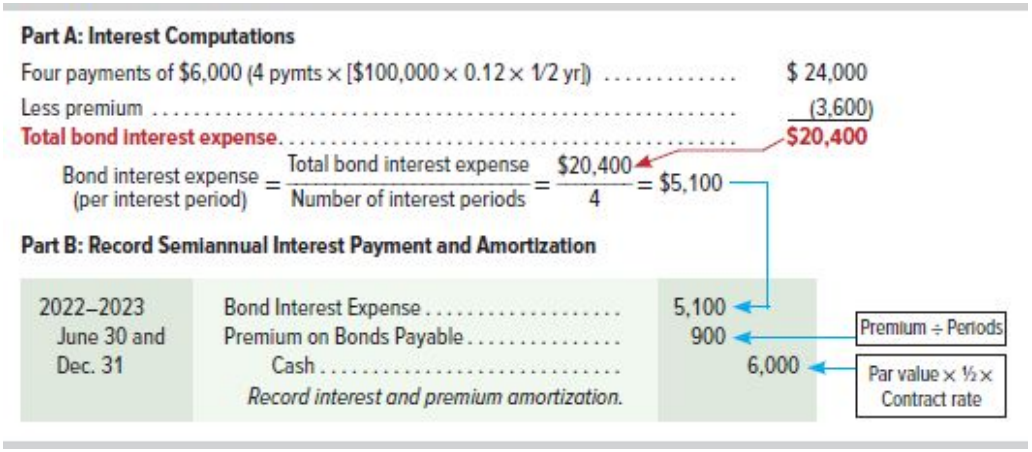
Amortizing Premium Bonds Adidas receives $103,600 for its bonds. In return, it pays bondholders $100,000 after two years (plus four interest payments). Part A of Exhibit 10.10 shows that the four $6,000 interest payments minus the $3,600 bond premium equals total bond interest expense of $20,400. The premium is subtracted because it reduces the issuer's cost. Total bond interest expense is allocated over the four semiannual periods using the straight-line method (or the effective interest method in Appendix 10B).

Straight-Line Method The straight-line method allocates equal bond interest expense to each semiannual interest period. We divide the total bond interest expense of $20,400 by 4 (number of semiannual periods in bonds' life). This gives bond interest expense of $5,100 per period. Part B of Exhibit 10.10 shows how Adidas records bond interest expense and updates the balance of the bond liability account for *each* semiannual period (June 30, 2022, through December 31, 2023).

EXHIBIT 10.10

Interest Computation and Entry for Premium Bonds





Point: A premium decreases Bond Interest Expense; a discount increases it.

Exhibit 10.11 shows the pattern of decreases in the unamortized Premium on Bonds Payable account and in the bonds' carrying value. Three points summarize straight-line amortization of premium bonds.

EXHIBIT 10.11

Straight-Line Amortization of Bond Premium

Semiannual Period-End	Unamortized Premium	Carrying Value
(0) 12/31/2021 ...	$3,600	$103,600
(1) 6/30/2022 ...	2,700	102,700
(2) 12/31/2022 ...	1,800	101,800
(3) 6/30/2023 ...	900	100,900
(4) 12/31/2023 ...	**0**	**100,000**

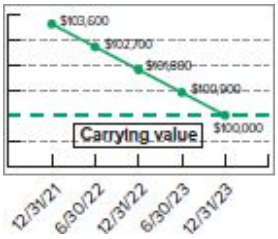
During the bond life, carrying value is adjusted to par and the amortized premium to zero.

- At issuance, the $103,600 carrying value equals the $100,000 par value plus the $3,600 unamortized premium

page 394

on bonds payable.

- During the bonds' life, the unamortized premium decreases each period by the $900 amortization ($3,600/4), and carrying value decreases each period by the same $900.
- At maturity, unamortized premium on bonds payable equals zero, and carrying value equals the $100,000 par value that the issuer pays the bondholder.



NEED-TO-KNOW 10-3

Recording Premium Bonds

P3

A company issues 8%, two-year bonds on December 31, 2021, with a par value of $7,000 and semiannual interest payments. On the issue date, the annual market rate for these bonds is 6%, which implies a selling price of 103.71 or $7,260. (a) Prepare an amortization table like Exhibit 10.11 for these bonds; use the straight-line method to amortize the premium. Then prepare journal entries to record (b) the issuance of bonds on December 31, 2021; (c) the first through fourth interest payments on each June 30 and December 31; and (d) the maturity of the bonds on December 31, 2023.

Solution

a.

Semiannual Period-End		Unamortized Premium	Carrying Value
(0)	12/31/2021	$260	$7,260
(1)	6/30/2022	195	7,195
(2)	12/31/2022	130	7,130
(3)	6/30/2023	65	7,065
(4)	12/31/2023	0	7,000

Interest computations for solutions *a*, *b*, and *c*

Four interest payments of $280 (4 pymts × [$7,000 × 0.08 × 1/2 yr])	$1,120
Less premium	260
Total bond interest expense	$ 860
Divided by number of periods	÷ 4
Bond interest expense per period	$ 215

b.

Dec. 31, 2021	Cash	7,260	
	Premium on Bonds Payable		260
	Bonds Payable		7,000
	Sold bonds at premium.		

c. Entry is made for each of the four interest payments.

2022–2023 June 30 and Dec. 31	Bond Interest Expense	215	
	Premium on Bonds Payable*	65	
	Cash†		280
	Pay semiannual interest and record amortization.		

*$260/4 †$7,000 × 8% × 1/2

d.

Dec. 31, 2023	Bonds Payable	7,000	
	Cash		7,000
	Record maturity and payment of bonds.		

Bonds Payable

		12/31/2021	7,000
		6/30/2022	—
		12/31/2022	—
		6/30/2023	—
12/31/2023	7,000		
		12/31/2023	0

Premium on Bonds Payable

		12/31/2021	260
6/30/2022	65		
12/31/2022	65		
6/30/2023	65		
12/31/2023	65		
		12/31/2023	0

Do More: QS 10-8, QS 10-11, QS 10-12, E 10-8, E 10-9, P 10-2

Bond Retirement

P4

Record the retirement of bonds.

This section covers the retirement of bonds, also called *bond redemption* .

Bond Retirement at Maturity The carrying value of bonds at maturity always equals par value. For example, both Exhibits 10.7 (a discount) and 10.11 (a premium) show that the carrying value of bonds at maturity equals par value ($100,000). Retirement of these bonds at maturity, assuming interest is already paid and recorded, is as follows.

Assets = Liabilities + Equity
−100,000 −100,000

Dec. 31, 2023	Bonds Payable	100,000	
	Cash		100,000
	Record retirement of bonds at maturity.		

Bond Retirement before Maturity Issuers sometimes page 395 retire some or all of their bonds before maturity. If interest rates decline, an issuer may want to replace high-interest-paying bonds with new low-interest bonds. There are two common ways to retire bonds before maturity.

- **Exercise a call option.** An issuer can reserve the right to retire bonds early by issuing *callable bonds.* This gives the issuer an option to *call* the bonds before they mature by paying the par value plus a *call premium* .
- **Open market purchase.** Issuer can repurchase them from bondholders at current market price.

Whether bonds are called or purchased, the issuer is likely to pay a price different from their carrying value. The issuer records a difference between the bonds' carrying value and the amount paid as a gain or loss. Assume that **Puma** issued callable bonds with a par value of $100,000. The call option requires Puma to pay a call premium of $3,000 to bondholders plus the par value. Next, assume that after the June 30 interest payment, the bonds have a carrying value of $104,500. Then on July 1, Puma calls these bonds and pays $103,000 to bondholders. Puma records a $1,500 gain from the difference between the bonds' carrying value of $104,500 and the retirement price of $103,000 as follows.

July 1	Bonds Payable	100,000	
	Premium on Bonds Payable	4,500	
	Gain on Bond Retirement		1,500
	Cash		103,000
	Record retirement of bonds before maturity.		

Assets = Liabilities + Equity
−103,000 −100,000 +1,500
−4,500

Decision Insight

Treasure Hunt Junk bonds are company bonds with low credit ratings due to a higher likelihood of nonpayment. On the upside, the high risk of junk bonds can yield high returns if the issuer repays its debt. Investors in junk bonds identify and buy bonds with low credit ratings when they believe those bonds will survive and pay their debts. Financial statements are used to identify junk bonds that are better than their ratings would suggest. ■

ARICAN/E+/Getty Images

LONG-TERM NOTES PAYABLE

C1

Explain the types of notes and prepare entries to account for notes.

Like bonds, notes are issued in exchange for assets such as cash. Unlike bonds, notes are usually issued to a *single* lender such as a bank. An issuer initially records a note at its selling price—the note's face value minus any discount or plus any premium. Over the note's life, the amount of interest expense allocated to each period is computed by multiplying the market rate at issuance of the note by the beginning-of-period note balance. The note's carrying (book) value at any time equals its face value minus any unamortized discount or plus any unamortized premium.

Installment Notes

An **installment note** is a liability requiring a series of payments to the lender. Installment notes are common for franchises and other

businesses when lenders and borrowers agree to spread payments over time.

Issuance of Notes Assume Foghog borrows $60,000 from a bank to purchase equipment. It signs an 8% installment note requiring three annual payments of principal plus interest. Foghog records the note's issuance at January 1, 2021, as follows.

Jan. 1	Cash	60,000	
	Notes Payable		60,000
	Borrowed $60,000 by signing 8%, three-year note.		

Assets = Liabilities + Equity
+60,000 +60,000

Payments of Principal and Interest Payments on an page 396 installment note include accrued interest expense plus part of the amount borrowed (the *principal*). For this section, let's consider an installment note with equal payments. The equal total payments pattern has changing amounts of both interest and principal. Foghog borrows $60,000 by signing a $60,000 note that requires three *equal payments* of $23,282 at each year-end. Exhibit 10.12 shows the pattern of equal total payments and its two parts, interest and principal. Column A shows the note's beginning balance. Column B shows accrued interest at 8% of the beginning note balance. Column C shows the portion that reduces the principal owed, which equals total payment in column D minus interest expense in column B. Column E shows the note's year-end balance.

EXHIBIT 10.12

Installment Note Amortization Schedule

Period Ending Date	(A) Beginning Balance	Payments (B) *Debit* Interest Expense 8% × (A)	+	(C) *Debit* Notes Payable (D) – (B)	=	(D) *Credit* Cash (computed)	(E) Ending Balance (A) – (C)
(1) 12/31/2021	$60,000	$4,800		$ 18,482		$23,282	$41,518
(2) 12/31/2022	41,518	3,321		19,961		23,282	21,557
(3) 12/31/2023	21,557	1,725		21,557		23,282	0
		$9,846		$60,000		$69,846	

*Table B.3 in Appendix B is used to compute the dollar amount of three payments that equal the initial note balance of $60,000 at 8% interest. We go to Table B.3, row 3, and across to the 8% column, where the present value factor is 2.5771. The dollar amount is then computed by solving the following equation. The amount is computed by dividing $60,000 by 2.5771, yielding $23,282.

Table	Present Value Factor		Dollar Amount		Present Value
B.3	2.5771	×	?	=	$60,000

Excel: Installment note payments.

	A	B
1	Rate per period	8%
2	Number of periods	3
3	Loan amount	$60,000
4	Loan payments	

=–PMT(B1,B2,B3)=$23,282

Excel: Principal portion of payments.

	A	B
1	Rate per period	8%
2	Number of periods	3
3	Loan amount	$60,000
4	Period	Principal
5	1	
6	2	
7	3	

=–PPMT(B1,A5,B2,B3)=$18,482
=–PPMT(B1,A6,B2,B3)=$19,961
=–PPMT(B1,A7,B2,B3)=$21,557

The three $23,282 cash payments are equal, but interest expense decreases each year because the principal balance of the note decreases. As the amount of interest decreases each year, the portion of each payment applied to principal increases. This pattern is shown

in the lower part of Exhibit 10.12. Foghog uses the amounts in Exhibit 10.12 to record its payments as follows. After three years, the Notes Payable account balance is zero.

		2021		2022		2023	
Dec. 31	Interest Expense	4,800		3,321		1,725	
	Notes Payable	18,482		19,961		21,557	
	Cash		23,282		23,282		23,282
	Record installment payments.						

Installment Notes with Monthly Payments

Installment notes with monthly payments are common in business when purchasing vehicles and property. We also deal with monthly payments through student loans, home mortgages, and auto loans.

Issuance of Notes Assume Foghog borrows $60,000 from a bank to purchase equipment. It signs a three-year, 12% installment note, requiring 36 monthly payments of principal plus interest. Foghog records the note's issuance at January 1, 2021, as follows.

page 397

Jan. 1	Cash	60,000	
	Notes Payable		60,000
	Borrowed $60,000 by signing 12%, 36-month note.		

Assets = Liabilities + Equity
+60,000 +60,000

Payments of Principal and Interest Foghog's $60,000 installment note requires 36 equal monthly payments of $1,993. The equal total monthly payments have different amounts of both interest and principal. The following table shows the *first three months* of this note's amortization schedule. The remaining month's payment components are calculated the same way.

Excel: Monthly note payments.

	A	B
1	Rate per month	1%
2	Number of months	36
3	Loan amount	$60,000
4	Loan payments	

=–PMT(B1,B2,B3)–$1,993

Column A shows the note's beginning balance. Column B shows accrued interest, computed as 12% annual interest times 1/12 (months) times the beginning note balance. Column C shows the

portion that reduces the principal owed, which equals total payment in column D minus interest expense in column B. Column E shows the note's month-end balance.

		Payments			
Period Ending Date	(A) Beginning Balance	(B) *Debit* Interest Expense 12% x 1/12 x (A)	+ (C) *Debit* Notes Payable (D) – (B)	= (D) *Credit* Cash (computed)	(E) Ending Balance (A) – (C)
1/31/2021	$60,000	$600	$1,393	$1,993	$58,607
2/28/2021	58,607	586	1,407	1,993	57,200
3/31/2021	57,200	572	1,421	1,993	55,779

← Table continues for 33 more months until Ending balance is $0.

The $1,993 cash payments are equal, but interest expense decreases each month because the principal balance of the note decreases. As the amount of interest decreases each month, the portion of each payment applied to principal increases. Foghog uses the amounts from the table to record its first three monthly payments as follows.

	Jan. 31		Feb. 28		Mar. 31	
Interest Expense	600		586		572	
Notes Payable	1,393		1,407		1,421	
Cash		1,993		1,993		1,993
Record installment payments.						

Mortgages

A **mortgage** is a legal agreement that helps protect a lender if a borrower does not make required payments on notes or bonds. A mortgage gives the lender a right to be paid from the cash proceeds of the sale of a borrower's assets identified in the mortgage. Mortgages are popular in the purchase of homes and plant assets. Accounting for mortgages is similar to that for notes and bonds, except that the mortgage agreement must be disclosed. For example, **TIBCO Software** reports that its "mortgage note payable . . . is collateralized by the commercial real property acquired."

Hidden Debt A study reports that 29% of employees in finance and accounting witnessed the falsifying or manipulating of accounting information in the past year. This includes nondisclosure of some long-term liabilities. Another study reports that most people committing fraud (36%) work in the finance function of their firm (KPMG). ■

NEED-TO-KNOW 10-4

Recording Installment Note

C1

On January 1, 2021, a company borrows $1,000 cash by signing a four-year, 5% installment note. The note requires four equal payments of $282, consisting of accrued interest and principal on December 31 of each year from 2021 through 2024.

1. Prepare an amortization table for this installment note like the one in Exhibit 10.12.
2. Prepare journal entries to record the loan on January 1, 2021, and the four payments from December 31, 2021, through December 31, 2024.

Solution

1.

Period Ending Date	(A) Beginning Balance [Prior (E)]	(B) *Debit* Interest Expense [5% × (A)]	+	(C) *Debit* Notes Payable [(D) − (B)]	=	(D) *Credit* Cash [computed]	(E) Ending Balance [(A) − (C)]
2021	$1,000	$ 50		$ 232		$ 282†	$768
2022	768	38		244		282	524
2023	524	26		256		282	268
2024	268	14*		268		282	0
		$128		$1,000		$1,128	

*Adjusted for rounding. †Amount of each payment = Initial note balance/PV of annuity for 4 periods at 5% (from Table B.3)
(An *annuity* is a series of equal payments occurring at equal time intervals.)
= $1,000/3.5460 = $282 (rounded)

2.

Jan. 1, 2021	Cash	1,000	
	Notes Payable		1,000
	Borrowed $1,000 by giving a note.		
Dec. 31, 2021	Interest Expense	50	
	Notes Payable	232	
	Cash		282
	Record first installment payment.		
Dec. 31, 2022	Interest Expense	38	
	Notes Payable	244	
	Cash		282
	Record second installment payment.		

Dec. 31, 2023	Interest Expense	26	
	Notes Payable	256	
	Cash		282
	Record third installment payment.		
Dec. 31, 2024	Interest Expense	14	
	Notes Payable	268	
	Cash		282
	Record fourth installment payment.		

Do More: QS 10-14, QS 10-15, QS 10-16, E 10-12, E 10-13, E 10-14

Decision Analysis Debt Features and the Debt-to-Equity Ratio

Features of Bonds and Notes

A2

Analyze the debt-to-equity ratio and assess debt features.

This section covers features of debt securities.

Secured Debt

Unsecured Debt

Secured or Unsecured **Secured bonds** (and notes) have specific assets of the issuer pledged (or *mortgaged*) as collateral. If the issuer does not pay its debt, the secured holders can demand that the collateral be sold and the proceeds used to pay the obligation. **Unsecured bonds** (and notes), also called *debentures,* are backed by the issuer's general credit standing and are riskier than secured debt.

Term or Serial **Term bonds** (and notes) mature on one specified date. **Serial bonds** (and notes) mature at more than one date (often in series) and thus are usually repaid over a number of periods. For instance, $100,000 of serial bonds might mature at the rate of $10,000 each year from 6 to 15 years after they are issued. **Sinking fund bonds** reduce the holder's risk by requiring the issuer to set aside assets to pay debt in a *sinking fund.*

Registered or Bearer Bonds issued in the names and addresses of their holders are **registered bonds** . The issuer makes bond payments by sending checks (or cash transfers) to registered holders. Bonds payable to whoever holds them (the *bearer*) are called **bearer bonds** or *unregistered bonds*. The holder of a bearer bond is presumed to be its rightful owner. Many bearer bonds are also **coupon bonds.** This term reflects interest coupons that are attached to the bonds. When each coupon matures, the holder presents it to a bank or broker for collection.

Convertible and/or Callable **Convertible bonds** (and page 399 notes) can be exchanged for a fixed number of shares of the issuing corporation's stock. Convertible debt offers holders the potential to profit from increases in stock price. Holders still receive interest while the debt is held and the par value if they hold the debt to maturity. **Callable bonds** (and notes) give the issuer the option to retire them at a stated dollar amount before maturity.

Callable Debt

Debt-to-Equity Ratio

A company financed mainly with debt is more risky because liabilities must be repaid with interest, whereas equity financing does not. A measure to assess the risk of a company's financing structure is the **debt-to-equity ratio** (see Exhibit 10.13.

EXHIBIT 10.13

Debt-to-Equity Ratio

$$\text{Debt-to-equity} = \frac{\text{Total liabilities}}{\text{Total equity}}$$

The debt-to-equity ratios for **Nike** and **Under Armour** are in Exhibit 10.14. Nike's current-year debt-to- equity ratio is 1.62, meaning that debtholders contributed $1.62 for each $1 contributed by equity holders. This implies a slightly higher risk financing structure versus its peers such as Under Armour, whose debt-to-equity ratio is 1.25. Analysis across the years shows that Nike's debt-to-equity ratio has risen to a riskier level in recent years. In the case of Nike, the increase in debt-to-equity ratio is less concerning as it has historically earned higher returns with this financing than the interest rate it pays. Still, investors and debtholders will continue to monitor Nike's debt-to-equity ratio so it does not reach a level to threaten debt repayment.

EXHIBIT 10.14

Analysis Using Debt-to-Equity Ratio

Company	$ millions	Current Year	1 Year Ago	2 Years Ago
Nike	Total liabilities	$14,677	$12,724	$10,852
	Total equity	$ 9,040	$ 9,812	$12,407
	Debt-to-equity	1.62	1.30	0.87
Under Armour	Total liabilities	$ 2,693	$ 2,228	$ 1,988
	Total equity	$ 2,150	$ 2,017	$ 2,019
	Debt-to-equity	1.25	1.10	0.98

Decision Maker

Bond Investor You plan to purchase bonds from one of two companies in the same industry that are similar in size and performance. The first company has $350,000 in total liabilities and $1,750,000 in equity. The second company has $1,200,000 in total liabilities and $1,000,000 in equity. Which company's bonds are less risky based on the debt-to-equity ratio? ■ *Answer:* The debt-to-equity ratio for the first company is 0.2 ($350,000/$1,750,000) and for the second is 1.2 ($1,200,000/$1,000,000), suggesting that financing for the second company is riskier than for the first.

NEED-TO-KNOW 10-5

COMPREHENSIVE

Accounting for Bonds and Notes—Amortization, Journal Entries, and Disposal

Water Sports Company (WSC) patented and successfully test-marketed a new product. To produce and market the new product, WSC needs to raise $800,000 of financing. On January 1, 2021, the company obtained the money in two ways.

a. WSC signed a $400,000, 10% installment note to be repaid with five equal annual installments of $105,519 to be made on December 31 of 2021 through 2025.

b. WSC issued five-year bonds with a par value of $400,000 for $430,881 cash on January 1, 2021. The bonds have a 12% annual contract rate and pay interest on June 30 and December 31. The bonds' annual market rate is 10%.

Required

1. For the installment note, (a) prepare an amortization table similar to Exhibit 10.12 and (b) prepare the journal entry for the first payment.

2. For the bonds, (a) prepare the January 1, 2021, journal entry to record their issuance; (b) prepare an amortization table using the

straight-line method; (c) prepare the June 30, 2021, journal entry to record the first interest payment; and (d) prepare a journal entry to record retiring the bonds at a $416,000 call price on January 1, 2023.

3.B Using Appendix 10B, redo parts 2(b), 2(c), and 2(d) assuming the bonds are amortized using the effective interest method.

SOLUTION

page 400

Part 1: Installment Note

a. An amortization table for the long-term note payable follows.

		Payments					
Annual Period Ending	(a) Beginning Balance	(b) Debit Interest Expense 10% × (a)	+	(c) Debit Notes Payable (d) − (b)	=	(d) Credit Cash (computed)	(e) Ending Balance (a) − (c)
(1) 12/31/2021	$400,000	$ 40,000		$ 65,519		$105,519*	$334,481
(2) 12/31/2022	334,481	33,448		72,071		105,519	262,410
(3) 12/31/2023	262,410	26,241		79,278		105,519	183,132
(4) 12/31/2024	183,132	18,313		87,206		105,519	95,926
(5) 12/31/2025	95,926	9,593		95,926		105,519	0
		$127,595		$400,000		$527,595	

*Annual payment = Note balance/PV annuity factor = $400,000/3.7908 = $105,519
(The present value annuity factor is for five payments at a rate of 10%.)

b. Journal entry for December 31, 2021, payment.

Dec. 31	Interest Expense	40,000	
	Notes Payable	65,519	
	Cash		105,519
	Record first installment payment.		

Part 2: Bonds (Straight-Line Amortization)

a. Journal entry for January 1, 2021, issuance.

Jan. 1	Cash	430,881	
	Premium on Bonds Payable		30,881
	Bonds Payable		400,000
	Sold bonds at a premium.		

b. The straight-line amortization table for premium bonds follows. The semiannual premium amortization is $3,088, computed as $30,881/10 periods.

Semiannual Period-End	Unamortized Premium	Carrying Value
(0) 1/1/2021	$30,881	$430,881
(1) 6/30/2021	27,793	427,793
(2) 12/31/2021	24,705	424,705
(3) 6/30/2022	21,617	421,617
(4) 12/31/2022	18,529	418,529
(5) 6/30/2023	15,441	415,441
(6) 12/31/2023	12,353	412,353
(7) 6/30/2024	9,265	409,265
(8) 12/31/2024	6,177	406,177
(9) 6/30/2025	3,089	403,089
(10) 12/31/2025	0*	400,000

*Adjusted for rounding.

c. Journal entry for June 30, 2021, bond payment.

June 30	Bond Interest Expense	20,912	
	Premium on Bonds Payable	3,088	
	Cash		24,000
	Paid semiannual interest on bonds.		

d. Journal entry for January 1, 2023, bond retirement (use carrying value as of 12/31/2022). page 401

Jan. 1	Bonds Payable	400,000	
	Premium on Bonds Payable	18,529	
	Cash		416,000
	Gain on Retirement of Bonds		2,529
	Record bond retirement for cash.		

Part 3: Bonds (Effective Interest Amortization)—Using Appendix 10B

b. The effective interest amortization table for premium bonds.

Semiannual Interest Period		(A) Cash Interest Paid 6% × $400,000	(B) Interest Expense 5% × Prior (E)	(C) Premium Amortization (A) – (B)	(D) Unamortized Premium Prior (D) – (C)	(E) Carrying Value $400,000 + (D)
(0)	1/1/2021				$30,881	$430,881
(1)	6/30/2021	$ 24,000	$ 21,544	$ 2,456	28,425	428,425
(2)	12/31/2021	24,000	21,421	2,579	25,846	425,846
(3)	6/30/2022	24,000	21,292	2,708	23,138	423,138
(4)	12/31/2022	24,000	21,157	2,843	20,295	420,295
(5)	6/30/2023	24,000	21,015	2,985	17,310	417,310
(6)	12/31/2023	24,000	20,866	3,134	14,176	414,176
(7)	6/30/2024	24,000	20,709	3,291	10,885	410,885
(8)	12/31/2024	24,000	20,544	3,456	7,429	407,429
(9)	6/30/2025	24,000	20,371	3,629	3,800	403,800
(10)	12/31/2025	24,000	20,200*	3,800	0	400,000
		$240,000	$209,119	$30,881		

*Adjusted for rounding.

Point: Using effective interest, carrying value is also computed as the present value of all remaining payments, discounted using the market rate at issuance.

c. Journal entry for June 30, 2021, bond payment.

June 30	Bond Interest Expense	21,544	
	Premium on Bonds Payable	2,456	
	Cash		24,000
	Paid semiannual interest on bonds.		

d. Journal entry for January 1, 2023, bond retirement (use carrying value as of 12/31/2022).

Jan. 1	Bonds Payable	400,000	
	Premium on Bonds Payable	20,295	
	Cash		416,000
	Gain on Retirement of Bonds		4,295
	Record bond retirement for cash.		

C2

Explain and compute bond pricing.

Bond Pricing

This section shows how to price the **Fila** discount bond and the **Adidas** premium bond described earlier.

Present Value of Discount Bonds The issue price of bonds is the present value of the bonds' cash payments, discounted at the bonds' market rate. The annual market rate is 10.031% for the Fila bonds. When computing the present value of the Fila bonds, we use *semiannual* compounding periods because this is the time between interest payments; the annual market rate of 10.031% is considered a semiannual rate of 5.0155%. Also, the two-year bond life is viewed as four semiannual periods. The price computation has two parts.

1. Find the present value of the $100,000 par value paid at maturity.
2. Find the present value of the four semiannual payments of $4,000 each; see Exhibit 10.4.

The present values are found using Excel or a calculator (see page 402 directions to the side). We also can find present values if the market rate is in *present value tables*. A snippet of the present value tables from Appendix B follow using four different interest rates. We can compute these tables using any interest rates we desire. Appendix B Tables B.1 and B.3 are useful for computing bond pricing when dealing with whole percents. **Table B.1 Excerpt** is used for the single $100,000 maturity payment, and **Table B.3 Excerpt** is used for the $4,000 series of interest payments.

Excel: Bond pricing.

	A	B
1	Annual contract rate	8%
2	Annual market rate	10.031%
3	Payments within yr	2
4	Years to maturity	2
5	Par (face) value	$100,000
6	Issue price	

=–PV(B2/B3,B3*B4,B5*B1/B3,B5)
=$96,400

TABLE B.1 EXCERPT

Present Value of 1

	Rate			
Periods	4.7500%	4.9851%	5.000%	5.0155%
1	0.9547	0.9525	0.9524	0.9522
2	0.9114	0.9073	0.9070	0.9068
3	0.8700	0.8642	0.8638	0.8635
4	0.8306	0.8232	0.8227	0.8222
5	0.7929	0.7841	0.7835	0.7829
6	0.7570	0.7469	0.7462	0.7456

TABLE B.3 EXCERPT

Present Value of an Annuity of 1

	Rate			
Periods	4.7500%	4.9851%	5.000%	5.0155%
1	0.9547	0.9525	0.9524	0.9522
2	1.8660	1.8598	1.8594	1.8590
3	2.7361	2.7240	2.7232	2.7225
4	3.5666	3.5467	3.5460	3.5449
5	4.3596	4.3313	4.3295	4.3276
6	5.1165	5.0781	5.0757	5.0732

The annual market rate is 10.031%, or 5.0155% semiannually. In this case, we go to Table B.1 Excerpt, row 4, and across to the 5.0155% column to identify the present value factor of 0.8222 for the maturity payment. Next, we go to Table B.3 Excerpt, row 4, and across to the 5.0155% column, where the present value factor is 3.5449 for the interest payments. We compute bond price by multiplying the cash flow payments by their present value factors and adding them—see Exhibit 10A.1.

Cash Flow	Table	Present Value Factor	Amount		Present Value
$100,000 par (maturity) value. . . .	B.1 Excerpt (PV of 1)	0.8222	× $100,000	=	$ 82,220
$4,000 interest payments	B.3 Excerpt (PV of ann.)	3.5449	× 4,000	=	14,180
Price of bond	(using a 5.0155% semiannual market rate)				$96,400

EXHIBIT 10A.1

Computing Issue Price for Fila Discount Bonds

Calculator

N = 4 PMT = 4,000

I/Yr = 5.0155% FV = 100,000

PV = 96,400

Present Value of Premium Bonds We compute the issue price of the Adidas bonds by using the market rate to compute the present value of the bonds' future cash flows. The annual market rate is 9.97% for the Adidas bonds. When computing the present value of these bonds, we again use *semiannual* compounding periods because this is the time between interest payments. The annual 9.97% market rate is applied as a semiannual rate of 4.9851%, and the two-year bond life is viewed as four semiannual periods. The computation has two parts.

1. Find the present value of the $100,000 par value paid at maturity.
2. Find the present value of the four payments of $6,000 each; see Exhibit 10.8.

These present values are found using Excel or a calculator (see directions to the side). We also can find present value if the market rate is in present value tables. The annual market rate is 9.97%, or 4.9851% semiannually. In this case, go to Table B.1 Excerpt, row 4, and across to the 4.9851% column, where the present value factor is 0.8232 for the maturity payment. Second, go to Table B.3 Excerpt, row 4, and across to the 4.9851% column, where the present value factor is 3.5467 for the series of interest payments. The bonds' price is computed by multiplying the cash flow payments by their present value factors and adding them—see Exhibit 10A.2.

Excel: Bond pricing

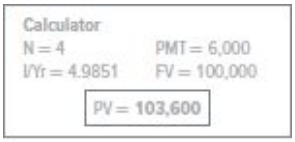
	A	B
1	Annual contract rate	12%
2	Annual market rate	9.97%
3	Payments within yr	2
4	Years to maturity	2
5	Par (face) value	$100,000
6	Issue price	

=–PV(B2/B3,B3*B4,B5*B1/B3,B5)

=$103,600

EXHIBIT 10A.2

Computing Issue Price for Adidas Premium Bonds



Point: Calculator inputs defined:

N	Number of semiannual periods
I/Yr	Market rate per semiannual period
FV	Future (maturity) value
PMT	Payment (interest) per semiannual period
PV	Price (present value)

Cash Flow	Table	Present Value Factor	Amount	Present Value
$100,000 par (maturity) value	B.1 Excerpt (PV of 1)	0.8232	× $100,000	= $ 82,320
$6,000 interest payments	B.3 Excerpt (PV of ann.)	3.5467	× 6,000	= 21,280
Price of bond	(using a 4.9851% semiannual market rate)			$103,600

Decision Insight

Equivalent Payments Concept Present value factors can be thought of as *equivalent payments.* For example, using Exhibit 10A.1, one payment of $100,000 scheduled two years from today is the *equivalent* of a 0.8222 payment of $100,000 today (assuming a market with 10.031% return). Similarly, four semiannual payments of $4,000 over the next two years are equivalent to 3.5449 payments of $4,000 today (again, assuming a 10.031% return). ■

page 403

APPENDIX

P5

Amortization using effective interest method.

10B

Effective Interest Amortization

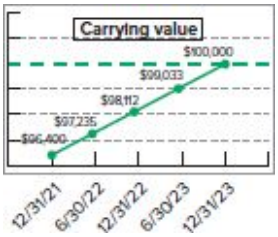
The **effective interest method** allocates total bond interest expense over the bonds' life in a way that yields a constant rate of interest. This constant rate of interest is the market rate at the issue date. This means bond interest expense for a period equals the carrying value of the bond at the beginning of that period multiplied by the market rate when issued.

Effective Interest Amortization of Discount Bonds Exhibit 10B.1 shows an effective interest amortization table for **Fila** bonds (as described in Exhibit 10.4. The key difference between the effective interest and straight-line methods is computing bond interest expense. Instead of assigning an equal amount of bond interest expense to each period, the effective interest method assigns a bond interest expense amount that increases over the life of a discount bond. **Both methods allocate the same $19,600 of total bond interest expense over the bonds' life, but in different patterns.** Specifically, the amortization table in Exhibit 10B.1 shows that the balance of the discount (column D) is amortized until it reaches zero. Also, the bonds' carrying value (column E) changes each period until it equals par value at maturity. Compare columns D and E to the columns in Exhibit 10.7 to see the amortization patterns. Total bond interest expense is $19,600, consisting of $16,000 of semiannual cash payments and $3,600 of the original bond discount, the same for both methods.

Point: Contract rate determines cash interest paid, but market rate determines the actual interest expense.

EXHIBIT 10B.1

Effective Interest Amortization of Bond Discount



Bonds: $100,000 Par Value, Semiannual Interest Payments, Two-Year Life, 4% Semiannual Contract Rate, 5.0155% Semiannual Market Rate						
	Semiannual Interest Period-End	(A) Cash Interest Paid 4% × $100,000	(B) Bond Interest Expense 5.0155% × Prior (E)	(C) Discount Amortization (B) – (A)	(D) Unamortized Discount Prior (D) – (C)	(E) Carrying Value $100,000 – (D)
(0)	12/31/2021				$3,600	$ 96,400
(1)	6/30/2022	$ 4,000	$ 4,835	$ 835	2,765	97,235
(2)	12/31/2022	4,000	4,877	877	1,888	98,112
(3)	6/30/2023	4,000	4,921	921	967	99,033
(4)	12/31/2023	4,000	4,967	967	0	100,000
		$16,000	$19,600	$3,600		

Column (A) is the par value ($100,000) multiplied by the semiannual contract rate (4%).
Column (B) is the prior period's carrying value multiplied by the semiannual market rate (5.0155%).
Column (C) is the difference between interest paid and bond interest expense, or [(B) – (A)].
Column (D) is the prior period's unamortized discount less the current period's discount amortization.
Column (E) is the par value less unamortized discount, or [$100,000 – (D)].

Except for differences in amounts, journal entries recording the expense and updating the liability balance are the same under the effective interest method and the straight-line method. We use the numbers in Exhibit 10B.1 to record each semiannual entry during the bonds' two-year life (June 30, 2022, through December 31, 2023). The interest payment entry at the end of the first semiannual period is

June 30, 2022	Bond Interest Expense	4,835	
	Discount on Bonds Payable		835
	Cash		4,000
	Record semiannual interest and discount amortization (effective interest method).		

Bonds Payable

		12/31/2021	100,000
		6/30/2022	—
		12/31/2022	—
		6/30/2023	—
12/31/2023	100,000		
		12/31/2023	0

Discount on Bonds Payable

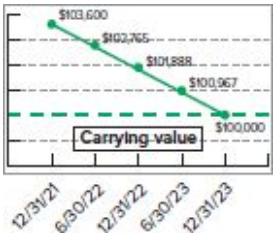
12/31/2021	3,600		
		6/30/2022	835
		12/31/2022	877
		6/30/2023	921
		12/31/2023	967
12/31/2023	0		

Effective Interest Amortization of Premium Bonds Exhibit 10B.2 shows the amortization table using the effective interest method for **Adidas** bonds (as described in Exhibit 10.8. Column A lists the semiannual cash payments. Column B shows the amount of bond interest expense, computed as the 4.9851% semiannual market rate at issuance multiplied by the beginning-of-period carrying value. The amount of cash paid in column A is larger than the bond interest expense because the cash payment is based on the higher 6% semiannual contract rate. The excess cash payment over the interest

expense reduces the principal. These amounts are shown in column C. Column E shows the carrying value after deducting the amortized premium in column C from the prior period's carrying value. Column D shows the premium's reduction by periodic amortization.

EXHIBIT 10B.2

Effective Interest Amortization of Bond Premium



Bonds: $100,000 Par Value, Semiannual Interest Payments, Two-Year Life, 6% Semiannual Contract Rate, 4.9851% Semiannual Market Rate

	Semiannual Interest Period-End	(A) Cash Interest Paid 6% × $100,000	(B) Bond Interest Expense 4.9851% × Prior (E)	(C) Premium Amortization (A) – (B)	(D) Unamortized Premium Prior (D) – (C)	(E) Carrying Value $100,000 + (D)
(0)	**12/31/2021**				**$3,600**	**$103,600**
(1)	**6/30/2022**	**$ 6,000**	**$ 5,165**	**$ 835**	**2,765**	**102,765**
(2)	12/31/2022	6,000	5,123	877	1,888	101,888
(3)	6/30/2023	6,000	5,079	921	967	100,967
(4)	12/31/2023	6,000	5,033	967	**0**	**100,000**
		$24,000	$20,400	$3,600		

Column (A) is the par value ($100,000) multiplied by the semiannual contract rate (6%).
Column (B) is the prior period's carrying value multiplied by the semiannual market rate (4.9851%).
Column (C) is the difference between interest paid and bond interest expense, or [(A) – (B)].
Column (D) is the prior period's unamortized premium less the current period's premium amortization.
Column (E) is the par value plus unamortized premium, or [$100,000 + (D)].

When the issuer makes the first semiannual interest payment, page 404 it records the following. Similar entries with different amounts are recorded at each payment date until the bond matures at the end of 2023. The effective interest method yields decreasing amounts of bond interest expense and increasing amounts of premium amortization over the bonds' life.

Bonds Payable			
		12/31/2021	100,000
		6/30/2022	—
		12/31/2022	—
		6/30/2023	—
12/31/2023	100,000		
		12/31/2023	0

Premium on Bonds Payable			
		12/31/2021	3,600
6/30/2022	835		
12/31/2022	877		
6/30/2023	921		
12/31/2023	967		
		12/31/2023	0

June 30, 2022	Bond Interest Expense	5,165	
	Premium on Bonds Payable	835	
	Cash		6,000
	Record semiannual interest and premium amortization (effective interest method).		

APPENDIX

10C

C3

Describe accounting for leases and pensions.

Leases and Pensions

Lease Liabilities A **lease** is an agreement between a *lessor* (owner) and a *lessee* (renter or tenant) that gives the lessee the right to use the asset for a period of time in return for cash (rent) payments. The financing of leases is a $1 trillion industry. The advantages of

lease financing include no up-front, full cash payment and the potential to deduct rental payments from taxable income.

Leases are classified as either finance leases or operating leases. In either case, for noncurrent leases the lessee records a “Right-of-Use Asset” and “Lease Liability” equal to the present value of lease payments. At each period-end, the lessee records financing expense differently depending on whether it’s a finance lease or operating lease.

Finance Leases

Finance leases are long-term leases where the lessee receives substantially all remaining benefits of the asset. A *finance lease* meets one or more of five criteria: (1) lease transfers ownership of lease asset to lessee, (2) lease has a purchase option that lessee is reasonably certain to exercise, (3) lease term is for major part of the lease asset’s remaining economic life, (4) present value of lease payments equals or exceeds substantially all of the lease asset’s fair value, or (5) the lease asset is specialized and expected to have no alternative use to lessor at lease-end.

A finance lease is similar to the financing of an asset purchase. Examples include most leases of airplanes, delivery trucks, medical equipment, railcars, and department store buildings. The lessee records the leased item as its own asset along with a lease liability at the start of the lease term; the amount recorded equals the present value of all lease payments.

Lease Start and First Payment Assume KDI Co. enters into a three-year lease of a building in which it sells sporting equipment. The lease is accounted for as a finance lease, it requires three $21,000 payments (the first at the *beginning* of the lease and the others at December 31 of 2021 and 2022), and the present value of its annual lease payments is $60,000 (implying a 5.086% discount rate). KDI records the asset and liability along with the first-period lease payment as follows. KDI reports the right-of-use lease asset as a long-term asset and the lease liability as a long-term liability. The portion of the lease liability expected to be paid in the next year is reported as a current liability.

Jan. 1, 2021	Right-of-Use Asset	60,000	
	Lease Liability		60,000
	Record right-of-use asset and lease liability.		
Jan. 1, 2021	Lease Liability	21,000	
	Cash		21,000
	Record beginning-year cash lease payment.		

Lease Asset Amortization At each year-end, KDI records page 405 amortization on the right-of-use asset (assume straight-line amortization, three-year lease term, and no salvage value) as follows.

Dec. 31, 2021	Amortization Expense	20,000	
	Accumulated Amortization—Right-of-Use Asset		20,000
	Record amortization on right-of-use asset.		
	($60,000–$0)/3 yrs		

Lease Payment for Liability and Interest KDI accrues interest expense on the lease liability at each year-end. Interest expense is computed by multiplying the lease liability by the interest rate on the lease. It records interest expense as part of its $21,000 annual lease payment as follows (for its first year).

Dec. 31, 2021	Interest Expense	1,984	
	Lease Liability	19,016	
	Cash		21,000
	*Record lease payment for interest and lease liability.**		

*Numbers are from a *lease payment schedule* as follows.

		Payments			
	(A)	(B) *Debit*	(C) *Debit*	(D) *Credit*	(E)
Date	Beginning Balance of Lease Liability	Interest on Lease Liability 5.086% × (A)	+ Lease Liability (D) – (B)	= Cash Lease Payment	Ending Balance of Lease Liability (A) – (C)
Jan. 1, 2021	**$60,000**	[redacted]	**$21,000**	**$21,000**	**$39,000**
Dec 31, 2021	39,000	$1,984	19,016	21,000	19,984
Dec 31, 2022	19,984	1,016	19,984	21,000	0
		$3,000	**$60,000**	**$63,000**	

KDI's entries for the final two years of this lease follow.

Dec. 31, 2022	Amortization Expense	20,000	
	Accumulated Amortization—Right-of-Use Asset		20,000
	Record amortization on right-of-use asset.		
Dec. 31, 2022	Interest Expense	1,016	
	Lease Liability	19,984	
	Cash		21,000
	Record lease payment for interest and lease liability.		
Dec. 31, 2023	Amortization Expense	20,000	
	Accumulated Amortization—Right-of-Use Asset		20,000
	Record amortization on right-of-use asset.		

Operating Leases **Operating leases** are long-term leases that do not meet any of the five criteria for finance leases.

Lease Start and Payments We prepare journal entries using the same *lease payment schedule* shown for the finance lease above. Recall this is a three-year lease that requires three $21,000 payments (the first at the *beginning* of the lease and the others at December 31 of 2021 and 2022), with a present value of its annual lease payments of $60,000 (implying a 5.086% discount rate). All entries under the finance lease apply here, but amounts for amortization entries differ.

Lease Amortization Total amortization for the lease life is the same for finance and operating leases. The difference is the yearly asset amortization. Those entries follow using the amortization calculated below.

page 406

		2021	2022	2023
Dec. 31	Amortization Expense	19,016	19,984	21,000
	Accumulated Amortization—Right-of-Use Asset	19,016	19,984	21,000
	*Record amortization on right-of-use asset.**			

	Amortization*	=	Lease Payment	–	Interest on Lease Liability
For 2021 . . .	**$19,016**	=	$21,000	–	$1,984
For 2022 . . .	**$19,984**	=	$21,000	–	$1,016
For 2023 . . .	**$21,000**	=	$21,000	–	$ 0

Point: In the income statement for an operating lease, Amortization Exp. and Interest Exp. are combined as one line item, "Lease Expense." The balance sheet and ledger keep them separate.

Short-Term Leases **Short-term leases** have lease terms of 12 months or less and do not have long-term purchase options. Examples include most car and apartment rental agreements. The lessee records such lease payments as expenses. The lessee does not

report the leased item as an asset or a liability (it is the lessor's asset). If **Verizon** leases a kiosk from the mall for $300 per month, its entry follows.

July 4	Rental Expense	300	
	Cash		300
	Record short-term lease rental payment.		

Pension Liabilities A **pension plan** is an agreement for the employer to provide benefits (payments) to employees after they retire. Some employers pay the full cost of the pension, and some pay part of the cost. An employer records its payment into a pension plan with a debit to Pension Expense and a credit to Cash. A *plan administrator* invests the payments in pension assets and makes benefit payments to *pension recipients* (retired employees).

Defined Benefit Plan *Defined benefit plans* give workers defined future benefits; the employer's contributions vary, depending on assumptions about future pension assets and liabilities. A pension liability is reported when the accumulated benefit obligation is *more than* the plan assets, called an *underfunded plan.* The accumulated benefit obligation is the present value of promised future pension payments to retirees. *Plan assets* refer to the market value of pension assets. A pension asset is reported when the accumulated benefit obligation is *less than* the plan assets, called an *overfunded plan.* An employer reports pension expense when employees earn wages, which is sometimes decades before it pays pension benefits to employees.

Point: Two types of pension plans are (1) *defined benefit plan* —the retirement benefit is defined and the employer estimates the contribution necessary to pay these benefits—and (2) *defined contribution plan* —the pension contribution is defined and the employer and/or employee contribute amounts specified in the pension agreement.

Other Postretirement Benefits *Other postretirement benefits* refer to nonpension benefits such as health care and life insurance benefits. Costs of these benefits are estimated and liabilities accrued when the employees earn them. Many of these benefits are not funded.

Summary: Cheat Sheet

BOND BASICS AND PAR BONDS

Bond advantages: Bonds do not affect owner control, interest on bonds is tax deductible, and bonds can potentially increase return on equity.

Bond disadvantages: Bonds can potentially decrease return on equity and require payments of both periodic interest and the par value at maturity.

Bonds issued at *par value* (called *par bonds*):

Cash	100,000	
Bonds Payable		100,000

Par bonds semiannual interest payment:

Bond Interest Expense	4,000	
Cash		4,000

Maturity of bonds (payment of par): When the bond issuer pays the par value back to the bondholder.

Bonds Payable	100,000	
Cash		100,000

DISCOUNT BONDS

Contract rate: The interest the bond issuer pays in cash.

Market rate: The interest rate that borrowers are willing to pay and-lenders are willing to accept.

Contract rate > Market rate	→	Bond sells at premium
Contract rate = Market rate	→	Bond sells at par
Contract rate < Market rate	→	Bond sells at discount

Bond prices: A $1,000 bond with a price of 96.400 is sold for page 407 $964.

A $1,000 bond with a price of 103½ is sold for $1,035.

Carrying (book) value of a bond: Equals bond par value plus any premium or minus any discount.

Discount bonds: Bonds issued with a contract rate that is *less* than the market rate.

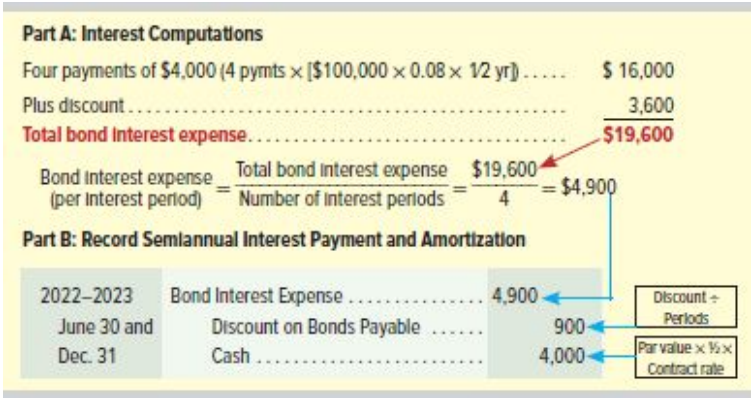
Issuance of discount bonds:

Cash	96,400	
Discount on Bonds Payable	3,600	
Bonds Payable		100,000

Reporting of discount bonds:

Long-term liabilities		
Bonds payable	$100,000	
Less discount on bonds payable	3,600	$96,400

Amortizing discount bonds (straight-line method):



Straight-line discount bond amortization table:

Semiannual Period-End	Unamortized Discount	Carrying Value
(0) 12/31/2021	$3,600	$ 96,400
(1) 6/30/2022	2,700	97,300
(2) 12/31/2022	1,800	98,200
(3) 6/30/2023	900	99,100
(4) **12/31/2023**	**0**	**100,000**

PREMIUM BONDS

Premium bonds : Bonds issued with a contract rate *higher* than the market rate.

Issuance of premium bonds:

Cash	103,600	
Premium on Bonds Payable		3,600
Bonds Payable		100,000

Reporting of premium bonds:

Long-term liabilities		
Bonds payable	$100,000	
Plus premium on bonds payable	3,600	$103,600

Amortizing premium bonds (straight-line method):

Part A: Interest Computations

Four payments of $6,000 (4 pymts × [$100,000 × 0.12 × 1/2 yr]) ..... $ 24,000

Less premium ..... (3,600)

Total bond interest expense **$20,400**

$$\text{Bond interest expense (per interest period)} = \frac{\text{Total bond interest expense}}{\text{Number of interest periods}} = \frac{\$20,400}{4} = \$5,100$$

Part B: Record Semiannual Interest Payment and Amortization

2022–2023 June 30 and Dec. 31	Bond Interest Expense	5,100	Premium ÷ Periods
	Premium on Bonds Payable	900	
	Cash	6,000	Par value × ½ × Contract rate

Straight-line premium bond amortization table:

Semiannual Period-End	Unamortized Premium	Carrying Value
(0) 12/31/2021	$3,600	$103,600
(1) 6/30/2022	2,700	102,700
(2) 12/31/2022	1,800	101,800
(3) 6/30/2023	900	100,900
(4) 12/31/2023	**0**	**100,000**

BOND RETIREMENT

Bond retirement by call option: Some bonds give issuers an option to call the bonds before they mature by paying par value plus a call premium. Record a gain if carrying value is *greater* than retirement price (shown here). Record a loss if carrying value is *less* than retirement price.

Bonds Payable	100,000	
Premium on Bonds Payable	4,500	
Gain on Bond Retirement		1,500
Cash		103,000

LONG-TERM NOTES

Installment note: A liability requiring a series of payments to the lender. Usually issued to a single lender, such as a bank.

Payments of principal and interest payments for note: Payments on an installment note include accrued interest expense plus part of the amount borrowed (the principal).

Note Amortization Table with Annual Payments:

Period Ending Date	(A) Beginning Balance	(B) *Debit* Interest Expense 8% × (A)	+	(C) *Debit* Notes Payable (D) − (B)	−	(D) *Credit* Cash (computed)	(E) Ending Balance (A) − (C)
(1) 12/31/2021	$60,000	$4,800		$ 18,482		$23,282	$41,518
(2) 12/31/2022	41,518	3,321		19,961		23,282	21,557
(3) 12/31/2023	21,557	1,725		21,557		23,282	0
		$9,846		$60,000		$69,846	

Issuance of note:

Jan. 1	Cash	60,000	
	Notes Payable		60,000

Annual note installment payments at each period-end:

	2021	2022	2023
Interest Expense	4,800	3,321	1,725
Notes Payable	18,482	19,961	21,557
Cash	23,282	23,282	23,282

Note Amortization Table with Monthly Payments: page 408

	(A)	Payments (B) Debit	(C) Debit	(D) Credit	(E)
Period Ending Date	Beginning Balance	Interest Expense 12% x 1/12 x (A)	+ Notes Payable (D) – (B)	– Cash (computed)	Ending Balance (A) – (C)
1/31/2021	$60,000	$600	$1,393	$1,993	$58,607
2/28/2021	58,607	586	1,407	1,993	57,200
3/31/2021	57,200	572	1,421	1,993	55,779

Key Terms

Bearer bonds (398)

Bond (387)

Bond certificate (388)

Bond indenture (388)

Callable bonds (399)

Carrying (book) value of bonds (390)

Contract rate (389)

Convertible bonds (399)

Coupon bonds (398)

Debt-to-equity ratio (399)

Discount on bonds payable (390)

Effective interest method (403)

Finance lease (404)

Installment note (395)

Lease (404)

Market rate (389)

Mortgage (397)

Operating lease (405)

Par value of a bond (387)

Penion plan (406)

Premium on bonds (392)

Registered bonds (398)

Secured bonds (398)

Serial bonds (398)

Short-term lease (406)

Sinking fund bonds (398)

Straight-line bond amortization (391)

Term bonds (398)

Unsecured bonds (398)

Multiple Choice Quiz

1. A bond traded at $97\frac{1}{2}$ means that

- **a.** The bond pays $97\frac{1}{2}$% interest.
- **b.** The bond trades at $975 per $1,000 bond.
- **c.** The market rate of interest is below the contract rate of interest for the bond.
- **d.** The bonds can be retired at $975 each.
- **e.** The bond's interest rate is $2\frac{1}{2}$ %.

2. An investor who owns a $1,000, 6%, 15-year (term) bond has

a. The right to receive $1,000 at maturity.

b. Ownership rights in the bond-issuing entity.

c. The right to receive $60 per month until maturity.

d. The right to receive $1,900 at maturity.

e. The right to receive $600 per year until maturity.

3. A company issues 8%, 20-year bonds with a par value of $500,000. The current market rate for the bonds is 8%. The amount of interest owed to the bondholders for each semiannual interest payment is

a. $40,000.

b. $0.

c. $20,000.

d. $800,000.

e. $400,000.

4. A company issued five-year, 5% bonds with a par value of $100,000. The company received $95,735 for the bonds. Using the straight-line method, the company's interest expense for the first semiannual interest period is

a. $2,926.50.

b. $5,853.00.

c. $2,500.00.

d. $5,000.00.

e. $9,573.50.

5. A company issued eight-year, 5% bonds with a par value of $350,000. The company received proceeds of $373,745. Interest is payable semiannually. The amount of premium amortized for the first semiannual interest period, assuming straight-line bond amortization, is

a. $2,698.

b. $23,745.

c. $8,750.

d. $9,344.

e. $1,484.

ANSWERS TO MULTIPLE CHOICE QUIZ

1. b

2. a

3. c; $500,000 × 0.08 × $^{1}/_{2}$ year = $20,000

4. a; Cash interest paid = $100,000 × 5% × $^{1}/_{2}$ year = $2,500
Discount amortization = ($100,000 − $95,735)/10 periods = $426.50

Interest expense = $2,500.00 + $426.50 = $2,926.50

5. e; ($373,745 − $350,000)/16 periods = $1,484

Superscript letter A, B, or C denotes assignments based on Appendix 10A, 10B, or 10C.

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Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

connect

Round dollar amounts to the nearest whole dollar for assignments in this chapter.

QUICK STUDY

QS 10-1

Advantages of bond financing

A1

Identify the following as either an advantage or a disadvantage of bond financing for a company.

a. Bonds do not affect owner control.

b. A company earns a lower return with borrowed funds than it pays in interest.

c. A company earns a higher return with borrowed funds than it pays in interest.

d. Bonds require payment of periodic interest.

e. Interest on bonds is tax deductible.

f. Bonds require payment of par value at maturity.

QS 10-2

Issuing bonds at par **P1**

Dunphy Company issued $10,000 of 6%, 10-year bonds at par value on January 1. Interest is paid semiannually each June 30 and December 31. Prepare the entries for (*a*) the issuance of the bonds and (*b*) the first interest payment on June 30.

QS 10-3

Financial statement impact of bond transactions **P1**

Separately analyze transactions a and b from QS 10-2 by showing their effects on the accounting equation—specifically, identify the accounts and amounts (including + or −) for each transaction.

QS 10-4

Issuing bonds at par

P1

Madrid Company plans to issue 8% bonds with a par value of $4,000,000. The company sells $3,600,000 of the bonds at par on January 1. The remaining $400,000 sells at par on July 1. The bonds pay interest semiannually on June 30 and December 31.

1. Record the entry for the first interest payment on June 30.

2. Record the entry for the July 1 cash sale of bonds.

QS 10-5

Recording bond issuance and interest

P1 P2 P3

On January 1, Renewable Energy issues bonds that have a $20,000 par value, mature in eight years, and pay 12% interest semiannually on June 30 and December 31.

1. Prepare the journal entry for issuance assuming the bonds are issued at (*a*) 99 and (*b*) $103\frac{1}{2}$.
2. How much interest does the company pay (in cash) to its bondholders every six months if the bonds are sold at par?

QS 10-6

Determining bond discount or premium

P2

Allegiant issues 6%, 20-year bonds with a par value of $2,000,000 and semiannual interest payments. In each separate situation, determine whether the bond is issued at par value, at a discount, or at a premium.

1. Market rate for the bond is 5%.
2. Market rate for the bond is 6%.
3. Market rate for the bond is 7%.

QS 10-7

Journalizing discount bond issuance **P2**

Enviro Company issues 8%, 10-year bonds with a par value of $250,000 and semiannual interest payments. On the issue date, the annual market rate for these bonds is 10%, which implies a selling price of $87\frac{1}{2}$. Prepare the journal entry for the issuance of the bonds for cash on January 1.

QS 10-8

Journalizing premium bond issuance **P3**

Garcia Company issues 10%, 15-year bonds with a par value of $240,000 and semiannual interest payments. On the issue date, the annual market rate for these bonds is 8%, which implies a selling price of $117\frac{1}{4}$. Prepare the journal entry for the issuance of these bonds for cash on January 1.

QS 10-9

Straight-Line: Discount bond computations

P2

Enviro Company issues 8%, 10-year bonds with a par value of $250,000 and semiannual interest payments. On the issue date, the annual market rate for these bonds is 10%, which implies a selling price of $87\frac{1}{2}$. The straight-line method is used to allocate interest expense.

1. What are the issuer's cash proceeds from issuance of these bonds?
2. What total amount of bond interest expense will be recognized over the life of these bonds?
3. What is the amount of bond interest expense recorded on the first interest payment date?

QS 10-10

Recording bond issuance and discount amortization

P2

Snap Company issues 10%, five-year bonds, on January 1 of this year, with a par value of $100,000 and semiannual interest payments. Use the following bond amortization table and prepare journal entries to record (*a*) the issuance of bonds on January 1, (*b*) the first interest

payment on June 30, and (*c*) the second interest payment on December 31.

Semiannual Period-End	Unamortized Discount	Carrying Value
(0) January 1, issuance	$7,360	$92,640
(1) June 30, first payment	6,624	93,376
(2) December 31, second payment	5,888	94,112

QS 10-11

Straight-Line: Premium bond computations

P3

Enviro Company issues 8%, 10-year bonds with a par value of $250,000 and semiannual interest payments. On the issue date, the annual market rate for these bonds is 5%, which implies a selling price of 123.375. The straight-line method is used to allocate interest expense.

1. What are the issuer's cash proceeds from issuance of these bonds?
2. What total amount of bond interest expense will be recognized over the life of these bonds?
3. What is the amount of bond interest expense recorded on the first interest payment date?

QS 10-12

Reporting premium and discount bonds

P2 P3

In each separate situation, show how bonds payable is reported in the long-term liabilities section of the December 31 balance sheet.

1. Bonds payable with a par value of $10,000 and a premium on bonds payable of $240.
2. Bonds payable with a par value of $30,000 and a discount on bonds payable of $500.

QS 10-13

Bond retirement by call option **P4**

On July 1, Aloha Co. exercises a call option that requires Aloha to pay $408,000 for its outstanding bonds that have a carrying value of $416,000 and a par value of $400,000. The company exercises the call option after the semiannual interest is paid the day before on June 30. Record the entry to retire the bonds.

QS 10-14

Issuance and interest for installment note

C1

On January 1, MM Co. borrows $340,000 cash from a bank and in return signs an 8% installment note for five annual payments of $85,155 each.

1. Prepare the journal entry to record issuance of the note.
2. For the first $85,155 annual payment at December 31, what amount goes toward interest expense? What amount goes toward principal reduction of the note?

QS 10-15

Financial statement impact of note transactions **C1**

Refer to QS 10-14 and separately analyze transactions 1 and 2, involving issuance of the note and its first annual payment, by showing their effects on the accounting equation—specifically, identify the accounts and amounts (including + or −) for each transaction.

QS 10-16

Accounting for monthly installment note **C1**

On January 1, $50,000 cash is borrowed from a bank in return for a 6% installment note with 24 *monthly* payments of $2,216 each.

Prepare the journal entry to record (1) the issuance of the note and (2) the first monthly interest payment.

QS 10-17

Bond features and terminology **A2**

Select the description that best fits each term or phrase.

A. Records and tracks the bondholders' names.

B. Is unsecured; backed only by the issuer's credit standing.

C. Has varying maturity dates for amounts owed.

D. The legal contract between the issuer and the bondholders.

E. Can be exchanged for shares of the issuer's stock.

F. Is unregistered; interest is paid to whoever possesses them.

G. Maintains a separate asset account from which bondholders are paid at maturity.

H. Pledges specific assets of the issuer as collateral.

1. Registered bond

2. Serial bond

3. Secured bond

4. Bearer bond

5. Convertible bond

6. Bond indenture

7. Sinking fund bond

8. Debenture

QS 10-18

Debt-to-equity ratio

A2

Compute the debt-to-equity ratio for each of the following companies. Which company appears to have a riskier financing structure?

	Atlanta Company	Spokane Company
Total liabilities	$429,000	$ 549,000
Total equity	572,000	1,830,000

QS 10-19[A]

Computing bond price **C2**

Compute the selling price of 8%, 10-year bonds with a par value of $250,000 and semiannual interest payments. The annual market rate for these bonds is 10%. Use present value tables B.1 and B.3 in Appendix B.

QS 10-20[A]

Computing bond price **C2**

Compute the selling price of 10%, 15-year bonds with a par value of $240,000 and semiannual interest payments. The annual market rate for these bonds is 8%. Use present value tables B.1 and B.3 in Appendix B.

QS 10-21[B]

Effective Interest: Bond discount computations

P5

Garcia Company issues 10%, 15-year bonds with a par value of $240,000 and semiannual interest payments. On the issue date, the annual market rate for these bonds is 14%, which implies a selling price of $75\frac{1}{4}$. The effective interest method is used to allocate interest expense.

1. What are the issuer's cash proceeds from issuance of these bonds?

2. What total amount of bond interest expense will be recognized over the life of these bonds?

3. What amount of bond interest expense is recorded on the first interest payment date?

QS 10-22[B]

Effective Interest: Bond premium computations

P5

Garcia Company issues 10%, 15-year bonds with a par value of $240,000 and semiannual interest payments. On the issue date, the annual market rate for these bonds is 8%, which implies a selling price of $117\frac{1}{4}$. The effective interest method is used to allocate interest expense.

1. What are the issuer's cash proceeds from issuance of these bonds?

2. What total amount of bond interest expense will be recognized over the life of these bonds?

3. What amount of bond interest expense is recorded on the first interest payment date?

QS 10-23[C]

Recording short-term leases **C3**

Jin Li, an employee of ETrain.com, leases a car at O'Hare Airport for a three-day business trip. The rental cost is $250. Prepare the entry by ETrain.com to record Jin Li's short-term car lease cost paid in cash.

QS 10-24[C]

Recording leases **C3**

Algoma Inc. signs a five-year lease for office equipment with Office Solutions. The present value of the lease payments is $15,499. Prepare the journal entry that Algoma records at the inception of this finance lease.

EXERCISES

Exercise 10-1

Debt versus equity financing

A1

Green Foods currently has $200,000 of equity and is planning an $80,000 expansion to meet increasing demand for its product. The company currently earns $50,000 in net income, and the expansion will yield $25,000 in additional income before any interest expense.

The company has three options: (1) do not expand, (2) expand and issue $80,000 in debt that requires payments of 8% annual interest, or (3) expand and raise $80,000 from equity financing. For each option, compute (*a*) net income and (*b*) return on equity (Net income ÷ Equity). Ignore any income tax effects.

Exercise 10-2

Recording bond issuance at par, interest payments, and bond maturity

P1

Brussels Enterprises issues bonds at par dated January 1, 2021, that have a $3,400,000 par value, mature in four years, and pay 9% interest semiannually on June 30 and December 31.

1. Record the entry for the issuance of bonds for cash on January 1.
2. Record the entry for the first semiannual interest payment and the second semiannual interest payment.
3. Record the entry for the maturity of the bonds on December 31, 2024 (assume semiannual interest is already recorded).

Exercise 10-3

Recording bond issuance and interest

P1

On January 1, Boston Enterprises issues bonds that have a $3,400,000 par value, mature in 20 years, and pay 9% interest semiannually on June 30 and December 31. The bonds are sold at par.

1. How much interest will the issuer pay (in cash) to the bondholders every six months?
2. Prepare journal entries to record (*a*) the issuance of bonds on January 1, (*b*) the first interest payment on June 30, and (*c*) the second interest payment on December 31.
3. Prepare the journal entry for issuance assuming the bonds are issued at (*a*) 98 and (*b*) 102.

Exercise 10-4

Straight-Line: Amortization of bond discount

P2

Tano Company issues bonds with a par value of $180,000 on January 1, 2021. The bonds' annual contract rate is 8%, and interest is paid semiannually on June 30 and December 31. The bonds mature in three years. The annual market rate at the date of issuance is 10%, and the bonds are sold for $170,862.

1. What is the amount of the discount on these bonds at issuance?
2. How much total bond interest expense will be recognized over the life of these bonds?
3. Prepare a straight-line amortization table like Exhibit 10.7 for these bonds.

Exercise 10-5

Straight-Line: Recording bond issuance and discount amortization

P2

Paulson Company issues 6%, four-year bonds, on January 1 of this year, with a par value of $200,000 and semiannual interest payments. Use the following bond amortization table and prepare journal entries

to record (*a*) the issuance of bonds on January 1, (*b*) the first interest payment on June 30, and (*c*) the second interest payment on December 31.

Semiannual Period-End	Unamortized Discount	Carrying Value
(0) January 1, issuance	$13,466	$186,534
(1) June 30, first payment	11,782	188,218
(2) December 31, second payment	10,098	189,902

Exercise 10-6

Straight-Line: Recording bond issuance and discount amortization

P2

Dobbs Company issues 5%, two-year bonds, on December 31, 2021, with a par value of $200,000 and semiannual interest payments. Use the following bond amortization table and prepare journal entries to record (*a*) the issuance of bonds on December 31, 2021; (*b*) the first through fourth interest payments on each June 30 and December 31; and (*c*) the maturity of the bonds on December 31, 2023.

Semiannual Period-End	Unamortized Discount	Carrying Value
(0) 12/31/2021	$12,000	$188,000
(1) 6/30/2022	9,000	191,000
(2) 12/31/2022	6,000	194,000
(3) 6/30/2023	3,000	197,000
(4) 12/31/2023	0	200,000

Exercise 10-7

Straight-Line: Amortization table and bond interest expense

P2

Duval Co. issues four-year bonds with a $100,000 par value on January 1, 2021, at a price of $95,952. The annual contract rate is 7%, and interest is paid semiannually on June 30 and December 31.

1. Prepare a straight-line amortization table like Exhibit 10.7 for these bonds.

2. Prepare journal entries to record the first two interest payments.
3. Prepare the journal entry for maturity of the bonds on December 31, 2024 (assume semiannual interest is already recorded).

Exercise 10-8

Straight-Line: Recording bond issuance and premium amortization

P3

Wookie Company issues 10%, five-year bonds, on January 1 of this year, with a par value of $200,000 and semiannual interest payments. Use the following bond amortization table and prepare journal entries to record (*a*) the issuance of bonds on January 1, (*b*) the first interest payment on June 30, and (*c*) the second interest payment on December 31.

Semiannual Period-End	Unamortized Premium	Carrying Value
(0) January 1, issuance	$16,222	$216,222
(1) June 30, first payment	14,600	214,600
(2) December 31, second payment	12,978	212,978

Exercise 10-9

Straight-Line: Amortization of bond premium

P3

Quatro Co. issues bonds dated January 1, 2021, with a par value of $400,000. The bonds' annual contract rate is 13%, and interest is paid semiannually on June 30 and December 31. The bonds mature in three years. The annual market rate at the date of issuance is 12%, and the bonds are sold for $409,850.

1. What is the amount of the premium on these bonds at issuance?
2. How much total bond interest expense will be recognized over the life of these bonds?
3. Prepare a straight-line amortization table like Exhibit 10.11 for these bonds.

Exercise 10-10

Bond retirement by call option

P4

Tyrell Company issued callable bonds with a par value of $10,000. The call option requires Tyrell to pay a call premium of $500 plus par (or a total of $10,500) to bondholders to retire the bonds. On July 1, Tyrell exercises the call option. The call option is exercised after the semiannual interest is paid the day before on June 30. Record the entry to retire the bonds under each separate situation.

1. The bonds have a carrying value of $9,000.
2. The bonds have a carrying value of $11,000.

Exercise 10-11

Straight-Line: Bond computations, amortization, and bond retirement

P2 P4

On January 1, 2021, Shay Company issues $700,000 of 10%, 15-year bonds. The bonds sell for $684,250. Six years later, on January 1, 2027, Shay retires these bonds by buying them on the open market for $731,500. All interest is accounted for and paid through December 31, 2026, the day before the purchase. The straight-line method is used to amortize any bond discount.

1. What is the amount of the discount on the bonds at issuance?
2. How much amortization of the discount is recorded on the bonds for the entire period from January 1, 2021, through December 31, 2026?
3. What is the carrying (book) value of the bonds as of the close of business on December 31, 2026?
4. Prepare the journal entry to record the bond retirement.

Exercise 10-12

Installment note amortization table **C1**

On January 1, 2021, Eagle Company borrows $100,000 cash by signing a four-year, 7% installment note. The note requires four equal payments of $29,523, consisting of accrued interest and principal on December 31 of each year from 2021 through 2024. Prepare an amortization table for this installment note like the one in Exhibit 10.12.

Exercise 10-13

Installment note entries **C1**

Use the information in Exercise 10-12 to prepare the journal entries for Eagle to record the note's issuance and each of the four payments.

Exercise 10-15

Reporting liabilities section of balance sheet

C1 P2

Selected accounts from WooHoo Co.'s adjusted trial balance for the year ended December 31 follow. Prepare the liabilities section of its classified balance sheet.

Notes payable (due in 5 years)	$ 3,000	Discount on bonds payable	$400
Accounts payable	500	Wages payable	200
Bonds payable (due in 10 years)	10,000	Interest payable (due in 2 weeks)	100
Machinery	4,500	Sales tax payable	50

Exercise 10-16

Applying debt-to- equity ratio

A2

Montclair Company is considering a project that will require a $500,000 loan. It presently has total liabilities of $220,000 and total assets of $620,000.

1. Compute Montclair's (*a*) current debt-to-equity ratio and (*b*) the debt-to-equity ratio assuming it borrows $500,000 to fund the

project.

2. If Montclair borrows the funds, does its financing structure become more or less risky?

Exercise 10-17[A]

Computing bond interest and price; recording bond issuance **C2**

Brin Company issues bonds with a par value of $800,000. The bonds mature in 10 years and pay 6% annual interest in semiannual payments. The annual market rate for the bonds is 8%.

1. Compute the price of the bonds as of their issue date.
2. Prepare the journal entry to record the bonds' issuance.

Exercise 10-18[A]

Computing bond interest and price; recording bond issuance **C2**

Citywide Company issues bonds with a par value of $150,000. The bonds mature in five years and pay 10% annual interest in semiannual payments. The annual market rate for the bonds is 8%.

1. Compute the price of the bonds as of their issue date.
2. Prepare the journal entry to record the bonds' issuance.

Exercise 10-19[B]

Effective Interest: Amortization of bond discount

P5

Stanford issues bonds dated January 1, 2021, with a par value of $500,000. The bonds' annual contract rate is 9%, and interest is paid semiannually on June 30 and December 31. The bonds mature in three years. The annual market rate at the date of issuance is 12%, and the bonds are sold for $463,140.

1. What is the amount of the discount on these bonds at issuance?

2. How much total bond interest expense will be recognized over the life of these bonds?
3. Prepare an effective interest amortization table like Exhibit 10B.1 for these bonds.

Exercise 10-20[B]

Effective Interest: Amortization of bond premium

P5

Quatro Co. issues bonds dated January 1, 2021, with a par value of $400,000. The bonds' annual contract rate is 13%, and interest is paid semiannually on June 30 and December 31. The bonds mature in three years. The annual market rate at the date of issuance is 12%, and the bonds are sold for $409,850.

1. What is the amount of the premium on these bonds at issuance?
2. How much total bond interest expense will be recognized over the life of these bonds?
3. Prepare an effective interest amortization table like Exhibit 10B.2 for these bonds.

Exercise 10-21[C]

Identifying finance and operating leases

C3

In each separate case, indicate whether the company has a finance lease or an operating lease.

1. The lessor retains title to the asset, and the lease term is 3 years on an asset that has a 10-year useful life.
2. The title is transferred to the lessee. The lessee can purchase the asset for $1 at the end of the lease, and the lease term is five years. The leased asset has an expected useful life of six years.
3. The present value of the lease payments is 95% of the leased asset's market value, and the lease term is 90% of the leased

asset's useful life.

Exercise 10-22[C]

Accounting for finance lease

C3

On January 1, Harbor (lessee) signs a five-year lease for equipment that is accounted for as a finance lease. The lease requires five $10,000 lease payments (the first at the beginning of the lease and the remaining four at December 31 of Years 1, 2, 3, and 4), and the present value of the five annual lease payments is $41,000, based on an 11% interest rate.

1. Prepare the January 1 journal entry Harbor records at inception of the lease for any asset or liability.
2. Prepare the January 1 entry Harbor records for the first $10,000 cash lease payment.
3. If the leased asset has a five-year useful life with no salvage value, prepare the December 31 journal entry Harbor records each year for amortization of the leased asset.

Exercise 10-23[C]

Analyzing lease purchase options

C3

National Motors Company advertised three alternatives for a 25-month lease on a new Tahoe: (1) zero dollars down and a lease payment of $1,750 per month for 25 months, (2) $5,000 down and $1,500 per month for 25 months, or (3) $38,500 down and no payments for 25 months. Use the present value Table B.3 in Appendix B to determine the current present value for each of the three options (assume you have enough cash to accept any alternative and the annual interest rate is 12% compounded monthly). Then, identify the best option for the customer.

PROBLEM SET A

Problem 10-1A

Straight-Line: Amortization of bond discount

P2

Hillside issues $4,000,000 of 6%, 15-year bonds dated January 1, 2021, that pay interest semiannually on June 30 and December 31. The bonds are issued at a price of $3,456,448.

Required

1. Prepare the January 1 journal entry to record the bonds' issuance.
2. For each semiannual period, compute (*a*) the cash payment, (*b*) the straight-line discount amortization, and (*c*) the bond interest expense.
3. Determine the total bond interest expense to be recognized over the bonds' life.
4. Prepare the first two years of a straight-line amortization table like Exhibit 10.7.
5. Prepare the journal entries to record the first two interest payments.

Check (3) $4,143,552 (4) 12/31/2022 carrying value, $3,528,920

Problem 10-2A

Straight Line: Amortization of bond premium

P3

Refer to the bond details in Problem 10-1A, *except* assume that the bonds are issued at a price of $4,895,980.

Required

1. Prepare the January 1 journal entry to record the bonds' issuance.

2. For each semiannual period, compute (*a*) the cash payment, (*b*) the straight-line premium amortization, and (*c*) the bond interest expense.
3. Determine the total bond interest expense to be recognized over the bonds' life.
4. Prepare the first two years of a straight-line amortization table like Exhibit 10.11.
5. Prepare the journal entries to record the first two interest payments.

Check (3) $2,704,020 4) 12/31/2022 carrying value, $4,776,516

Problem 10-3A

Straight-Line: Amortization of bond premium

P3

Ellis Company issues 6.5%, five-year bonds dated January 1, 2021, with a $250,000 par value. The bonds pay interest on June 30 and December 31 and are issued at a price of $255,333. The annual market rate is 6% on the issue date.

Required

1. Calculate the total bond interest expense over the bonds' life.
2. Prepare a straight-line amortization table like Exhibit 10.11 for the bonds' life.
3. Prepare the journal entries to record the first two interest payments.

Check (2) 6/30/2023 carrying value, $252,668

Problem 10-4A

Straight-Line: Amortization of bond discount **P2**

Legacy issues $325,000 of 5%, four-year bonds dated January 1, 2021, that pay interest semiannually on June 30 and December 31. They are issued at $292,181 when the market rate is 8%.

Required

1. Prepare the January 1 journal entry to record the bonds' issuance.
2. Determine the total bond interest expense to be recognized over the bonds' life.
3. Prepare a straight-line amortization table like the one in Exhibit 10.7 for the bonds' first two years.
4. Prepare the journal entries to record the first two interest payments.

Check (2) $97,819 (3) 12/31/2022 carrying value, $308,589

Problem 10-5A

Installment notes

C1

On January 1, 2021, Norwood borrows $200,000 cash from a bank by signing a five-year installment note bearing 8% interest. The note requires equal payments of $50,091 each year on December 31.

Required

1. Complete an amortization table for this installment note similar to the one in Exhibit 10.12.
2. Prepare journal entries to record the note's issuance and each of the first two payments.

Problem 10-6A

Using present value factors in computing installment note payments

C1

On January 1, McNeil Company borrows $100,000 cash by signing a four-year, 9% installment note. The note requires four equal payments

consisting of accrued interest and principal on December 31 for each of the next four years.

Required

1. Compute the amount of each of the four equal payments. Round the answer to a whole number. Hint: Use Table B.3 in Appendix B.
2. Prepare an amortization table for this installment note.
3. Prepare journal entries for (a) the note's issuance; (b) the first payment on December 31, Year 1; and (c) the final payment on December 31, Year 4.

Problem 10-7A

Applying the debt-to- equity ratio

A2

The following information is available for both Pulaski Company and Scott Company at the current year-end.

	Pulaski Company	Scott Company
Total assets	$860,000	$440,000
Total liabilities	360,000	240,000
Total equity	500,000	200,000

Required

1. Compute the debt-to-equity ratio for both companies.
2. Which company has the riskier financing structure?

Problem 10-8A[A]

Computing bond price and recording issuance

C2

Hartford Research issues bonds dated January 1 that pay interest semiannually on June 30 and December 31. The bonds have a

$40,000 par value and an annual contract rate of 10%, and they mature in 10 years.

Required

Check (1) Premium, $5,437

(3) Discount, $4,588

For each separate situation, (*a*) determine the bonds' issue price on January 1 and (*b*) prepare the journal entry to record their issuance.

1. The market rate at the date of issuance is 8%.
2. The market rate at the date of issuance is 10%.
3. The market rate at the date of issuance is 12%.

Problem 10-9A[B]

Effective Interest: Amortization of bond discount **P5**

Refer to the bond details in Problem 10-4A.

Required

1. Prepare the January 1 journal entry to record the bonds' issuance.
2. Determine the total bond interest expense to be recognized over the bonds' life.
3. Prepare an effective interest amortization table like the one in Exhibit 10B.1 for the bonds' first two years.
4. Prepare the journal entries to record the first two interest payments.

Check (2) $97,819 (3) 12/31/2022 carrying value, $307,308

Problem 10-10A[B]

Effective Interest: Amortization of bond premium **P5**

Refer to the bond details in Problem 10-3A.

Required

1. Compute the total bond interest expense over the bonds' life.
2. Prepare an effective interest amortization table like the one in Exhibit 10B.2 for the bonds' life.
3. Prepare the journal entries to record the first two interest payments.

Check (2) 6/30/2023 carrying value, $252,865

Problem 10-11A[B]

Effective Interest: Amortization of bond

P5

Ike issues $180,000 of 11%, three-year bonds dated January 1, 2021, that pay interest semiannually on June 30 and December 31. They are issued at $184,566 when the market rate is 10%.

Required

1. Prepare the January 1 journal entry to record the bonds' issuance.
2. Determine the total bond interest expense to be recognized over the bonds' life.
3. Prepare an effective interest amortization table like Exhibit 10B.2 for the bonds' first two years.
4. Prepare the journal entries to record the first two interest payments.

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Check (3) 6/30/2022 carrying value, $182,448

Problem 10-12A[C]

Accounting for finance lease

C3

On January 1, Rogers (lessee) signs a three-year lease for machinery that is accounted for as a finance lease. The lease requires three

$18,000 lease payments (the first at the beginning of the lease and the remaining two at December 31 of Year 1 and Year 2). The present value of the three annual lease payments is $51,000, using a 6.003% interest rate. The lease payment schedule follows.

Date	(A) Beginning Balance of Lease Liability	(B) *Debit* Interest on Lease Liability 6.003% × (A)	+	(C) *Debit* Lease Liability (D) − (B)	=	(D) *Credit* Cash Lease Payment	(E) Ending Balance of Lease Liability (A) − (C)
Jan. 1, Year 1	$51,000			$18,000		$18,000	$33,000
Dec. 31, Year 1	33,000	$1,981		16,019		18,000	16,981
Dec. 31, Year 2 . . .	16,981	1,019		16,981		18,000	0
		$3,000		$51,000		$54,000	

Required

1. Prepare the January 1 journal entry at the start of the lease to record any asset or liability.
2. Prepare the January 1 journal entry to record the first $18,000 cash lease payment.
3. Prepare the December 31 journal entry to record straight-line amortization with zero salvage value at the end of (*a*) Year 1, (*b*) Year 2, and (*c*) Year 3.
4. Prepare the December 31 journal entry to record the $18,000 cash lease payment at the end of (*a*) Year 1 and (*b*) Year 2.

Problem 10-13A[C]

Accounting for operating lease

C3

Refer to the lease details in Problem 10-12A. Assume that this lease is classified as an operating lease instead of a finance lease.

Required

1. Prepare the January 1 journal entry at the start of the lease to record any asset or liability.

2. Prepare the January 1 journal entry to record the first $18,000 cash lease payment.
3. Prepare the December 31 journal entry to record amortization at the end of (*a*) Year 1, (*b*) Year 2, and (*c*) Year 3.
4. Prepare the December 31 journal entry to record the $18,000 cash lease payment at the end of (*a*) Year 1 and (*b*) Year 2.

PROBLEM SET B

Problem 10-1B

Straight-Line: Amortization of bond discount

P2

Romero issues $3,400,000 of 10%, 10-year bonds dated January 1, 2021, that pay interest semiannually on June 30 and December 31. The bonds are issued at a price of $3,010,000.

Required

1. Prepare the January 1 journal entry to record the bonds' issuance.
2. For each semiannual period, compute (*a*) the cash payment, (*b*) the straight-line discount amortization, and (*c*) the bond interest expense.
3. Determine the total bond interest expense to be recognized over the bonds' life.
4. Prepare the first two years of a straight-line amortization table like Exhibit 10.7.
5. Prepare the journal entries to record the first two interest payments.

Check (3) $3,790,000 (4) 6/30/2022 carrying value, $3,068,500

Problem 10-2B

Straight-Line: Amortization of bond premium

P3

Refer to the bond details in Problem 10-1B, *except* assume that the bonds are issued at a price of $4,192,932.

Required

1. Prepare the January 1 journal entry to record the bonds' issuance.
2. For each semiannual period, compute (*a*) the cash payment, (*b*) the straight-line premium amortization, and (*c*) the bond interest expense.
3. Determine the total bond interest expense to be recognized over the bonds' life.
4. Prepare the first two years of a straight-line amortization table like Exhibit 10.11.
5. Prepare the journal entries to record the first two interest payments.

Check (3) $2,607,068 (4) 6/30/2022 carrying value, $4,073,991

Problem 10-3B

Straight-Line: Amortization of bond premium

P3

Ripkin Company issues 9%, five-year bonds dated January 1, 2021, with a $320,000 par value. The bonds pay interest on June 30 and December 31 and are issued at a price of $332,988. Their annual market rate is 8% on the issue date.

Required

1. Calculate the total bond interest expense over the bonds' life.
2. Prepare a straight-line amortization table like Exhibit 10.11 for the bonds' life.
3. Prepare the journal entries to record the first two interest payments.

Check (3) $2,607,068 (4) 6/30/2022 carrying value, $4,073,991

Problem 10-4B

Straight-Line: Amortization of bond discount

P2

Gomez issues $240,000 of 6%, 15-year bonds dated January 1, 2021, that pay interest semiannually on June 30 and December 31. They are issued at $198,494 when the market rate is 8%.

Required

1. Prepare the January 1 journal entry to record the bonds' issuance.
2. Determine the total bond interest expense to be recognized over the life of the bonds.
3. Prepare a straight-line amortization table like the one in Exhibit 10.7 for the bonds' first two years.
4. Prepare the journal entries to record the first two interest payments.

Check 2) $257,506 (3) 6/30/2022 carrying value, $202,646

Analysis Component

5. Assume the market rate at issuance is 4% instead of 8%. Without providing numbers, describe how this change affects the amounts reported on Gomez's financial statements.

Problem 10-5B

Installment notes

C1

On January 1, 2021, Gordon borrows $150,000 cash from a bank by signing a three-year installment note bearing 10% interest. The note requires equal payments of $60,316 each year on December 31.

Required

1. Complete an amortization table for this installment note similar to the one in Exhibit 10.12.
2. Prepare journal entries to record the note's issuance and each of the first two payments.

Problem 10-6B

Using present value factors in computing installment note payments

C1

On January 1, JCCC borrows $130,000 cash by signing a 4-year, 5% installment note. The note requires four equal payments consisting of accrued interest and principal on December 31 for each of the next four years.

Required

1. Compute the amount of each of the four equal payments. Round the answer to a whole number. Hint: Use Table B.3 in Appendix B.
2. Prepare an amortization table for this installment note.
3. Prepare journal entries for (a) the note's issuance; (b) the first payment on December 31, Year 1; and (c) the final payment on December 31, Year 4.

Problem 10-7B

Applying the debt-to- equity ratio

A2

The following information is available for both Atlas Company and Bryan Company at the current year-end.

	Atlas Company	Bryan Company
Total assets	$180,000	$750,000
Total liabilities	80,000	562,500
Total equity	100,000	187,500

Required

1. Compute the debt-to-equity ratio for both companies.
2. Which company has the riskier financing structure?

Problem 10-8B[A]

Computing bond price and recording issuance

C2

Flagstaff Systems issues bonds dated January 1 that pay interest semiannually on June 30 and December 31. The bonds have a $90,000 par value and an annual contract rate of 12%, and they mature in five years.

Required

For each separate situation, (*a*) determine the bonds' issue price on January 1 and (*b*) prepare the journal entry to record their issuance.

1. The market rate at the date of issuance is 10%.
2. The market rate at the date of issuance is 12%.
3. The market rate at the date of issuance is 14%.

Check (1) Premium, $6,948 (3) Discount, $6,326

Problem 10-9B[B]

Effective Interest: Amortization of bond discount **P5**

Refer to the bond details in Problem 10-4B.

Required

1. Prepare the January 1 journal entry to record the bonds' issuance.
2. Determine the total bond interest expense to be recognized over the bonds' life.
3. Prepare an effective interest amortization table like the one in Exhibit 10B.1 for the bonds' first two years.
4. Prepare the journal entries to record the first two interest payments.

Check (2) $257,506 (3) 6/30/2022 carrying value, $200,803

Problem 10-10B[B]

Effective Interest: Amortization of bond premium **P5**

Refer to the bond details in Problem 10-3B.

Required

1. Compute the total bond interest expense over the bonds' life.
2. Prepare an effective interest amortization table like the one in Exhibit 10B.2 for the bonds' life.
3. Prepare the journal entries to record the first two interest payments.

Check (2) 6/30/2023 carrying value, $327,136

Problem 10-11B[B]

Effective Interest: Amortization of bond

P5

Valdez issues $450,000 of 13%, four-year bonds dated January 1, 2021, that pay interest semiannually on June 30 and December 31. They are issued at $493,608 when the market rate is 10%.

Required

1. Prepare the January 1 journal entry to record the bonds' issuance.
2. Determine the total bond interest expense to be recognized over the bonds' life.
3. Prepare an effective interest amortization table like the one in Exhibit 10B.2 for the bonds' first two years.
4. Prepare the journal entries to record the first two interest payments.

Check (3) 6/30/2022 carrying value, $479,202

Analysis Component

5. Assume that the market rate at issuance is 14% instead of 10%. Without presenting numbers, describe how this change affects the amounts reported on Valdez's financial statements.

Problem 10-12B[C]

Accounting for finance lease

C3

On January 1, Kwak (lessee) signs a three-year lease for equipment that is accounted for as a finance lease. The lease requires three $14,000 lease payments (the first at the beginning of the lease and the remaining two at December 31 of Year 1 and Year 2). The present value of the three annual lease payments is $39,000, using a 7.9% interest rate. The lease payment schedule follows.

Required

page 419

Date	(A) Beginning Balance of Lease Liability	(B) *Debit* Interest on Lease Liability 7.9% × (A)	+	(C) *Debit* Lease Liability (D) − (B)	=	(D) *Credit* Cash Lease Payment	(E) Ending Balance of Lease Liability (A) − (C)
Jan. 1, Year 1	$39,000			$14,000		$14,000	$25,000
Dec. 31, Year 1 . . .	25,000	$1,975		12,025		14,000	12,975
Dec. 31, Year 2 . . .	12,975	1,025		12,975		14,000	0
		$3,000		$39,000		$42,000	

1. Prepare the January 1 journal entry at the start of the lease to record any asset or liability.

2. Prepare the January 1 journal entry to record the first $14,000 cash lease payment.

3. Prepare the December 31 journal entry to record straight-line amortization with zero salvage value at the end of (*a*) Year 1, (*b*) Year 2, and (*c*) Year 3.

4. Prepare the December 31 journal entry to record the $14,000 cash lease payment at the end of (*a*) Year 1 and (*b*) Year 2.

Problem 10-13B[C]

Accounting for operating lease

C3

Refer to the lease details in Problem 10-12B. Assume that this lease is classified as an operating lease instead of a finance lease.

Required

1. Prepare the January 1 journal entry at the start of the lease to record any asset or liability.
2. Prepare the January 1 journal entry to record the first $14,000 cash lease payment.
3. Prepare the December 31 journal entry to record amortization at the end of (*a*) Year 1, (*b*) Year 2, and (*c*) Year 3.
4. Prepare the December 31 journal entry to record the $14,000 cash lease payment at the end of (*a*) Year 1 and (*b*) Year 2.

connect

SERIAL PROBLEM

Business Solutions

A1 A2

Alexander Image/Shutterstock

Serial problem began in Chapter 1. If previous chapter segments were not completed, the serial problem can begin at this point. It is available in ***Connect*** *with an algorithmic option.*

SP 10 Santana Rey has consulted with her local banker and is considering financing an expansion of her business by obtaining a long-term bank loan. Selected account balances at March 31, 2022, for **Business Solutions** follow.

Total assets	$120,268	Total liabilities	$875	Total equity	$119,393

Required

1. The bank has offered a long-term secured note to Business Solutions. The bank's loan procedures require that a client's debt-to-equity ratio not exceed 0.8. As of March 31, 2022, what is the maximum amount that Business Solutions could borrow from this bank?
2. If Business Solutions borrows the maximum amount allowed from the bank, what percentage of assets would be financed (*a*) by debt and (*b*) by equity?
3. What are some factors the business should consider before borrowing the funds?

Check (1) $94,639

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities run in **Connect**. All are auto-gradable.

Tableau DA 10-1 Quick Study , Recording bond issuance, **P2** — similar to QS 10-7

Tableau DA 10-2 Exercise , Recording bond issuance and amortization, **P2** —similar to Exercise 10-6

Tableau DA 10-3 Mini-Case , Debt versus equity financing, **A1** — similar to Exercise 10-1

Accounting Analysis connect

COMPANY ANALYSIS

A1 A2

AA 10-1 Use **Apple** 's financial statements in Appendix A to answer the following. Note: Apple's long-term debt is called "Term debt" under non-current liabilities.

1. Identify Apple's long-term debt as reported on its balance sheet at (*a*) September 28, 2019, and (*b*) September 29, 2018 .
2. Calculate the percentage change in long-term debt from September 29, 2018, to September 28, 2019 .
3. If Apple's reported long-term debt continues on the current trend, do we expect total interest expense to increase or decrease?

COMPARATIVE ANALYSIS

A2

AA 10-2 Key figures for **Apple** and **Google** follow.

	Apple		Google	
$ millions	Current Year	Prior Year	Current Year	Prior Year
Total assets	$338,516	$365,725	$275,909	$232,792
Total liabilities	248,028	258,578	74,467	55,164
Total equity	90,488	107,147	201,442	177,628

Required

1. Compute the debt-to-equity ratios for Apple and Google for both the current year and the prior year.
2. Use the ratios from part 1 to determine which company's financing structure is less risky.

3. Is its debt-to-equity ratio more risky or less risky compared to the industry (assumed) average of 0.5 for (*a*) Apple and (*b*) Google?

EXTENDED ANALYSIS

A2

AA 10-3 Selected results from **Samsung** , **Apple** , and **Google** follow.

$ millions	Samsung		Apple	Google
	Current Year	Prior Year	Current Year	Current Year
Total assets	$302,511	$291,179	$338,516	$275,909
Total liabilities	76,952	78,599	248,028	74,467
Total equity	225,559	212,580	90,488	201,442

Required

1. Compute Samsung's debt-to-equity ratio for the current year and the prior year.
2. Is Samsung's financing structure more risky or less risky in the current year versus the prior year?
3. In the current year, is Samsung's financing structure more risky or less risky than (*a*) Apple's and (*b*) Google's?

Discussion Questions

1. What is the main difference between notes payable and bonds payable?
2. What is the main difference between a bond and a share of stock?
3. What is the advantage of issuing bonds instead of obtaining financing from the company's owners?

4. What is a bond indenture? What provisions are usually included in it?
5. What are the *contract* rate and the *market* rate for bonds?
6. What factors affect the market rates for bonds?
7. [B] Does the straight-line or effective interest method produce an interest expense allocation that yields a constant rate of interest over a bond's life? Explain.
8. Explain the concept of accrued interest on bonds at the end of an accounting period.
9. If you know the par value of bonds, the contract rate, and the market rate, how do you compute the bonds' price?
10. What is the issue price of a $2,000 bond sold at $98\frac{1}{4}$? What is the issue price of a $6,000 bond sold at $101\frac{1}{2}$?
11. Describe the debt-to-equity ratio and explain how creditors and owners use this ratio to evaluate a company's risk.
12. What obligation does an entrepreneur (owner) have to investors that purchase bonds to finance the business?
13. [C] When can a lease create both an asset and a liability for the lessee?
14. [C] Compare and contrast a finance lease with an operating lease.
15. [C] Describe the two basic types of pension plans.

Beyond the Numbers

ETHICS CHALLENGE

C3 A1

BTN 10-1 Traverse County needs a new county government building that would cost $10 million. The politicians feel that voters will not approve a municipal bond issue to fund the building because it would increase taxes. They opt to have a state bank

issue $10 million of tax-exempt securities to pay for the building construction. The county then will make yearly lease payments (of principal and interest) to repay the obligation. Unlike conventional municipal bonds, the lease payments are not binding obligations on the county and, therefore, require no voter approval.

Required

1. Do you think the actions of the politicians and the bankers in this situation are ethical?
2. In terms of risk, how do the tax-exempt securities used to pay for the building compare to a conventional municipal bond issued by Traverse County?

COMMUNICATING IN PRACTICE

P3

BTN 10-2 Your business associate mentions that she is considering investing in corporate bonds currently selling at a premium. She says that because the bonds are selling at a premium, they are highly valued and her investment will yield more than the going rate of return for the risk involved. Reply with a memorandum to confirm or correct your associate's interpretation of premium bonds.

TEAMWORK IN ACTION

P5

BTN 10-3 [B] Break into teams and complete the following requirements related to *effective interest* amortization for a premium bond.

1. Each team member is to independently prepare a blank table with proper headings for amortization of a bond premium. When all have finished, compare tables and ensure that all are in agreement.

Parts 2 and 3 require use of these facts: On January 1, 2021, McElroy issues $100,000, 9%, five-year bonds at 104.1. The market rate at issuance is 8%. McElroy pays interest semiannually on June 30 and December 31.

2. In rotation, *each* team member must explain how to complete *one* line of the bond amortization table, including all computations for his or her line. All members are to fill in their tables during this process. You need not finish the table; stop after all members have explained a line.
3. In rotation, *each* team member is to identify a separate column of the table and indicate what the final number in that column will be and explain the reasoning.
4. Reach a team consensus as to what the total bond interest expense on this bond issue will be if the bond is not retired before maturity.
5. As a team, prepare a list of similarities and differences between the amortization table just prepared and the amortization table if the bond had been issued at a discount.

Hint: Rotate teams to report on parts 4 and 5. Consider requiring entries for issuance and interest payments.

ENTREPRENEURIAL DECISION

A1

BTN 10-4 Brian, Joe, and Nate are the founders of **Airbnb**. Assume that the company currently has $250,000 in equity and is considering a $100,000 expansion to meet increased demand. The $100,000 expansion would yield $16,000 in additional annual income before interest expense. Assume that the business currently earns $40,000 annual income before interest expense of $10,000, yielding a return on equity of 12% ($30,000/$250,000). To fund the expansion, the company is considering the issuance of a 10-year, $100,000 note with annual interest payments (the principal due at the end of 10 years).

Required

1. Using return on equity as the decision criterion, show computations to support or reject the expansion if interest on the $100,000 note is (*a*) 10%, (*b*) 15%, (*c*) 16%, (*d*) 17%, and (*e*) 20%.
2. What general rule do the results in part 1 illustrate?

11 Corporate Reporting and Analysis

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Chapter Preview

COMMON STOCK

C1 Stock basics

P1 Stock issuance:

- Par value
- No-par value
- Stated value
- Noncash assets

NTK 11-1

DIVIDENDS

P2 Cash dividends

- Stock dividends
- Stock splits

NTK 11-2

PREFERRED STOCK

C2 Issuance

Dividend preferences

Rationale

NTK 11-3

TREASURY STOCK

P3 Purchasing treasury stock

Reissuing treasury stock

NTK 11-4

REPORTING AND ANALYSIS

C3 Retained earnings and equity

A1 EPS

PE ratio

Dividend yield

NTK 11-5

Learning Objectives

CONCEPTUAL

C1 Identify characteristics of corporations and their organization.

C2 Explain characteristics of, and distribute dividends between, common and preferred stock.

C3 Explain the items reported in retained earnings.

ANALYTICAL

A1 Analyze earnings per share, price-earnings ratio, and dividend yield.

PROCEDURAL

P1 Record the issuance of corporate stock.

P2 Record transactions involving cash dividends, stock dividends, and stock splits.

P3 Record purchases and sales of treasury stock.

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Golden Ticket

"Be fearless"**—Julia Hartz**

SAN FRANCISCO—Julia Hartz was 25 and tired of her job in television development. She convinced her fiancé Kevin and friend Renaud Visage to join her in starting a business. Julia created **Eventbrite** , a ticketing website that allows users to browse or create their own local events.

"We could reinvent the way people came together for live events," explains Julia. "We wanted to ticket everything from a 5-person yoga class to a 10-person cookery class to a fashion event."

Julia studied ways to finance her start-up. She could seek outside investors, but that would mean giving up equity ownership in Eventbrite. Instead, Kevin convinced Julia to bet on themselves and fund the business with savings. “I don’t know why I said yes,” recalls Julia, “but I did.”

After a terrific start, Julia wished to expand. This required more financing. Julie again decided to bet on her ownership team and seek equity financing. She took Eventbrite into an initial public offering (IPO). An IPO is when a company first offers its stock for sale to the public. Julia kept a large portion of equity in Eventbrite for herself.

Julia takes pride in Eventbrite being ranked among the best places to work. “Our goal was to empower,” proclaims Julia. “I’ve viewed everything I’ve done in the past five years through the lens of putting the people before the company.”

Richard Drew/AP Images

Sources: *Eventbrite website,* January 2021; *Inc.com* , January 2019 and January 2015; *Forbes* , March 2018; *Irish Times* , November 2014

CORPORATE FORM OF ORGANIZATION

C1

Identify characteristics of corporations and their organization.

A **corporation** is an entity that is separate from its owners and has many of the same rights as a person. Owners of corporations are called *stockholders* or *shareholders.* Corporations are separated into two types. A *privately held* (or *closely held*) corporation does not offer its stock for public sale and usually has few stockholders. A *publicly held* corporation offers its stock for public sale and can have thousands of stockholders. *Public sale* means selling and trading stock on an organized stock market such as the **NYSE** or **NASDAQ** .

Corporate Advantages

- **Separate legal entity:** A corporation has many of the same rights, duties, and responsibilities as a person. It takes actions through its agents, who are its officers and managers.
- **Limited liability:** Stockholders are not liable for corporate actions or debt.
- **Transferable ownership rights:** Transfer of shares from one stockholder to another has no direct effect on operations except when it causes a change in directors who oversee the corporation.
- **Continuous life:** A corporation's life is indefinite because it is not tied to the physical lives of its owners.
- **No mutual agency for stockholders:** Stockholders, who are not officers and managers, cannot bind the corporation to contracts—called *lack of mutual agency.*
- **Easier capital accumulation:** Buying stock is attractive to investors because of the advantages above, which helps corporations collect large sums of money.

Corporate Disadvantages

- **Government regulation:** A corporation must follow a state's incorporation laws. Proprietorships and partnerships avoid many

of these.

- **Corporate taxation:** Corporations pay many of the same page 424 taxes as proprietorships and partnerships plus *additional* taxes. The most burdensome are federal and state corporate income taxes that together can take 21% or more of pretax income. Also, corporate income is usually taxed a second time as part of stockholders' personal income when they receive cash dividends. This is called *double taxation.*

Corporate Organization and Management

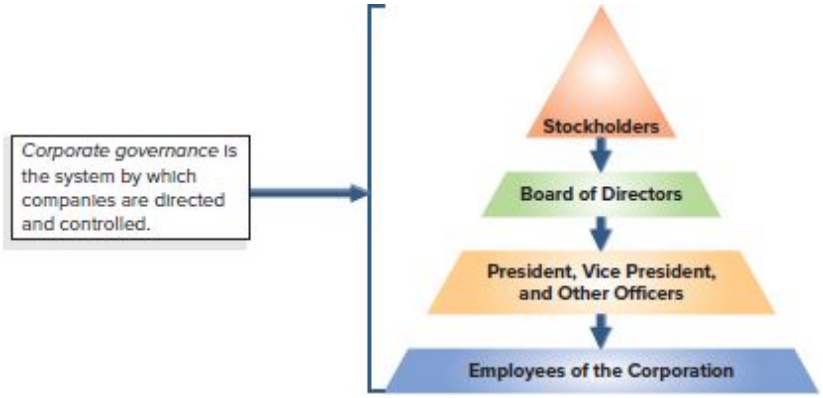
Incorporation A corporation is created by getting a charter from a state government. A charter application is signed by the prospective stockholders, called *incorporators* or *promoters* , and then filed with the state. When the application process is complete and fees paid, the charter is issued and the corporation is formed. Investors then purchase the corporation's stock, meet as stockholders, and elect a board of directors.

Organization Expenses **Organization expenses** (or *organization costs*) are the costs to start a corporation; they include legal fees, promoters' fees, and payments for a charter. The corporation records (debits) these costs to *Organization Expenses*. Organization costs are expensed as incurred.

Management Exhibit 11.1 shows the corporate structure. Stockholders control a corporation by electing a *board of directors,* or *directors*. A stockholder usually has one vote for each share of stock owned. The board of directors is responsible for overseeing corporate activities and is in charge of hiring and firing key executives who manage day-to-day operations. A corporation's chief executive officer (CEO) is often its president. Several vice presidents are commonly assigned to specific areas such as finance, production, and marketing.

EXHIBIT 11.1

Corporate Structure



A corporation usually holds a stockholder meeting at least once a year to elect directors. Stockholders who do not attend stockholders' meetings can give their voting rights to an agent by signing a **proxy** , a document that gives a designated agent the right to vote the stock.

Point: *Bylaws* are guidelines that govern the corporation.

Point: While rare, not all common stock has voting rights; **Google** 's C Class shares are nonvoting.

Corporate Stockholders

Rights of Stockholders Stockholders have *specific* rights under the corporation's charter and *general* rights under state law. Stockholders also have the right to receive timely financial reports. When a corporation has only one class of stock, it is called **common stock** . State laws vary, but common stockholders usually have the right to

- Vote at stockholders' meetings (or register proxy votes).
- Sell or dispose of their stock.
- Purchase their proportional share of any common stock later issued. This **preemptive right** protects stockholders' proportionate interest. For example, a stockholder who owns 25% of a corporation's stock has the first opportunity to buy 25% of any new stock issued.
- Receive the same dividend, if any, on each common share.

- Share in any assets remaining after creditors and preferred stockholders are paid if the corporation is liquidated. Each common share receives the same amount.

Stock Certificates and Transfer A corporation sometimes gives a *stock certificate* as proof of share ownership. Exhibit 11.2 shows a stock certificate issued by the **Green Bay Packers** , the only nonprofit, community-owned major professional team. A certificate shows the company name, stockholder name, number of shares, and other information. Issuance of paper certificates is becoming less common.

EXHIBIT 11.2

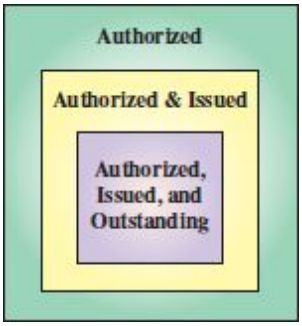
Stock Certificate

Courtesy of JJW Images

Registrar and Transfer Agents If a corporation's stock page 425 is traded on a stock exchange, the corporation has a registrar and a transfer agent. A *registrar* keeps a list of stockholders for stockholder meetings and dividend payments. A *transfer agent* assists with purchases and sales of shares. Registrars and transfer agents are usually large banks or trust companies.

Corporate Stock

Subcategories of Authorized Stock



Innermost box would show a decline in shares outstanding if a company buys back its stock.

Capital stock is shares issued to obtain capital (owner financing).

Authorized Stock **Authorized stock** is the number of shares that a corporation's charter allows it to sell. The number of authorized shares usually exceeds the number of shares issued (and outstanding) by a large amount. *Outstanding stock* is stock held by stockholders. No journal entry is required for stock authorization. A corporation discloses the number of shares authorized in the equity section of its balance sheet or notes. **Apple** 's balance sheet reports 12.6 billion common shares authorized.

Selling (Issuing) Stock A corporation can sell stock directly or indirectly. To *sell directly,* it offers its stock to buyers. This type of sale is common with privately held corporations. To *sell indirectly,* a corporation pays a brokerage house (investment banker) to sell its stock. Some brokerage houses *underwrite* stock, meaning they buy the stock from the corporation and resell it to investors.

Market Value of Stock **Market value per share** is the price at which a stock is bought and sold. Expected future income, dividends, growth, and economic factors influence market value. The current market value of previously issued shares does not impact the issuing corporation's stockholders' equity.

Classes of Stock When all authorized shares have the same rights and characteristics, the stock is called *common stock*. A corporation sometimes issues more than one class of stock, including preferred stock and different classes of common stock.

Amazon has authorized two types of stock: common and preferred. To date, Amazon has only issued common stock.

Par Value Stock **Par value stock** is stock that has a **par value** , which is an amount assigned per share by the corporation in its charter. **Coca-Cola** 's common stock has a par value of $0.25. Other commonly assigned par values are $5, $1, and $0.01. There is no restriction on assigned par value. In many states, the par value of a stock establishes **minimum legal capital** , which is the least amount that the buyers of stock must contribute to the corporation or be at risk to pay creditors at a future date.

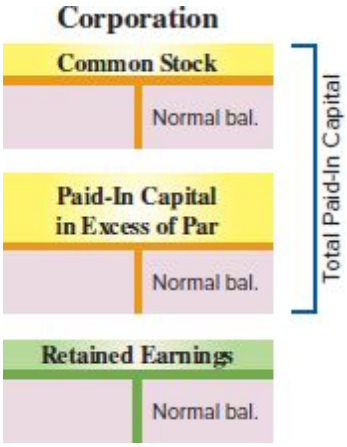
No-Par Value Stock **No-par value stock** , or *no-par stock,* is stock *not* assigned an amount per share by the corporate charter. There is no minimum legal capital with no-par stock.

Stated Value Stock **Stated value stock** is no-par stock that has an assigned "stated" value per share. Stated value per share is the minimum legal capital per share in this case. Stated value, par value, and no-par value do *not* affect the stock's market value.

Stockholders' Equity A corporation's equity is called **stockholders' equity** , or *shareholders' equity*. Exhibit 11.3 shows stockholders' equity consists of (1) paid-in (or contributed) capital and (2) retained earnings. **Paid-in capital** , or *contributed capital,* is the total amount of cash and other assets the corporation receives from its stockholders in exchange for its stock. **Retained earnings** is the cumulative net income (and loss) not distributed as dividends to its stockholders.

EXHIBIT 11.3

Equity Composition



Decision Insight

52 Weeks Hi	52 Weeks Lo	Sym	Div	Yld %	PE	Hi	Lo	Close	Net Chg
42.70	32.55	T	2.00	5.24	7.95	38.31	37.77	37.81	+0.53

Price is Right The AT&T stock quote is interpreted as (left to right): **Hi,** highest price in past 52 weeks; **Lo,** lowest price in past 52 weeks; **Sym,** company exchange symbol; **Div,** dividends paid per share in past year; **Yld %,** dividend divided by closing price; **PE,** stock price per share divided by earnings per share; **Hi,** highest price for the day; **Lo,** lowest price for the day; **Close,** closing price for the day; **Net Chg,** change in closing price from prior day. ■

COMMON STOCK

P1

Record the issuance of corporate stock.

Issuance of stock affects paid-in (contributed) capital accounts; retained earnings is unaffected.

Issuing Par Value Stock

Par value stock can be issued at par, at a premium (above par), or at a discount (below par). Cash or other assets are received in exchange for stock.

Issuing Par Value Stock at Par When common stock is issued at par value, we record both the asset(s) received and the par value stock issued. The entry to record Dillon's issuance of 30,000 shares of $10 par value stock for $300,000 cash on June 5 follows.

Assets	=	Liabilities	+	Equity
+300,000				+300,000

June 5	Cash	300,000	
	Common Stock, $10 Par Value*		300,000
	Issued 30,000 shares of $10 par value stock at par.		

*$10 par value × 30,000 shares

Issuing Par Value Stock at a Premium A **premium on stock** occurs when a corporation sells its stock for more than par (or stated) value. If Dillon issues its $10 par value common stock at $12 per share, its stock is sold at a $2 per share premium. The premium, called **paid-in capital in excess of par value** , is reported as part of equity; it is not revenue and is not listed on the income statement. The entry to issue 30,000 shares of $10 par value stock for $12 per share follows.

Assets	=	Liabilities	+	Equity
+360,000				+300,000
				+60,000

June 5	Cash	360,000	
	Common Stock, $10 Par Value*		300,000
	Paid-In Capital in Excess of Par Value, Common Stock†		60,000
	Sold and issued 30,000 shares of $10 par value common stock at $12 per share.		

*$10 par value × 30,000 shares †[$12 issue price – $10 par value] × 30,000 shares

Point: Paid-In Capital in Excess of Par Value is also called *Additional Paid-In Capital.*

The Paid-In Capital in Excess of Par Value account is added to the par value of the stock in the equity section of the balance sheet, as shown in Exhibit 11.4.

EXHIBIT 11.4

Stockholders' Equity for Stock Issued at a Premium

Common stock—$10 par value; 50,000 shares authorized; 30,000 shares issued and outstanding	$300,000
Paid-in capital in excess of par value, common stock	60,000
Retained earnings*	65,000
Total stockholders' equity	$425,000

*This is the company's first year of operations, with income of $65,000 and no dividends.

Issuing Par Value Stock at a Discount A **discount on stock** occurs when it is sold for less than par value. Most states prohibit this. Details are in advanced courses.

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Issuing No-Par Value Stock

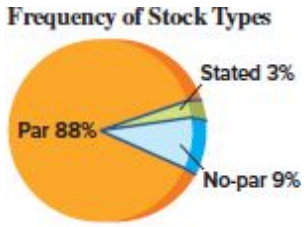
When no-par stock is issued, the amount the corporation receives is credited to a no-par stock account. The entry to issue 1,000 shares of no-par common stock for $40 cash per share follows.

Oct. 20	Cash	40,000	
	Common Stock, No-Par Value*		40,000
	Issued 1,000 shares of no-par stock at $40 per share.		

*$40 issue price × 1,000 no-par shares

Assets	=	Liabilities	+	Equity
+40,000				+40,000

Issuing Stated Value Stock



Assets	=	Liabilities	+	Equity
+50,000				+40,000
				+10,000

When stated value stock is issued, the stated value is credited to the stock account. Any amount above the stated value is credited to Paid-In Capital in Excess of Stated Value, which is reported in stockholders' equity. The entry to issue 1,000 shares of no-par common stock having a stated value of $40 per share in return for $50 cash per share follows.

Oct. 20	Cash	50,000	
	Common Stock, $40 Stated Value*		40,000
	Paid-In Capital in Excess of Stated Value, Common Stock†		10,000
	Issued 1,000 shares of $40 per share stated value stock at $50 per share.		

*$40 stated value × 1,000 shares †[$50 issue price − $40 stated value] × 1,000 shares

Assets	=	Liabilities	+	Equity
+50,000				+40,000
				+10,000

Issuing Stock for Noncash Assets

A corporation can receive assets other than cash in exchange for its stock. (It also can take liabilities such as a mortgage on property received.) The corporation records the assets received at their market values as of the transaction date. The stock given in exchange is recorded at its par (or stated) value with any excess recorded in the Paid-In Capital in Excess of Par (or Stated) Value account. If no-par stock is issued, the stock is recorded at the assets' market value. The entry to record receipt of land valued at $105,000 in return for 4,000 shares of $20 par value common stock is

Point: Stock issued for noncash assets is recorded at the market value of either the stock or the noncash assets, whichever is more determinable.

June 10	Land	105,000	
	Common Stock, $20 Par Value*		80,000
	Paid-In Capital in Excess of Par Value, Common Stock†		25,000
	Exchanged 4,000 shares of $20 par value stock for land.		

*$20 par value × 4,000 shares †$105,000 asset value − $80,000 par value

A corporation sometimes gives shares of its stock to promoters in exchange for their work in organizing the corporation, which it records as organization expenses. The entry to issue 600 shares of $15 par value common stock for $12,000 of organizing work is

June 5	Organization Expenses	12,000	
	Common Stock, $15 Par Value*		9,000
	Paid-In Capital in Excess of Par Value, Common Stock†		3,000
	Gave promoters 600 shares of $15 par value common stock in exchange for their services.		

*$15 par value × 600 shares †$12,000 services value − $9,000 par value

Assets	=	Liabilities	+	Equity
				−12,000
				+9,000
				+3,000

Analytics Insight

Artificial Unintelligence **Dow Jones** newswire mistakenly published a bogus news story about **Google** acquiring **Apple** for $9 billion. Informed investors were not fooled, as Apple's market value was over $700 billion. However, bots designed to purchase stock of any

company rumored of being acquired instantaneously purchased millions of shares of Apple. This event revealed how bots are increasingly impacting our financial markets. ■

NEED-TO-KNOW 11-1

Recording Stock Issuance

P1

Prepare journal entries to record the following four separate issuances of stock.

1. Issued 80 shares of $5 par value common stock for $700 cash.
2. Issued 40 shares of no-par common stock to promoters in exchange for their efforts, estimated to be worth $800. The stock has a $1 per share stated value.
3. Issued 40 shares of no-par common stock in exchange for land estimated to be worth $800. The stock has no stated value.
4. Issued 20 shares of no-par common stock with a stated value of $30 per share for $900 cash.

Solution

1.

Cash	700	
Common Stock, $5 Par Value*		400
Paid-In Capital in Excess of Par Value, Common Stock†		300
Issued common stock for cash.		

*80 shares × $5 per share = $400 †$700 − $400 = $300

2.

Organization Expenses	800	
Common Stock, $1 Stated Value		40
Paid-In Capital in Excess of Stated Value, Common Stock		760
Issued stock to promoters.		

3.

Land	800	
Common Stock, No-Par Value		800
Issued stock in exchange for land.		

4.

Cash	900	
Common Stock, $30 Stated Value*		600
Paid-In Capital in Excess of Stated Value, Common Stock†		300
Issued stated value stock for cash.		

*20 shares × $30 stated value = $600 †$900 − $600 = $300

Do More: QS 11-2, QS 11-3, QS 11-4, QS 11-5, E 11-3, E 11-4, E 11-5, E 11-6

DIVIDENDS

P2

Record transactions involving cash dividends, stock dividends, and stock splits.

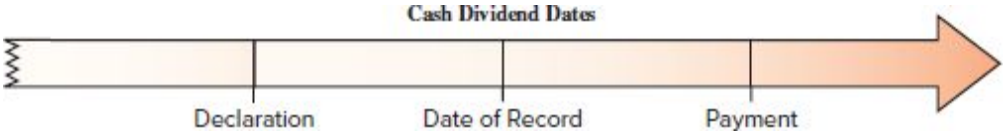
Cash Dividends

Cash dividends are distributions of cash to stockholders. The board of directors decides whether to pay cash dividends. The directors may decide to keep the cash to invest in the corporation's growth, to meet emergencies, or to pay off debt. **Amazon** has never declared a cash divided. Alternatively, many corporations, such as **Microsoft** , pay cash dividends to their stockholders at regular dates.

Accounting for Cash Dividends Exhibit 11.5 shows cash dividends have three important dates: declaration, record, and payment. **Date of declaration** is the date the directors vote to declare and pay a dividend. This creates a legal liability of the corporation to its stockholders. **Date of record** is the date for identifying those stockholders to receive dividends. Persons who own stock on the date of record receive dividends. **Date of payment** is the date when the corporation makes payment.

EXHIBIT 11.5

Cash Dividend Dates



Date of Declaration The entry for a January 9 *declaration* page 429 of a $1 per share cash dividend by Z-Tech with 5,000 outstanding shares follows. Common Dividend Payable is a current liability.

Date of Declaration—Cash Dividend

Jan. 9	Retained Earnings	5,000	
	Common Dividend Payable*		5,000
	Declared $1 per common share cash dividend.†		

Assets = Liabilities + Equity
+5,000 −5,000

*$1 per share declared dividend × 5,000 outstanding shares

†To aid learning and show how dividends impact retained earnings, we **debit** (reduce) **Retained Earnings** on the date of declaration in this chapter and all assignments. We normally debit Dividends; then, at period-end, Dividends is closed to Retained Earnings. The effect is the same: Retained earnings is decreased from dividends.

Date of Record The *date of record* for this dividend is January 22. **No journal entry is made on the date of record.**

Date of Payment The February 1 *date of payment* entry removes the liability and reduces cash.

Date of Payment—Cash Dividend

Feb. 1	Common Dividend Payable	5,000	
	Cash		5,000
	Paid $1 per common share cash dividend.		

Assets = Liabilities + Equity
−5,000 −5,000

Stock Dividends

A **stock dividend** , declared by a corporation's directors, is a distribution of additional shares of its own stock to its stockholders without any payment in return. Stock dividends and cash dividends are different. A stock dividend does not reduce assets and equity but instead transfers a portion of equity from retained earnings to contributed capital.

Reasons for Stock Dividends Stock dividends are given for at least two reasons. First, stock dividends keep the market price of the

stock affordable. When a corporation has a stock dividend, it increases the number of outstanding shares, which lowers the per share stock price. Second, a stock dividend shows management's confidence that the company is doing well and will continue to do well.

Accounting for Stock Dividends A stock dividend transfers part of retained earnings to contributed capital accounts, called *capitalizing* retained earnings. Accounting for a stock dividend depends on whether it is a small or large stock dividend.

- A **small stock dividend** is a distribution of 25% or less of previously outstanding shares. It is recorded by capitalizing retained earnings for an amount equal to the **market value** of the shares to be distributed.
- A **large stock dividend** is a distribution of more than 25% of previously outstanding shares. It is recorded by capitalizing retained earnings for the **par or stated value** of the stock.

Hint: Five Steps to Record Stock Dividends

Step 1: Identify number of shares outstanding.
Step 2: Identify the stock dividend percentage.
Step 3: Compute number of new shares (step 1 × step 2).
Step 4: Value new shares at market (small stock dividend) *or* par (large stock dividend).
Step 5: Determine debit (reduction) to Retained Earnings (step 3 × step 4).

The equity section of Quest's balance sheet just *before* its declaration of a stock dividend on December 31 follows.

Stockholders' Equity	Before Dividend
Common stock—$10 par value, 15,000 shares authorized, 10,000 shares issued and outstanding	$100,000
Paid-in capital in excess of par value, common stock	8,000
Retained earnings	35,000
Total stockholders' equity	$143,000

Small Stock Dividend Assume that Quest declares a 10% stock dividend on December 31. This stock dividend of 1,000 shares, computed as 10% of its 10,000 outstanding shares, is to be distributed on January 20 to the stockholders of record on January

15. Because the market price of Quest's stock on December 31 is $15 per share, this small stock dividend declaration is recorded as follows.

Assets = Liabilities + Equity
−15,000
+10,000
+ 5,000

Date of Declaration—Small Stock Dividend

Dec. 31	Retained Earnings	15,000	
	Common Stock Dividend Distributable*		10,000
	Paid-In Capital in Excess of Par Value, Common Stock†		5,000
	Declared a 10% stock dividend of 1,000 shares.		

*10% dividend × 10,000 outstanding shares × $10 par value
†10% dividend × 10,000 outstanding shares × [$15 market price − $10 par value]

The balance sheet changes in three ways when a small stock dividend is declared. page 430

- Common Stock Dividend Distributable, an equity account that exists only until the shares are distributed, increases by $10,000. Unlike a cash dividend, a stock dividend is never a liability because it never reduces assets.
- Paid-In Capital in Excess of Par increases by $5,000, which is the amount in excess of par or stated value.
- Retained Earnings decreases by $15,000, reflecting the increase in both common stock and paid-in capital in excess of par.

The impacts on stockholders' equity from the 10% stock dividend are in Exhibit 11.6. Total equity is not affected by the stock dividend.

EXHIBIT 11.6

Stockholders' Equity before, during, and after a Stock Dividend

Stockholders' Equity	Before Dividend	Date of Declaration	Date of Payment	After Dividend
Common stock—$10 par value, 15,000 shares authorized, 10,000 shares issued and outstanding	$100,000	$	$+10,000	$110,000
Common stock dividend distributable—1,000 shares	0	+10,000	−10,000	0
Paid-in capital in excess of par value, common stock	8,000	+ 5,000		13,000
Retained earnings	35,000	−15,000		20,000
Total stockholders' equity	$143,000	$ 0	$ 0	$143,000

No entry is made on the date of record for a stock dividend. However, on January 20, the date of payment, Quest distributes the new shares and records the entry below (numbers from the

"Payment" column of Exhibit 11.6. The combined effect of these entries is to transfer (or capitalize) $15,000 of retained earnings to paid-in capital accounts (see far right column of Exhibit 11.6. A stock dividend has no effect on the ownership percentage of stockholders.

Assets = Liabilities + Equity
−10,000
+10,000

Date of Payment—Small Stock Dividend

Jan. 20	Common Stock Dividend Distributable	10,000	
	Common Stock, $10 Par Value		10,000
	Record issuance of common stock dividend.		

Large Stock Dividend A corporation capitalizes retained earnings equal to the par or stated value of the newly issued shares for a large stock dividend. Suppose Quest declares a stock dividend of 30% instead of 10% on December 31. Because this dividend is more than 25%, it is a large stock dividend. This means the par value of the 3,000 (10,000 outstanding shares × 30%) dividend shares is capitalized at the date of declaration with the entry below. This transaction decreases retained earnings and increases contributed capital by $30,000.

Assets = Liabilities + Equity
−30,000
+30,000

Date of Declaration—Large Stock Dividend

Dec. 31	Retained Earnings	30,000	
	Common Stock Dividend Distributable*		30,000
	Declared a 30% stock dividend of 3,000 shares.		

*30% dividend × 10,000 outstanding shares × $10 par value

On the date of dividend payment, the company makes the following entry. page 431

Date of Payment—Large Stock Dividend

Jan. 15	Common Stock Dividend Distributable	30,000	
	Common Stock, $10 Par Value		30,000

Assets = Liabilities + Equity
−30,000
+30,000

Stock Splits

A **stock split** is the distribution of additional shares to stockholders according to their percent ownership. When a stock split occurs, the corporation "calls in" its outstanding shares and issues more than one new share in exchange for each old share. Splits can be done in any ratio. **Apple** did a 7-for-1 stock split. Stock splits reduce the par

or stated value per share. The reasons for stock splits are similar to those for stock dividends, including affordability and management confidence.

Assume CTI has 100,000 outstanding shares of $20 par value common stock with a current market value of $88 per share. A 2-for-1 stock split cuts par value in half as it replaces 100,000 shares of $20 par value stock with 200,000 shares of $10 par value stock. The split does not affect any equity amounts reported on the balance sheet or any individual stockholder's percent ownership. *No journal entry is made*. The only effect on the accounts is a change in the stock account description. After the split, CTI changes its stock account title to *Common Stock, $10 Par Value*. The stock's description on the balance sheet also changes to reflect the additional issued and outstanding shares and the new par value.

After 2-for-1 stock split

Financial Statement Effects of Dividends and Splits

	Cash Dividend	Small Stock Dividend	Large Stock Dividend	Stock Split
Total assets	Decrease	No change	No change	No change
Total liabilities	No change	No change	No change	No change
Total equity	Decrease	No change	No change	No change
Common stock	No change	Increase	Increase	No change
Paid-in capital in excess of par	No change	Increase	No change	No change
Retained earnings	Decrease	Decrease	Decrease	No change

Decision Maker

Entrepreneur A company you co-founded and own stock in announces a 50% stock dividend. Has the value of your stock

investment increased, decreased, or remained the same? Would it make a difference if it was a 3-for-2 stock split executed in the form of a dividend? ■ *Answer:* The stock dividend does not affect the value of your investment or give you income. However, a stock dividend can reveal positive expectations and also improve a stock's marketability by making it more affordable. The same answer applies to the 3-for-2 stock split.

NEED-TO-KNOW 11-2

Recording Dividends

P2

A company began the current year with the following balances in its stockholders' equity accounts.

Common stock—$10 par, 500 shares authorized, 200 shares issued and outstanding	$2,000
Paid-in capital in excess of par, common stock	1,000
Retained earnings	5,000
Total	$8,000

All outstanding common stock was issued for $15 per share when the company was created. Prepare journal entries to account for the following transactions during the current year.

Jan. 10 The board declared a $0.10 cash dividend per share to shareholders of record on January 28.

Feb. 15 Paid the cash dividend declared on January 10.

Mar. 31 Declared a 20% stock dividend when the market value of the stock was $18 per share.

May 1 Distributed the stock dividend declared on March 31.

Dec. 1 Declared a 40% stock dividend when the market value of the stock was $25 per share.

Dec. 31 Distributed the stock dividend declared on December 1.

Solution

Jan. 10	Retained Earnings[a]	20	
	Common Dividend Payable		20
	Declared a $0.10 per share cash dividend.		
	[a]200 outstanding shares × $0.10		
Feb. 15	Common Dividend Payable	20	
	Cash		20
	Paid $0.10 per share cash dividend.		
Mar. 31	Retained Earnings[b]	720	
	Common Stock Dividend Distributable[c]		400
	Paid-In Capital in Excess of Par Value, Common Stock		320
	Declared a small stock dividend of 20%, or 40 shares; market value is $18 per share.		
	[b]200 outstanding shares × 20% × $18 market		
	[c]40 new shares × $10 par		

May 1	Common Stock Dividend Distributable	400	
	Common Stock		400
	Distributed 40 shares of common stock.		
Dec. 1	Retained Earnings[d]	960	
	Common Stock Dividend Distributable		960
	Declared a large stock dividend of 40%, or 96 shares (40% × [200 + 40]); par value is $10 per share.		
	[d]240 outstanding shares × 40% × $10 par		
Dec. 31	Common Stock Dividend Distributable	960	
	Common Stock		960
	Distributed 96 shares of common stock.		

Do More: QS 11-6, QS 11-7, QS 11-8, QS 11-9, QS 11-10, E 11-8, E 11-9, E 11-10

PREFERRED STOCK

C2

Explain characteristics of, and distribute dividends between, common and preferred stock.

Preferred stock has special rights that give it priority over common stock in one or more areas. Special rights usually include a preference for receiving dividends and assets in liquidation. Preferred stock has the rights of common stock unless the corporate charter excludes them. A common exclusion is the right to vote.

Issuance of Preferred Stock

Preferred stock is recorded in its own separate capital accounts. If Dillon issues 50 shares of $100 par value preferred stock for $6,000 cash, the entry is

Assets	=	Liabilities	+	Equity
+6,000				+5,000
				+1,000

July 1	Cash	6,000	
	Preferred Stock, $100 Par Value*		5,000
	Paid-In Capital in Excess of Par Value, Preferred Stock†		1,000
	Issued preferred stock for cash.		

*$100 par value × 50 shares †$6,000 cash − [$100 par value × 50 shares]

The equity section of the year-end balance sheet for Dillon, including preferred stock, is in Exhibit 11.7. (The entry for issuing no-par preferred stock is similar to issuing no-par common stock. Also, the entry for issuing preferred stock for noncash assets is similar to that for common stock.)

EXHIBIT 11.7

Stockholders' Equity with Preferred Stock

Stockholders' Equity	
Preferred stock—$100 par value; 1,000 shares authorized; 50 shares issued and outstanding	$ 5,000
Paid-in capital in excess of par value, preferred stock	1,000
Common stock—$10 par value; 50,000 shares authorized; 30,000 shares issued and outstanding	300,000
Retained earnings	65,000
Total stockholders' equity	$371,000

Dividend Preference of Preferred Stock

Preferred stock has preference for dividends, meaning that preferred stockholders are paid their dividends before any dividends are paid to common stockholders. Dividend preference does not mean that

preferred stockholders get more dividends than common stockholders. A preference for dividends does *not* guarantee dividends. If the directors do not declare a dividend, neither the preferred nor the common stockholders get dividends.

Cumulative or Noncumulative Most preferred stock has a cumulative dividend right. page 433

- **Cumulative preferred stock** gives its owners a right to be paid both the current and all prior periods' unpaid dividends before any dividend is paid to common stockholders. When preferred stock is cumulative and the directors either do not declare a dividend to preferred stockholders or declare one that does not cover the total amount of cumulative dividend, the unpaid dividend amount is called **dividend in arrears** . Accumulation of dividends in arrears on cumulative preferred stock does not guarantee they will be paid. Dividend in arrears is not a liability and is usually reported in notes to financial statements.
- **Noncumulative preferred stock** does not have rights to prior periods' unpaid dividends if they were not declared in those prior periods. It does have rights to current-period dividends.

To show the difference between cumulative and noncumulative preferred stock, assume that a corporation's outstanding stock includes

- 1,000 shares of $100 par, 9% preferred stock—with *potential* dividends of $9,000 per year; computed as 1,000 shares × $100 par × 9%.
- 4,000 shares of $50 par value common stock.

During Year 1, the first year of operations, the directors declare cash dividends of $5,000. In Year 2, they declare cash dividends of $42,000. Exhibit 11.8 shows the allocation of dividends. If the preferred stock is cumulative, the $4,000 in arrears is paid in Year 2 before any other dividends are paid—shown in green below. With noncumulative preferred, the preferred stockholders never receive the $4,000 skipped in Year 1.

EXHIBIT 11.8

Cumulative vs. Noncumulative

Preferred Stock Is Cumulative	Preferred	Common
Year 1	$ 5,000	$ 0
Year 2		
Step 1: Dividend in arrears	$ 4,000	
Step 2: Current year's preferred dividend	9,000	
Step 3: Remainder to common		$29,000
Totals for Year 2	$13,000	$29,000
Totals for Year 1 & Year 2	$18,000	$29,000

Preferred Stock Is Noncumulative	Preferred	Common
Year 1	$ 5,000	$ 0
Year 2		
Step 1: Current year's preferred dividend	$ 9,000	
Step 2: Remainder to common		$33,000
Totals for Year 1 & Year 2	$14,000	$33,000

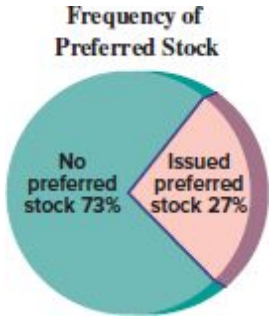
Reasons for Issuing Preferred Stock

Preferred stock is issued for several reasons. One reason is to raise money without giving up control. We can, for example, raise money by issuing preferred stock with no voting rights.

A second reason is to boost the return earned by common stockholders. Suppose a corporation's organizers expect to earn an annual after-tax income of $22,000 on an investment of $200,000. If they sell $200,000 worth of common stock, the $22,000 income produces an 11% return ($22,000⁄$200,000). If they issue $150,000 of 8% preferred stock to outsiders and $50,000 of common stock to themselves, their own return increases to 20% ([$22,000 − $12,000]⁄$50,000).

Use of preferred stock to increase return to common stockholders is an example of **financial leverage** . As a general rule, when the dividend rate on preferred stock is less than the rate the corporation earns on its assets, issuing preferred stock increases the rate earned by common stockholders.

Other reasons for issuing preferred stock include its appeal to some investors who believe that the corporation's common stock is too risky or that the expected return on common stock is too low.



Decision Maker

Concert Organizer Assume that you alter your business strategy from organizing concerts targeted at under 1,000 people to those targeted at between 5,000 and 20,000 people. You also incorporate because of an increased risk of lawsuits and a desire to issue stock for financing. It is important that you control the company for decisions on whom to schedule. What types of stock do you offer? ■

Answer: You have two options: (1) different classes of common stock or (2) common and preferred stock. You want to own stock that has all or a majority of voting power. The other class of stock, whether common or preferred, would have limited or no voting rights. In this way, you keep control and are able to raise money.

NEED-TO-KNOW 11-3

Allocating Cash Dividends

C2

A company's outstanding stock consists of 80 shares of *noncumulative* 5% preferred stock with a $5 par value and also 200 shares of common stock with a $1 par value. During its first three years of operation, the corporation declared and paid the following total cash dividends.

Year 1 total cash dividends . . .	$15	Year 2 total cash dividends. . . .	$5	Year 3 total cash dividends. . . .	$200

Part 1. Determine the amount of dividends paid each year to each of the two classes of stockholders: preferred and common.

Part 2. Determine the amount of dividends paid each year to each of the two classes of stockholders assuming that the preferred stock is *cumulative.*

Solution—Part 1

	Noncumulative Preferred	Common
Year 1 ($15 paid)		
Preferred*	$15	
Common—remainder		$ 0
Total for the year	$15	$ 0
Year 2 ($5 paid)		
Preferred*	$ 5	
Common—remainder		$ 0
Total for the year	$ 5	$ 0
Year 3 ($200 paid)		
Preferred*	$20	
Common—remainder		$180
Total for the year	$20	$180
Total for three years	$40	$180

*Holders of noncumulative preferred stock are entitled to no more than $20 of dividends in any one year (5% × $5 × 80 shares).

Solution—Part 2

	Cumulative Preferred	Common
Year 1 ($15 paid)		
Preferred*	$15	
Common—remainder		$ 0
Total for the year	$15	$ 0
(Note: $5 in preferred dividends in arrears; [$20 × 1 yr] − $15 paid.)		
Year 2 ($5 paid)		
Preferred—arrears from Year 1	$ 5	
Preferred*	0	
Common—remainder		$ 0
Total for the year	$ 5	$ 0
(Note: $20 in preferred dividends in arrears; [$20 × 2 yrs] − $15 paid − $5 paid.)		
Year 3 ($200 paid)		
Preferred—arrears from Year 2	$20	
Preferred*	20	
Common—remainder		$160
Total for the year	$40	$160
(Note: $0 in preferred dividends in arrears; [$20 × 3 yrs] − $15 paid − $5 paid − $40 paid.)		
Total for three years	$60	$160

*Holders of cumulative preferred stock are entitled to $20 of dividends declared in any year (5% × $5 × 80 shares) plus any dividends in arrears.

Do More: QS 11-11, QS 11-12, QS 11-13, QS 11-14, E 11-11, E 11-12

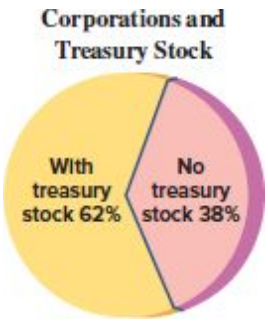
TREASURY STOCK

P3

Record purchases and sales of treasury stock.

Corporations buy back their own stock, called a *stock buyback,* for several reasons: (1) to use their shares to acquire another corporation, (2) to avoid a takeover of the company, (3) to give them to employees as compensation, and (4) to maintain a strong market for their stock or to show confidence in the current price.

A corporation's reacquired shares are called **treasury stock** , which is similar to unissued stock in several ways: (1) neither treasury stock nor unissued stock is an asset, (2) neither receives cash dividends or stock dividends, and (3) neither has voting rights.



Purchasing Treasury Stock

Purchasing treasury stock reduces the corporation's assets and equity by equal amounts. We describe the *cost method* of accounting for treasury stock, which is the most popular method. The *par value* method is explained in advanced courses. The simple balance sheet below shows Cyber Inc.'s account balances ***before*** any treasury stock purchase (Cyber has no liabilities).

Assets		Stockholders' Equity	
Cash	$ 30,000	Common stock—$10 par; 10,000 shares authorized, issued, and outstanding	$100,000
Other assets	95,000	Retained earnings	25,000
Total assets	$125,000	Total stockholders' equity	$125,000

Cyber then purchases 1,000 of its own shares for $11,500. The entry below reduces equity with a debit to the **Treasury Stock account, which is a contra equity account.**

May 1	Treasury Stock, Common*	11,500	
	Cash		11,500
	Purchased 1,000 treasury shares at $11.50 per share.		

*$11.50 cost per share × 1,000 shares

Assets = Liabilities + Equity
−11,500 −11,500

The balance sheet below shows account balances ***after*** this transaction. The treasury stock purchase reduces Cyber's cash, total assets, and total equity by $11,500 but does not reduce Common Stock or Retained Earnings. The stock description says that 1,000 issued shares are in treasury, leaving only 9,000 shares still outstanding. The description for retained earnings says that it is partly restricted.

Assets		Stockholders' Equity	
Cash	$ 18,500	Common stock—$10 par; 10,000 shares authorized and issued; 1,000 shares in treasury	$100,000
Other assets	95,000	Retained earnings, $11,500 restricted by treasury stock purchase	25,000
		Less cost of treasury stock	(11,500)
Total assets	$113,500	Total stockholders' equity	$113,500

Reissuing Treasury Stock

Treasury stock can be reissued by selling it at cost, above cost, or below cost.

Selling Treasury Stock at Cost If treasury stock is reissued at cost, the entry is the reverse of the one made to record the purchase.

If on May 21 Cyber reissues 100 of the treasury shares purchased on May 1 at the same $11.50 per share cost, the entry is

May 21	Cash	1,150	
	Treasury Stock, Common*		1,150
	Received $11.50 per share for 100 treasury shares costing $11.50 per share.		

*$11.50 cost per share × 100 shares

Assets = Liabilities + Equity
+1,150 +1,150

Selling Treasury Stock *above* Cost If treasury stock is sold for more than cost, the amount received in excess of cost is credited to the Paid-In Capital, Treasury Stock account. This account is reported as a separate item in the stockholders' equity section. No "gain" is ever reported from the sale of treasury stock. If Cyber receives $12 cash per share on June 3 for 400 treasury shares costing $11.50 per share, the entry is

June 3	Cash	4,800	
	Treasury Stock, Common*		4,600
	Paid-In Capital, Treasury Stock†		**200**
	Received $12 per share for 400 treasury shares costing $11.50 per share.		

*$11.50 cost per share × 400 shares †[$12 issue price − $11.50 cost per share] × 400 shares

Assets = Liabilities + Equity
+4,800 +4,600
+200

Selling Treasury Stock below Cost When treasury stock page 436 is sold below cost, the Paid-In Capital, Treasury Stock account is debited for the excess of the cost over the selling price but not to exceed the credit balance. When the credit balance is eliminated, any remaining difference between the cost and selling price is debited to Retained Earnings. If Cyber sells its remaining 500 shares of treasury stock at $11.20 per share on July 10, equity is reduced by $150 (500 shares × $0.30 per share excess of cost over selling price), as shown below. This entry reduces the credit balance in the Paid-In Capital account created on June 3. A company never reports a "loss" from the sale of treasury stock.

Point: Paid-In Capital, Treasury Stock account can have a zero or credit balance but never a debit balance.

Assets = Liabilities + Equity
+5,600 −150
+5,750

July 10	Cash	5, 600	
	Paid-In Capital, Treasury Stock*	**150**	
	Treasury Stock, Common‡		5,750
	Received $11.20 per share for 500 treasury shares costing $11.50 per share.		

*[$11.20 issue price − $11.50 cost per share] × 500 shares ‡$11.50 cost per share × 500 shares

NEED-TO-KNOW 11-4

Recording Treasury Stock

P3

A company began the current year with the following balances in its stockholders' equity accounts.

Common stock—$10 par, 500 shares authorized, 200 shares issued and outstanding	$2,000
Paid-in capital in excess of par, common stock	1,000
Retained earnings	5,000
Total	$8,000

All outstanding common stock was issued for $15 per share when the company was created. Prepare journal entries to account for the following transactions during the current year.

July 1 Purchased 30 shares of treasury stock at $20 per share.

Sep. 1 Sold 20 treasury shares at $26 cash per share.

Dec. 1 Sold the remaining 10 shares of treasury stock at $9 cash per share.

Do More: QS 11-15, QS 11-16, QS 11-17, E 11-13

Solution

July 1	Treasury Stock, Common[a]	600	
	Cash		600
	Purchased 30 common shares at $20 per share.		
	[a]30 shares × $20 cost		
Sep. 1	Cash[b]	520	
	Treasury Stock, Common[c]		400
	Paid-In Capital, Treasury Stock		120
	Sold 20 treasury shares at $26 per share.		
	[b]20 shares × $26 reissue price		
	[c]20 shares × $20 cost		

Dec. 1	Cash[d]	90	
	Paid-In Capital, Treasury Stock	110	
	Treasury Stock, Common[e]		200
	Sold 10 treasury shares at $9 per share.		
	[d]10 shares × $9 reissue price		
	[e]10 shares × $20 cost		

Treasury Stock, Common

July 1	600		
		Sep. 1	400
		Dec. 1	200
End. bal.	0		

Paid-In Capital, Treasury Stock

		Sep. 1	120
Dec. 1	110		
		End. bal.	10

REPORTING OF EQUITY

C3

Explain the items reported in retained earnings.

Statement of Retained Earnings

Retained earnings generally consists of cumulative net income minus any net losses and dividends declared. Retained earnings does *not* mean that a certain amount of cash or other assets is available to pay stockholders. For example, **Abercrombie & Fitch** has $2,313,745 thousand in retained earnings, but only $671,267 thousand in cash.

Restrictions and Appropriations **Restricted retained earnings** are statutory and contractual restrictions. A common *statutory* (or *legal*) *restriction* is to limit treasury stock purchases to the amount of retained earnings. A common *contractual restriction* is a loan agreement that restricts paying dividends beyond a specified amount of retained earnings. Restrictions are usually described in the notes. **Appropriated retained earnings** is a voluntary transfer of amounts from the Retained Earnings account to the Appropriated Retained Earnings account to inform users of special activities that require funds.

Prior Period Adjustments **Prior period adjustments** are corrections of material errors in past financial statements. These errors include math errors, improper accounting, and missed facts. Prior period adjustments are reported in the *statement of retained earnings* , net of any income tax effects. Prior period adjustments result in changing the beginning balance of retained earnings for *events occurring prior to the earliest period reported in the current set of financial statements.* Assume that ComUS made an error two years ago in a journal entry for the purchase of land by incorrectly debiting an expense account. When this is discovered in the current year, the statement of retained earnings includes a prior period adjustment, as shown in Exhibit 11.9.

EXHIBIT 11.9

Prior Period Adjustment

Statement of Retained Earnings	
Retained earnings, Dec. 31, 2020, as previously reported	$4,700
Prior period adjustment	
Cost of land incorrectly expensed (net of $60 of income tax benefit)	**200**
Retained earnings, Dec. 31, 2020, as adjusted	4,900
Plus net income	800
Less cash dividends declared	(300)
Retained earnings, Dec. 31, 2021	$5,400

Many items reported in financial statements are based on estimates. Future events reveal that some estimates were inaccurate even when based on the best data available at the time. These

inaccuracies are *not* considered errors and are *not* reported as prior period adjustments. Instead, they are **changes in accounting estimates** and are accounted for in current and future periods.

Statement of Stockholders' Equity

A **statement of stockholders' equity** lists the beginning and ending balances of key equity accounts and describes the changes that occur during the period. Exhibit 11.10 is an example.

EXHIBIT 11.10

Statement of Stockholders' Equity

MAC INC.
Statement of Stockholders' Equity
For Year Ended December 31

	Common Stock	Paid-In Capital in Excess of Par	Retained Earnings	Treasury Stock	Total Equity
Beginning balance	$ 2,000	$ 20,000	$ 50,000		$ 72,000
Net income			30,000		30,000
Issuance of common stock	1,000	10,000			11,000
Purchase of treasury stock				$ (15,000)	(15,000)
Cash dividends			(8,000)		(8,000)
Ending balance	$3,000	$30,000	$72,000	$(15,000)	$90,000

Decision Insight

Dream of Doing Sources for start-up money include (1) "angel" investors such as family, friends, or anyone who believes in a company; (2) employees, investors, and even suppliers; and (3) venture capitalists (investors) who have a record of entrepreneurial success. ■

Ulkas/iStock/Getty Images

Decision Analysis Earnings per Share, Price-Earnings Ratio, and Dividend Yield

A1

Analyze earnings per share, price-earnings ratio, and dividend yield.

Earnings per Share

Earnings per share , also called *EPS* or *net income per share,* is the income earned per share of outstanding common stock. The **basic earnings per share** formula is in Exhibit 11.11. When a company has no preferred stock, then preferred dividends are zero. The weighted-average common shares outstanding is measured over the income reporting period; its computation is explained in advanced courses.

EXHIBIT 11.11

Basic Earnings per Share

$$\text{Basic earnings per share} = \frac{\text{Net income} - \text{Preferred dividends}}{\text{Weighted-average common shares outstanding}}$$

Point: Diluted EPS is covered in advanced courses.

Assume Quantum Co. earns $40,000 net income in the current year and declares dividends of $7,500 on its noncumulative preferred stock. (If preferred stock is *non* cumulative, preferred dividends are only subtracted if dividends are *declared* in that same period. If preferred stock is cumulative, preferred dividends are subtracted whether declared or not.) Quantum has 5,000 weighted-average common shares outstanding during the year. Its basic EPS is $6.50, computed as ($40,000 − $7,500)/5,000 shares.

Price-Earnings Ratio

A comparison of a company's EPS and its market value per share reveals market expectations. This comparison is made using a **price-earnings (orPE) ratio,** also called *price earnings* or *price to earnings*. Some analysts interpret this ratio as what price the market is willing to pay for a company's current earnings stream. Price-earnings ratios differ across companies that have similar earnings because of either higher or lower expectations of future earnings. The price-earnings ratio is in Exhibit 11.12.

EXHIBIT 11.12

Price-Earnings Ratio

$$\text{Price-earnings ratio} = \frac{\text{Market value (price) per share}}{\text{Earnings per share}}$$

Price-earnings ratios for **Visa** and **Mastercard** follow. Both companies have relatively high PE ratios, showing that investors have high expectations of future earnings for both. Based on Mastercard's higher PE versus Visa, one interpretation is the market is willing to pay slightly more for Mastercard's current earnings stream.

Company	Market Value per Share	Earnings per Share	P/E Ratio
Visa.....	$187.90	$5.32	35.3
Mastercard.....	$298.59	$7.98	37.4

Dividend Yield

Investors buy company stock to get a return from cash dividends, stock price increases, or both. Stocks that pay large dividends on a regular basis, called *income stocks,* are attractive to investors who want recurring cash flows from their investments. In contrast, *growth stocks* pay little or no cash dividends but are attractive to investors because of expected stock price increases. One way to help identify whether a stock is an income stock or a growth stock is to analyze its dividend yield. **Dividend yield** is defined in Exhibit 11.13.

EXHIBIT 11.13

Dividend Yield

$$\text{Dividend yield} = \frac{\text{Annual cash dividends per share}}{\text{Market value per share}}$$

The table below shows recent dividend and stock price data for **Amazon** and **Altria Group** to compute dividend yield. Dividend yield is zero for Amazon, implying it is a growth stock. An investor in Amazon expects increases in stock prices and eventual cash from the sale of stock. Altria has a dividend yield of 7.0%, implying it is an income stock for which dividends are important in assessing its value.

Company	Cash Dividends per Share	Market Value per Share	Dividend Yield
Amazon	$0.00	$1,901	0.0%
Altria Group	$3.36	$ 48	7.0%

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Decision Maker

Money Manager You plan to invest in one of two companies identified as having identical future prospects. One has a PE of 19 and the other a PE of 25. Which do you invest in? ■ *Answer:* Because one company requires a payment of $19 for each $1 of earnings and the other requires $25, you prefer the stock with a PE of 19; it is a better deal given identical prospects.

NEED-TO-KNOW 11-5

COMPREHENSIVE

Issuance of, and Dividends to, Common and Preferred Stock

Barton Corporation began operations on January 1. The following transactions relating to stockholders' equity occurred in the first two years of the company's operations.

Year 1

Jan. 1 Authorized the issuance of 2 million shares of $5 par value common stock and 100,000 shares of $100 par value, 10% cumulative preferred stock.

2 Issued 200,000 shares of common stock for $12 cash per share.

3 Issued 100,000 shares of common stock in exchange for a building valued at $820,000 and merchandise inventory valued at $380,000.

4 Paid $10,000 cash to the company's founders for organization activities.

5 Issued 12,000 shares of preferred stock for $110 cash per share.

Year 2

June 4 Issued 100,000 shares of common stock for $15 cash per share.

Required

1. Prepare journal entries to record these transactions.
2. Prepare a table showing dividend allocations for both years assuming Barton declares the following cash dividends: Year 1, $50,000, and Year 2, $300,000.
3. Prepare the January 2 entry for issuance of 200,000 shares of common stock for $12 cash per share if

   a. Common stock is no-par stock without a stated value.

   b. Common stock is no-par stock with a stated value of $10 per share.

SOLUTION

1. Journal entries.

Year 1	Jan. 2	Cash	2,400,000	
		Common Stock, $5 Par Value		1,000,000
		Paid-In Capital in Excess of Par Value, Common Stock		1,400,000
		Issued 200,000 shares of common stock.		
	Jan. 3	Building	820,000	
		Merchandise Inventory	380,000	
		Common Stock, $5 Par Value		500,000
		Paid-In Capital in Excess of Par Value, Common Stock		700,000
		Issued 100,000 shares of common stock.		
	Jan. 4	Organization Expenses	10,000	
		Cash		10,000
		Paid founders for organization costs.		
	Jan. 5	Cash	1,320,000	
		Preferred Stock, $100 Par Value		1,200,000
		Paid-In Capital in Excess of Par Value, Preferred Stock		120,000
		Issued 12,000 shares of preferred stock.		
Year 2	June 4	Cash	1,500,000	
		Common Stock, $5 Par Value		500,000
		Paid-In Capital in Excess of Par Value, Common Stock		1,000,000
		Issued 100,000 shares of common stock.		

2. Dividend allocation table.

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	Common	Preferred
Year 1 ($50,000)		
Preferred—current year (12,000 shares × $10 = $120,000)	$ 0	$ 50,000
Common—remainder (300,000 shares outstanding)	0	0
Total for the year	$ 0	$ 50,000
Year 2 ($300,000)		
Preferred—dividend in arrears ($120,000 – $50,000)	$ 0	$ 70,000
Preferred—current year	0	120,000
Common—remainder (400,000 shares outstanding)	110,000	0
Total for the year	$110,000	$190,000

3. Journal entries.

a. No-par stock without a stated value.

Jan. 2	Cash	2,400,000	
	Common Stock, No-Par Value		2,400,000
	Issued 200,000 shares of no-par stock at $12 per share.		

b. No-par stock with a stated value.

Jan. 2	Cash	2,400,000	
	Common Stock, $10 Stated Value		2,000,000
	Paid-In Capital in Excess of Stated Value, Common Stock		400,000
	Issued 200,000 shares of $10 stated value common stock at $12 per share.		

Summary: Cheat Sheet

COMMON STOCK

Corporate advantages: Separate legal entity, limited liability, transferable ownership, continuous life, no mutual agency for shareholders, and easier capital accumulation.

Corporate disadvantages: More government regulation and corporate income taxes (double taxation).

Issuing common stock at par value:

Cash	300,000	
Common Stock, $10 Par Value		300,000

Issuing common stock above par: When market value > par value.

Cash	360,000	
Common Stock, $10 Par Value		300,000
Paid-In Capital in Excess of Par Value, Common Stock		60,000

Issuing no-par common stock:

Cash	40,000	
Common Stock, No-Par Value		40,000

Issuing stated value common stock: When market value > stated value.

Cash	50,000	
Common Stock, $40 Stated Value		40,000
Paid-In Capital in Excess of Stated Value, Common Stock		10,000

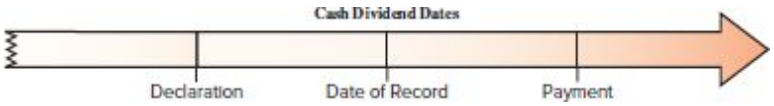
Issuing common stock for noncash assets:

Land	105,000	
Common Stock, $20 Par Value		80,000
Paid-In Capital in Excess of Par Value, Common Stock		25,000

Issuing common stock in exchange for services: page 441

Organization Expenses	12,000	
Common Stock, $15 Par Value		9,000
Paid-In Capital in Excess of Par Value, Common Stock		3,000

DIVIDENDS



Cash dividend—Date of declaration:

Retained Earnings	5,000	
Common Dividend Payable		5,000

Cash dividend—Date of record: No entry is made.

Cash dividend—Date of payment:

Common Dividend Payable	5,000	
Cash		5,000

Small stock dividend: Distribution of 25% or less of previously outstanding shares. Retained earnings is capitalized for an amount equal to *market value* of shares.

Small stock dividend—Date of declaration:

Retained Earnings	15,000	
Common Stock Dividend Distributable		10,000
Paid-In Capital in Excess of Par Value, Common Stock		5,000

Small stock dividend—Date of payment:

Common Stock Dividend Distributable	10,000	
Common Stock, $10 Par Value		10,000

Large stock dividend: Distribution of more than 25% of previously outstanding shares. Retained earnings is capitalized for an amount equal to *par* or *stated value* of shares.

Large stock dividend—Date of declaration:

Retained Earnings	30,000	
Common Stock Dividend Distributable		30,000

Large stock dividend—Date of payment:

Common Stock Dividend Distributable	30,000	
Common Stock, $10 Par Value		30,000

Stock split: Distribution of additional shares to stockholders according to percent ownership. It does not affect any equity balances. No journal entry is made. Only effect is a change in stock account description.

PREFERRED STOCK

Issuing preferred stock: When market value > par value.

Cash	6,000	
Preferred Stock, $100 Par Value		5,000
Paid-In Capital in Excess of Par Value, Preferred Stock		1,000

Cumulative preferred stock: Preferred stockholders are paid both current and all prior periods' unpaid dividends before any dividend is paid to common stockholders.

Dividend in arrears: Unpaid dividends due to cumulative preferred stock.

Noncumulative preferred stock: Does not have rights to prior periods' unpaid dividends, only current-period dividends.

TREASURY STOCK

Treasury stock: Shares reacquired by the company. It reduces equity and does not receive dividends.

Treasury Stock, Common	11,500	
Cash		11,500

Treasury stock in stockholders' equity:

Stockholders' Equity	
Common stock—$10 par; 10,000 shares authorized and issued; 1,000 shares in treasury	$100,000
Retained earnings, $11,500 restricted by treasury stock purchase	25,000
Less cost of treasury stock	**(11,500)**
Total stockholders' equity	$113,500

Selling treasury stock at cost:

Cash	1,150	
Treasury Stock, Common		1,150

Selling treasury stock above cost: When sale price > reacquisition price.

Cash	4,800	
Treasury Stock, Common		4,600
Paid-In Capital, Treasury Stock		200

Selling treasury stock below cost: When sale price < reacquisition price.

Cash	5,600	
Paid-In Capital, Treasury Stock	150	
Treasury Stock, Common		5,750

REPORTING AND ANALYSIS

Prior period adjustments: Corrections of material errors in past financial statements. Errors include math errors, improper accounting, and missed facts. Prior period adjustments are reported in statement of retained earnings, net of any income tax effects.

Changes in accounting estimates: Revised estimates that were inaccurate even when based on the best data available at the time. These are not errors and are *not* reported as prior period adjustments. Instead, they are accounted for in current and future periods.

Statement of Retained Earnings	
Retained earnings, Dec. 31, 2020, as previously reported	$4,700
Prior period adjustment	
Cost of land incorrectly expensed (net of $60 of income tax benefit)	**200**
Retained earnings, Dec. 31, 2020, as adjusted	4,900
Plus net income	800
Less cash dividends declared	(300)
Retained earnings, Dec. 31, 2021	$5,400

Key Terms

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Appropriated retained earnings (437)

Authorized stock (425)

Basic earnings per share (438)

Capital stock (425)

Cash dividend (428)

Change in an accounting estimate (437)

Common stock (424)

Restricted retained earnings (437)

Retained earnings (425)

Small stock dividend (429)

Stated value stock (425)

Statement of stockholders' equity (437)

Stock dividend (429)

Stock split (431)

Stockholders' equity (425)

Treasury stock (434)

Multiple Choice Quiz

1. The entry to record issuance of 6,000 shares of $5 par value common stock for $8 cash per share includes a
   - **a.** Debit to Paid-In Capital in Excess of Par Value for $18,000.
   - **b.** Credit to Common Stock for $48,000.
   - **c.** Credit to Paid-In Capital in Excess of Par Value for $30,000.
   - **d.** Credit to Cash for $48,000.
   - **e.** Credit to Common Stock for $30,000.
2. On January 1, Bee Gees Inc. had a retained earnings balance of $900. During the year, Bee Gees reported net income of $600 and paid cash dividends of $1,000. Calculate the retained earnings balance at its December 31 year-end.
   - **a.** $(400).
   - **b.** $2,500.
   - **c.** $700.
   - **d.** $(700).
   - **e.** $500.

3. A company reports net income of $75,000. Its weighted-average common shares outstanding is 19,000. It has no other stock outstanding. Its earnings per share is

   a. $4.69.

   b. $3.95.

   c. $3.75.

   d. $2.08.

   e. $4.41.

4. A company paid cash dividends of $0.81 per share. Its earnings per share is $6.95 and its market price per share is $45.00. Its dividend yield is

   a. 1.8%.

   b. 11.7%.

   c. 15.4%.

   d. 55.6%.

   e. 8.6%.

5. A company's shares have a market value of $85 per share. Its net income is $3,500,000, and its weighted-average common shares outstanding is 700,000. Its price-earnings ratio is

   a. 5.9.

   b. 425.0.

   c. 17.0.

   d. 10.4.

   e. 41.2.

ANSWERS TO MULTIPLE CHOICE QUIZ

1. e; Entry to record this stock issuance follows.

Cash (6,000 × $8)	48,000	
Common Stock (6,000 × $5)		30,000
Paid-In Capital in Excess of Par Value, Common Stock		18,000

2. e; $900 + $600 − $1,000 = $500
3. b; $75,000 / 19,000 shares = $3.95 per share
4. a; $0.81 / $45.00 = 1.8%
5. c; Earnings per share = $3,500,000/700,000 shares = $5 per share; PE ratio = $85 / $5 = 17.0

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

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QUICK STUDY

QS 11-1

Characteristics of corporations

C1

Identify which of the following statements are true for the corporate form of organization.

1. Ownership rights cannot be easily transferred.
2. Owners have unlimited liability for corporate debts.
3. Capital is more easily accumulated than with most other forms of organization.
4. Corporate income that is distributed to shareholders is usually taxed twice.
5. It is a separate legal entity.
6. It has a limited life.

7. Owners are not agents of the corporation.

QS 11-2

Issuance of common stock

P1

Prepare the journal entry to record Zende Company's issuance of 75,000 shares of $5 par value common stock assuming the shares sell for

a. $5 cash per share.

b. $6 cash per share.

QS 11-3

Issuance of par and stated value common stock **P1**

Prepare the journal entry to record Jevonte Company's issuance of 36,000 shares of its common stock assuming the shares have a

a. $2 par value and sell for $18 cash per share.

b. $2 stated value and sell for $18 cash per share.

QS 11-4

Issuance of no-par common stock **P1**

Prepare the journal entry to record Autumn Company's issuance of 63,000 shares of no-par value common stock assuming the shares

a. Sell for $29 cash per share.

b. Are exchanged for land valued at $1,827,000.

QS 11-5

Issuance of common stock

P1

Prepare the issuer's journal entry for each of the following separate transactions.

a. On March 1, Atlantic Co. issues 42,500 shares of $4 par value common stock for $297,500 cash.

b. On April 1, OP Co. issues no-par value common stock for $70,000 cash.

c. On April 6, MPG issues 2,000 shares of $25 par value common stock for $45,000 of inventory, $145,000 of machinery, and acceptance of a $94,000 note payable.

QS 11-6

Accounting for cash dividends

P2

Prepare journal entries to record the following transactions for Emerson Corporation.

July 15 Declared a cash dividend payable to common stockholders of $165,000.

Aug. 15 Date of record is August 15 for the cash dividend declared on July 15.

Aug. 31 Paid the dividend declared on July 15.

QS 11-7

Accounting for small stock dividends **P2**

Epic Inc. has 10,000 shares of $2 par value common stock outstanding. Epic declares a 5% stock dividend on July 1 when the stock's market value is $8 per share. The stock dividend is distributed on July 20. Prepare journal entries for (*a*) declaration and (*b*) distribution of the stock dividend.

QS 11-8

Reporting a small stock dividend

P2

The stockholders' equity section of Jun Co.'s balance sheet as of April 1 follows. On April 2, Jun declares and distributes a 10% stock dividend. The stock's per share market value on April 2 is $20 (prior to the dividend). Prepare the stockholders' equity section immediately after the stock dividend is distributed.

Common stock—$5 par value, 375,000 shares authorized, 200,000 shares issued and outstanding	$1,000,000
Paid-in capital in excess of par value, common stock	600,000
Retained earnings	833,000
Total stockholders' equity	$2,433,000

QS 11-9

Accounting for large stock dividends **P2**

Belkin Inc. has 100,000 shares of $3 par value common stock outstanding. Belkin declares a 40% stock dividend on March 2 when the stock's market value is $72 per share. Prepare the journal entry for declaration of the stock dividend.

QS 11-10

Dividend features **P2**

For each of the following statements regarding dividends, indicate whether it is true or false.

1. Cash and stock dividends reduce retained earnings.
2. Dividends payable is recorded at the time a cash dividend is declared.
3. The date of record is the date a cash dividend is paid to stockholders.
4. Stock dividends help keep the market price of stock affordable.

QS 11-11

Preferred stock issuance and dividends **C2**

1. Prepare the journal entry to record Tamas Company's issuance of 5,000 shares of $100 par value, 7% cumulative preferred stock for $102 cash per share.
2. Assuming the facts in part 1, if Tamas declares a year-end cash dividend, what is the amount of dividend paid to preferred shareholders? (Assume no dividends in arrears.)

QS 11-12

Dividend allocation between classes of shareholders **C2**

Stockholders' equity of Ernst Company consists of 80,000 shares of $5 par value, 8% cumulative preferred stock and 250,000 shares of $1 par value common stock. Both classes of stock have been outstanding since the company's inception. Ernst did not declare any dividends in the prior year, but it now declares and pays a $110,000 cash dividend at the current year-end. Determine the amount distributed to each class of stockholders for this two-year-old company.

QS 11-13

Dividends on noncumulative preferred stock **C2**

Green Planet Corp. has 5,000 shares of noncumulative 10% preferred stock with a $2 par value and 17,000 shares of common stock with a $0.01 par value. During its first two years of operation, Green Planet declared and paid the following total cash dividends. Compute the dividends paid *each year* to each of the two classes of stockholders: preferred and common.

Year 1 total cash dividends	$800	Year 2 total cash dividends	$1,700

QS 11-14

Dividends on cumulative preferred stock **C2**

Use the information in QS 11-13 to compute the dividends paid *each year* to each of the two classes of stockholders assuming that the preferred stock is *cumulative* .

QS 11-15

Financial statement impact of stock issuances and treasury stock **P1** **P3**

For each transaction, determine the impact—increase, decrease, or no effect—on total assets, total liabilities, and total equity.

	Total Assets	Total Liabilities	Total Equity
Issued $12,000 of common stock for cash			
Issued $23,000 of common stock for land			
Purchased treasury stock for $1,000 cash			
Issued $5,000 of preferred stock for cash			

QS 11-16

Determining shares outstanding **P3**

Anthem Co. has 100,000 shares authorized, 90,000 shares issued, and 20,000 shares of treasury stock. Determine the number of shares outstanding.

QS 11-17

Purchase and sale of treasury stock **P3**

On May 3, Zirbal Corporation purchased 4,000 shares of its own stock for $36,000 cash. On November 4, Zirbal reissued 850 shares of this treasury stock for $8,500. Prepare the May 3 and November 4 journal entries to record Zirbal's purchase and reissuance of treasury stock.

QS 11-18

Impacts of stock issuances, dividends, splits, and treasury transactions

P2 P3

Identify whether stockholders' equity would increase, decrease, or have no effect as a result of each separate transaction listed below.

1. A stock dividend equal to 30% of the previously outstanding shares is declared.
2. New shares of common stock are issued for cash.
3. Treasury shares of common stock are purchased.
4. Cash dividends are paid to shareholders.

QS 11-19

Preparing stockholders' equity section

C2 P1 P3

On December 31, Westworld Inc. has the following equity accounts and balances. Prepare the stockholders' equity section of Westworld's balance sheet.

Preferred Stock	$7,000	Retained Earnings	$45,000
Common Stock	1,000	Paid-In Capital in Excess of Par Value, Common Stock	39,000
Treasury Stock	2,000	Paid-In Capital in Excess of Par Value, Preferred Stock	3,000

QS 11-20

Accounting for changes in estimates; error adjustments

C3

For each situation, identify whether it is treated as a prior period adjustment or change in accounting estimate.

1. A review of notes payable discovers that three years ago the company reported the entire amount of a payment (principal and

interest) on an installment note payable as interest expense. This mistake had a material effect on net income in that year.

2. After using an expected useful life of seven years and no salvage value to depreciate its office equipment over the preceding three years, the company decided early this year that the equipment will last only two more years.

3. Upon reviewing customer contracts, the company realizes it mistakenly reported $150,000 in revenue instead of the actual amount earned of $15,000. This mistake occurred two years ago and had a material effect on financial statements.

QS 11-21

Determining retained earnings balance **C3**

On January 1, Payson Inc. had a retained earnings balance of $20,000. During the year, Payson reported net income of $30,000 and paid cash dividends of $17,000. Calculate the retained earnings balance at its December 31 year-end.

QS 11-22

Basic earnings per share **A1**

Murray Company reports net income of $770,000 for the year. It has no preferred stock, and its weighted-average common shares outstanding is 280,000 shares. Compute its basic earnings per share.

QS 11-23

Basic earnings per share **A1**

Epic Company earned net income of $900,000 this year. There were 400,000 weighted-average common shares outstanding, and preferred shareholders received a $20,000 cash dividend. Compute Epic Company's basic earnings per share.

QS 11-24

Price-earnings ratio

A1

Compute Topp Company's price-earnings ratio if its common stock has a market value of $20.54 per share and its EPS is $3.95. Its key competitor, Lower Deck, has a PE ratio of 9.5. For which company does the market have higher expectations of future performance?

QS 11-25

Dividend yield **A1**

Foxburo Company expects to pay a $2.34 per share cash dividend this year on its common stock. The current market value of Foxburo stock is $32.50 per share. Compute the expected dividend yield. If a competitor with a dividend yield of 3% is considered an income stock, would we classify Foxburo as a growth or an income stock?

EXERCISES

Exercise 11-1

Characteristics of corporations

C1

Match each corporate characteristic 1 through 8 with the description that best relates to it.

1. Owner authority and control
2. Ease of formation
3. Transferability of ownership
4. Ability to raise large capital amounts
5. Duration of life
6. Owner liability

7. Legal status

8. Tax status of income

a. Requires government approval

b. Corporate income is taxed

c. Separate legal entity

d. Readily transferred

e. One vote per share

f. High ability

g. Unlimited

h. Limited

Exercise 11-2

Rights of stockholders

C1

Indicate which activities of Stockton Corporation violated the rights of a stockholder who owned one share of common stock.

1. Did not allow the stockholder to sell the stock to her brother.

2. Rejected the stockholder's request to be put in charge of its retail store.

3. Paid the stockholder a smaller dividend per share than another common stockholder.

4. Rejected the stockholder's request to vote via proxy because she was home sick.

5. In liquidation, paid the common shareholder after all creditors were already paid.

Exercise 11-3

Accounting for par, stated, and no-par stock issuances

P1

Rodriguez Corporation issues 19,000 shares of its common stock for $152,000 cash on February 20. Prepare journal entries to record this event under each of the following separate situations.

1. The stock has a $2 par value.
2. The stock has neither par nor stated value.
3. The stock has a $5 stated value.

Exercise 11-4

Recording stock issuances

P1

Prepare journal entries to record each of the following four separate issuances of stock.

1. A corporation issued 4,000 shares of $5 par value common stock for $35,000 cash.
2. A corporation issued 2,000 shares of no-par common stock to its promoters in exchange for their efforts, estimated to be worth $40,000. The stock has a $1 per share stated value.
3. A corporation issued 2,000 shares of no-par common stock to its promoters in exchange for their efforts, estimated to be worth $40,000. The stock has no stated value.
4. A corporation issued 1,000 shares of $50 par value preferred stock for $60,000 cash.

Exercise 11-5

Analyzing impact of stock issuance transactions **P1**

Analyze each transaction from Exercise 11-4 by showing its effect on the accounting equation— specifically, identify the accounts and amounts (including + or −) for each transaction.

Exercise 11-6

Stock issuance for noncash assets **P1**

Sudoku Company issues 7,000 shares of $7 par value common stock in exchange for land and a building. The land is valued at $45,000 and the building at $85,000. Prepare the journal entry to record issuance of the stock in exchange for the land and building.

Exercise 11-7

Stock issuance for noncash assets **P2**

For each dividend and stock split issued, determine the impact—increase, decrease, or no effect—on total assets, total liabilities, and total equity.

	Total Assets	Total Liabilities	Total Equity
$5,000 cash dividend			
7% stock dividend			
40% stock dividend			
7-for-1 stock split			

Exercise 11-8

Large stock dividend

P2

On June 30, Sharper Corporation's stockholders' equity section of its balance sheet appears as follows before any stock dividend or split. Sharper declares and immediately distributes a 50% stock dividend. After the distribution is made, (1) prepare the updated stockholders' equity section and (2) compute the number of shares outstanding.

Common stock—$10 par value, 50,000 shares issued and outstanding	$ 500,000
Paid-in capital in excess of par value, common stock	200,000
Retained earnings	660,000
Total stockholders' equity	$1,360,000

Exercise 11-9

Stock split **P2**

Refer to the information in Exercise 11-8. Assume that instead of distributing a stock dividend, Sharper did a 3-for-1 stock split. After the split, (1) prepare the updated stockholders' equity section and (2) compute the number of shares outstanding. Hint: A 3-for-1 split means that each old share is replaced with 3 new shares.

Exercise 11-10

Small stock dividend

P2

The stockholders' equity section of TVX Company on February 4 follows.

Common stock—$10 par value, 150,000 shares authorized, 60,000 shares issued and outstanding. . . .	$ 600,000
Paid-in capital in excess of par value, common stock	425,000
Retained earnings.	550,000
Total stockholders' equity	$1,575,000

On February 5, the directors declare a 20% stock dividend distributable on February 28 to the February 15 stockholders of record. The stock's market value is $40 per share on February 5 before the stock dividend.

1. Prepare entries to record both the dividend declaration and its distribution.
2. Prepare the stockholders' equity section after the stock dividend is distributed. (Assume no other changes to equity.)

Exercise 11-11

Dividends on common and noncumulative preferred stock

C2

York's outstanding stock consists of 80,000 shares of *noncumulative* 7.5% preferred stock with a $5 par value and also 200,000 shares of common stock with a $1 par value. During its first four years of operation, the corporation declared and paid the following total cash dividends. Determine the amount of dividends paid each year to each of the two classes of stockholders: preferred and common. Also compute the total dividends paid to each class for the four years combined.

Year 1 total cash dividends	$20,000	Year 3 total cash dividends	$200,000
Year 2 total cash dividends	28,000	Year 4 total cash dividends	350,000

Check 4-year total paid to preferred, $108,000

Exercise 11-12

Dividends on common and cumulative preferred **C2**

Use the data in Exercise 11-11 to determine the amount of dividends paid each year to each of the two classes of stockholders assuming that the preferred stock is *cumulative*. Also determine the total dividends paid to each class for the four years combined.

Exercise 11-13

Recording and reporting treasury stock transactions

P3

On October 10, the stockholders' equity section of Sherman Systems appears as follows.

Common stock—$10 par value, 72,000 shares authorized, issued, and outstanding	$ 720,000
Paid-in capital in excess of par value, common stock	216,000
Retained earnings	864,000
Total stockholders' equity	$1,800,000

1. Prepare journal entries to record the following transactions for Sherman Systems.

a. Purchased 5,000 shares of its own common stock at $25 per share on October 11.

b. Sold 1,000 treasury shares on November 1 for $31 cash per share.

c. Sold all remaining treasury shares on November 25 for $24 cash per share.

2. Prepare the stockholders' equity section after the October 11 treasury stock purchase.

Exercise 11-14

Preparing stockholders' equity section

C2 C3 P1 P3

In Draco Corporation's first year of business, the following transactions affected its equity accounts. Prepare the stockholders' equity section of Draco's balance sheet as of December 31.

- Issued 4,000 shares of $2 par value common stock for $18. It authorized 20,000 shares.
- Issued 1,000 shares of 12%, $10 par value preferred stock for $23. It authorized 3,000 shares.
- Reacquired 200 shares of common stock for $30 each.
- Retained earnings is impacted by reported net income of $50,000 and cash dividends of $15,000.

Exercise 11-15

Preparing a classified balance sheet

C2 C3 P1 P3

Prepare a classified balance sheet for Tucson Co. for the year ended December 31 using the following data.

Common stock	$ 1,000	Notes payable (due in 5 years)	$10,000
Cash	20,000	Preferred stock	8,000
Land	25,000	Salaries payable	5,000
Retained earnings	7,000	Accounts payable	4,000
Accounts receivable	3,000	Paid-in capital in excess of par value, common stock	17,000
Treasury stock	6,000	Paid-in capital in excess of par value, preferred stock	2,000

Exercise 11-16

Determining retained earnings balance

C3

Tuscan Inc. had a retained earnings balance of $60,000 at December 31 of the *prior year*. In the current year, Tuscan reported the following results. Calculate the retained earnings balance at December 31 of the *current year* .

- Reported net income of $100,000.
- Cash dividends of $33,000 declared and paid.
- Tuscan discovered this year that it made a math error three years ago; to correct for this, $12,000 (net of tax) must be added to the current year's beginning retained earnings balance.
- Revised an estimate of a machine's salvage value this year. Depreciation increased by $1,000 per year.

Exercise 11-17

Preparing a statement of retained earnings

C3

Prepare a statement of retained earnings for Tidal Co. for the *current year* ended December 31 using the following data.

Cash dividends declared and paid in current year	$ 8,000	Net income in current year	$33,000
Retained earnings at December 31, *prior year*	60,000		

Exercise 11-18

Preparing a statement of retained earnings with prior period adjustment

C3

The following information is from Amos Company for the current year ended December 31. Prepare a statement of retained earnings for Amos Company for the current year.

- Retained earnings at December 31 of the *prior year* (before discovery of an error) was $1,375,000.
- Amos discovered this year that it forgot to record depreciation expense of $55,500 (net of tax benefit) two years ago.
- Cash dividends declared and paid in the current year were $43,000.
- Reported $126,000 of net income in the current year.

Exercise 11-19

Preparing a statement of stockholders' equity

C3

Prepare a statement of stockholders' equity for Hulu Inc. for the year ended December 31 using the following data.

- Beginning balances of $300 for Common Stock, $9,700 for Paid-In Capital in Excess of Par, and $20,000 for Retained Earnings.
- Reported net income of $40,000.
- Issued common stock, which increased common stock by $100 and increased the Paid-In Capital in Excess of Par by $2,900.
- Purchased $6,000 of treasury stock.
- Declared and paid $4,000 of cash dividends.

Exercise 11-20

Computing earnings per share

A1

Ecker Company reports $2,700,000 of net income and declares $388,020 of cash dividends on its preferred stock for the year. At year-end, the company had 678,000 weighted-average shares of common stock.

1. What amount of net income is available to common stockholders?
2. What is the company's basic EPS?

Check (2) $3.41

Exercise 11-21

Analyzing earnings per share

A1

Kelley Company reports $960,000 of net income and declares $120,000 of cash dividends on its preferred stock for the year. At year-end, the company had 400,000 weighted-average shares of common stock.

1. What is the company's basic EPS? Round your answer to the nearest whole cent.
2. In the prior year, Kelley had a basic EPS of $1.90. Did Kelly improve its EPS in the current year?

Exercise 11-22

Price-earnings ratio computation and interpretation

A1

Compute the price-earnings ratio for each of these four separate companies. For which of these four companies does the market have the lowest expectation of future performance?

	A	B	C
1	Company	Earnings per Share	Market Value per Share
2	Hilton	$12.00	$176.40
3	SPG	10.00	96.00
4	Hyatt	7.50	93.75
5	Accor	50.00	250.00

Exercise 11-23

Dividend yield computation and interpretation

A1

Compute the dividend yield for each of these four separate companies. Which company's stock would probably *not* be classified as an income stock?

	A	B	C
1	Company	Annual Cash Dividend per Share	Market Value per Share
2	Etihad	$16.06	$220.00
3	United	13.86	132.00
4	Lingus	3.96	72.00
5	Allied	0.48	80.00

Exercise 11-24

Cash dividends, treasury stock, and statement of retained earnings

C3 P2 P3

Alex Corporation reports the following components of stockholders' equity at December 31 of the *prior year* .

Common stock—$25 par value, 50,000 shares authorized, 30,000 shares issued and outstanding	$ 750,000
Paid-in capital in excess of par value, common stock	50,000
Retained earnings	340,000
Total stockholders' equity	$1,140,000

During the current year, the following transactions affected its stockholders' equity accounts.

Jan. 2 Purchased 3,000 shares of its own stock at $25 cash per share.

Jan. 7 Directors declared a $1.50 per share cash dividend payable on February 28 to the February 9 stockholders of record.

Feb. 28 Paid the dividend declared on January 7.

July 9 Sold 1,200 of its treasury shares at $30 cash per share.

Aug. 27 Sold 1,500 of its treasury shares at $21 cash per share.

Sep. 9 Directors declared a $2 per share cash dividend payable on October 22 to the September 23 stockholders of record.

Oct. 22 Paid the dividend declared on September 9.

Dec. 31 Closed the $52,000 credit balance (from net income) in the Income Summary account to Retained Earnings.

Required

1. Prepare journal entries to record each of these transactions.
2. Prepare a statement of retained earnings for the current year ended December 31.
3. Prepare the stockholders' equity section of the balance sheet as of December 31 of the current year.

PROBLEM SET A

Problem 11-1A

Stockholders' equity transactions and analysis

P1

Kinkaid Co. was incorporated at the beginning of this year and had a number of transactions. The following journal entries impacted its stockholders' equity during its first year of operations.

a.	Cash	300,000	
	Common Stock, $25 Par Value		250,000
	Paid-In Capital in Excess of Par Value, Common Stock		50,000
b.	Organization Expenses	150,000	
	Common Stock, $25 Par Value		125,000
	Paid-In Capital in Excess of Par Value, Common Stock		25,000
c.	Cash	43,000	
	Accounts Receivable	15,000	
	Building	81,500	
	Notes Payable		59,500
	Common Stock, $25 Par Value		50,000
	Paid-In Capital in Excess of Par Value, Common Stock		30,000
d.	Cash	120,000	
	Common Stock, $25 Par Value		75,000
	Paid-In Capital in Excess of Par Value, Common Stock		45,000

Required

1. Explain the transaction(s) underlying each journal entry *a* through *d* .
2. How many shares of common stock are outstanding at year-end?
3. What is the total paid-in capital at year-end?

Check (2) 20,000 shares (3) $650,000

Problem 11-2A

Cash dividends, treasury stock, and statement of retained earnings

C3 P2 P3

Kohler Corporation reports the following components of stockholders' equity at December 31 of the *prior year* .

Common stock—$10 par value, 100,000 shares authorized, 40,000 shares issued and outstanding	$400,000
Paid-in capital in excess of par value, common stock	60,000
Retained earnings	270,000
Total stockholders' equity	$730,000

During the current year, the following transactions affected its stockholders' equity accounts.

Jan. 2 Purchased 4,000 shares of its own stock at $20 cash per share.

Jan. 5 Directors declared a $2 per share cash dividend payable on February 28 to the February 5 stockholders of record.

Feb. 28 Paid the dividend declared on January 5.

July 6 Sold 2,000 of its treasury shares at $24 cash per share.

Aug. 22 Sold 2,000 of its treasury shares at $16 cash per share.

Sep. 5 Directors declared a $2 per share cash dividend payable on October 28 to the September 25 stockholders of record.

Oct. 28 Paid the dividend declared on September 5.

Dec. 31 Closed the $388,000 credit balance (from net income) in the Income Summary account to Retained Earnings.

Required

1. Prepare journal entries to record each of these transactions.
2. Prepare a statement of retained earnings for the current year ended December 31.
3. Prepare the stockholders' equity section of the balance sheet as of December 31 of the current year.

Problem 11-3A

Equity analysis—journal entries and account balances

P2

At September 30, the end of Beijing Company's third quarter, the following stockholders' equity accounts are reported.

Common stock, $12 par value	$360,000
Paid-in capital in excess of par value, common stock	90,000
Retained earnings	320,000

In the fourth quarter, the following entries related to its equity are recorded.

Oct. 2	Retained Earnings	60,000	
	Common Dividend Payable		60,000
Oct. 25	Common Dividend Payable	60,000	
	Cash		60,000
Oct. 31	Retained Earnings	75,000	
	Common Stock Dividend Distributable		36,000
	Paid-In Capital in Excess of Par Value, Common Stock		39,000
Nov. 5	Common Stock Dividend Distributable	36,000	
	Common Stock, $12 Par Value		36,000
Dec. 1	Memo—Change the title of the Common Stock account to reflect the new par value of $4.		
Dec. 31	Income Summary	210,000	
	Retained Earnings		210,000

Required

1. Explain the transaction(s) underlying each journal entry.
2. Complete the following table showing the equity account balances at each indicated date (take into account the beginning balances from September 30).

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	Sep. 30	Oct. 2	Oct. 25	Oct. 31	Nov. 5	Dec. 1	Dec. 31
Common stock	$ 360,000	$	$	$	$	$	$
Common stock dividend distributable	0						
Paid-in capital in excess of par, common stock	90,000						
Retained earnings	320,000						
Total equity	$ 770,000	$	$	$	$	$	$

Check Total equity: Oct. 2, $710,000; Dec. 31, $920,000

Problem 11-4A

Analyzing changes in stockholders' equity accounts

C3 P2 P3

The equity sections for Atticus Group at the beginning of the year (January 1) and end of the year (December 31) follow.

Stockholders' Equity (January 1)	
Common stock—$4 par value, 100,000 shares authorized, 40,000 shares issued and outstanding	$160,000
Paid-in capital in excess of par value, common stock	120,000
Retained earnings	320,000
Total stockholders' equity	$600,000

Stockholders' Equity (December 31)	
Common stock—$4 par value, 100,000 shares authorized, 47,400 shares issued, 3,000 shares in treasury	$189,600
Paid-in capital in excess of par value, common stock	179,200
Retained earnings ($30,000 restricted by treasury stock)	400,000
	768,800
Less cost of treasury stock	(30,000)
Total stockholders' equity	$738,800

The following transactions and events affected its equity during the year.

Jan. 5 Declared a $0.50 per share cash dividend, date of record January 10.

Mar. 20 Purchased treasury stock for cash.

Apr. 5 Declared a $0.50 per share cash dividend, date of record April 10.

July 5 Declared a $0.50 per share cash dividend, date of record July 10.

July 31 Declared a 20% stock dividend when the stock's market value was $12 per share.

Aug. 14 Issued the stock dividend that was declared on July 31.

Oct. 5 Declared a $0.50 per share cash dividend, date of record October 10.

Required

1. How many common shares are outstanding on each cash dividend date?
2. What is the total dollar amount for each of the four cash dividends?
3. What is the amount of retained earnings transferred to paid-in capital accounts (capitalized) for the stock dividend?
4. What is the per share cost of the treasury stock purchased?
5. How much net income did the company earn this year?

Check (3) $88,800 (4) $10 (5) $248,000

Problem 11-5A

Computing par values and dividend allocations

C2

Raphael Corporation's balance sheet shows the following stockholders' equity section.

Required

1. Determine the par values of the corporation's preferred stock and its common stock.
2. If two years' preferred dividends are in arrears at the current date and the board of directors declares cash dividends of $11,500, compute the total amount paid to (*a*) preferred shareholders and (*b*) common shareholders.

PROBLEM SET B

Problem 11-1B

Stockholders' equity transactions and analysis

P1

Weiss Company was incorporated at the beginning of this year and had a number of transactions. The following journal entries impacted

its stockholders' equity during its first year of operations.

a.	Cash	120,000	
	Common Stock, $1 Par Value		3,000
	Paid-In Capital in Excess of Par Value, Common Stock		117,000
b.	Organization Expenses	40,000	
	Common Stock, $1 Par Value		1,000
	Paid-In Capital in Excess of Par Value, Common Stock		39,000
c.	Cash	13,300	
	Accounts Receivable	8,000	
	Building	37,000	
	Notes Payable		18,300
	Common Stock, $1 Par Value		800
	Paid-In Capital in Excess of Par Value, Common Stock		39,200
d.	Cash	60,000	
	Common Stock, $1 Par Value		1,200
	Paid-In Capital in Excess of Par Value, Common Stock		58,800

Required

1. Explain the transaction(s) underlying each journal entry *a* through *d* .
2. How many shares of common stock are outstanding at year-end?
3. What is the total paid-in capital at year-end?

Check (2) 6,000 shares (3) $260,000

Problem 11-2B

Cash dividends, treasury stock, and statement of retained earnings

C3 P2 P3

Balthus Corp. reports the following components of stockholders' equity at December 31 of the *prior year* .

Common stock—$1 par value, 320,000 shares authorized, 200,000 shares issued and outstanding	$ 200,000
Paid-in capital in excess of par value, common stock	1,400,000
Retained earnings	2,160,000
Total stockholders' equity	$3,760,000

It completed the following transactions related to stockholders' equity during the current year.

Jan. 10 Purchased 40,000 shares of its own stock at $12 cash per share.

Mar. 2 Directors declared a $1.50 per share cash dividend payable on March 31 to the March 15 stockholders of record.

Mar. 31 Paid the dividend declared on March 2.

Nov. 11 Sold 24,000 of its treasury shares at $13 cash per share.

Nov. 25 Sold 16,000 of its treasury shares at $10.50 cash per share.

Dec. 1 Directors declared a $2.50 per share cash dividend payable on January 2 to the December 10 stockholders of record.

Dec. 31 Closed the $1,072,000 credit balance (from net income) in the Income Summary account to Retained Earnings.

Required

1. Prepare journal entries to record each of these transactions.
2. Prepare a statement of retained earnings for the current year ended December 31.
3. Prepare the stockholders' equity section of the balance sheet as of December 31 of the current year.

Problem 11-3B

Equity analysis—journal entries and account balances

P2

At December 31, the end of Chilton Communication's third quarter, the following stockholders' equity accounts are reported.

Common stock, $10 par value	$ 960,000
Paid-in capital in excess of par value, common stock	384,000
Retained earnings	1,600,000

In the fourth quarter, the following entries related to its equity are recorded. page 453

Jan. 17	Retained Earnings	96,000	
	Common Dividend Payable		96,000
Feb. 5	Common Dividend Payable	96,000	
	Cash		96,000
Feb. 28	Retained Earnings	252,000	
	Common Stock Dividend Distributable		120,000
	Paid-In Capital in Excess of Par Value, Common Stock		132,000
Mar. 14	Common Stock Dividend Distributable	120,000	
	Common Stock, $10 Par Value		120,000
Mar. 25	Memo—Change the title of the Common Stock account to reflect the new par value of $5.		
Mar. 31	Income Summary	720,000	
	Retained Earnings		720,000

Required

1. Explain the transaction(s) underlying each journal entry.
2. Complete the following table showing the equity account balances at each indicated date (take into account the beginning balances from December 31).

	Dec. 31	Jan. 17	Feb. 5	Feb. 28	Mar. 14	Mar. 25	Mar. 31
Common stock	$ 960,000	$	$	$	$	$	$
Common stock dividend distributable	0						
Paid-in capital in excess of par, common stock	384,000						
Retained earnings	1,600,000						
Total equity	$ 2,944,000	$	$	$	$	$	$

Check Total equity: Jan. 17, $2,848,000; Mar. 31, $3,568,000

Problem 11-4B

Analyzing changes in stockholders' equity accounts

C3 P2 P3

The equity sections for Hovo Corp. at the beginning of the year (January 1) and end of the year (December 31) follow.

Stockholders' Equity (January 1)	
Common stock—$20 par value, 30,000 shares authorized, 17,000 shares issued and outstanding	$340,000
Paid-in capital in excess of par value, common stock	60,000
Retained earnings	270,000
Total stockholders' equity	$670,000

Stockholders' Equity (December 31)	
Common stock—$20 par value, 30,000 shares authorized, 19,000 shares issued, 1,000 shares in treasury	$380,000
Paid-in capital in excess of par value, common stock	104,000
Retained earnings ($40,000 restricted by treasury stock)	295,200
	779,200
Less cost of treasury stock	(40,000)
Total stockholders' equity	$739,200

The following transactions and events affected its equity during the year. page 454

Feb. 15 Declared a $0.40 per share cash dividend, date of record five days later.

Mar. 2 Purchased treasury stock for cash.

May 15 Declared a $0.40 per share cash dividend, date of record five days later.

Aug. 15 Declared a $0.40 per share cash dividend, date of record five days later.

Oct. 4 Declared a 12.5% stock dividend when the stock's market value was $42 per share.

Oct. 20 Issued the stock dividend that was declared on October 4.

Nov. 15 Declared a $0.40 per share cash dividend, date of record five days later.

Required

1. How many common shares are outstanding on each cash dividend date?
2. What is the total dollar amount for each of the four cash dividends?
3. What is the amount of retained earnings transferred to paid-in capital accounts (capitalized) for the stock dividend?
4. What is the per share cost of the treasury stock purchased?
5. How much net income did the company earn this year?

Check (3) $84,000 (4) $40 (5) $136,000

Problem 11-5B

Computing par values and dividend allocations

C2

Soltech Company's balance sheet shows the following stockholders' equity section.

Preferred stock—8% cumulative, $___ par value, 1,500 shares authorized, issued, and outstanding	$ 375,000
Common stock—$___ par value, 18,000 shares authorized, issued, and outstanding	900,000
Retained earnings	1,125,000
Total stockholders' equity	$2,400,000

Required

1. Determine the par values of the corporation's preferred stock and its common stock.
2. If two years' preferred dividends are in arrears at the current date and the board of directors declares cash dividends of $100,000, compute the total amount paid to (*a*) preferred shareholders and (*b*) common shareholders.

SERIAL PROBLEM

Business Solutions

P1 C1 C2

Serial problem began in Chapter 1. If previous chapter segments were not completed, the serial problem can begin at this point. It is available in Connect with an algorithmic option.

SP 11 Santana Rey created **Business Solutions** on October 1, 2021. The company has been successful, and Santana plans to expand her business. She believes that an additional $86,000 is needed and is investigating three funding sources.

a. Santana's sister Cicely is willing to invest $86,000 in the business as a common shareholder. Because Santana currently has about $129,000 invested in the business, Cicely's investment will mean that Santana will maintain about 60% ownership and Cicely will have 40% ownership of Business Solutions.

b. Santana's uncle Marcello is willing to invest $86,000 in the business as a preferred shareholder. Marcello would purchase 860 shares of $100 par value, 7% preferred stock.

c. Santana's banker is willing to lend her $86,000 on a 7%, 10-year note payable. She would make monthly payments of $1,000 for 10 years.

Required

1. Prepare the journal entry to reflect the initial $86,000 investment under each of the options *a* , *b* , and *c* .

2. Evaluate the three proposals for expansion, providing the pros and cons of each option.

3. Which option do we recommend Santana adopt? Explain.

Alexander Image/Shutterstock

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA 11-1 Quick Study , Dividends on noncumulative preferred stock, **C2** —similar to QS 11-13

Tableau DA 11-2 Exercise , Dividends on cumulative preferred stock, **C2** —similar to Exercise 11-12

Tableau DA 11-3 Mini-Case , Comparing dividends on noncumulative and cumulative preferred stock, **C2** —similar to Exercises 11-11 & 11-12

connect

GENERAL LEDGER

General Ledger (GL) Assignments expose students to general ledger software similar to that in practice. **GL** is part of **Connect** , and **GL** assignments are auto-gradable and have algorithmic options.

GL 11-1 Prepare journal entries related to treasury stock, cash dividends, and net income. Then prepare the statement of retained

earnings and the stockholders' equity section of the balance sheet.

GL 11-2 Prepare journal entries for cash dividends and stock dividends. Calculate the number of shares outstanding, the amount of net income, and the amount of retained earnings to be capitalized as a result of the stock dividend.

Accounting Analysis connect

COMPARATIVE ANALYSIS

C2 A1

AA 11-1 Use **Apple** 's financial statements in Appendix A to answer the following.

1. How many shares of Apple common stock are issued and outstanding at (*a*) September 28, 2019, and (*b*) September 29, 2018?
2. What is the total amount of cash dividends paid to common stockholders for the years ended (*a*) September 28, 2019, and (*b*) September 29, 2018?
3. Identify basic EPS amounts for fiscal years (*a*) 2019 and (*b*) 2018.
4. Is the change in Apple's EPS from 2018 to 2019 favorable or unfavorable?
5. If Apple buys back outstanding shares from investors, would you expect EPS to increase or decrease from the buyback?

COMPARATIVE ANALYSIS

A1

AA 11-2 Use the following comparative figures for **Apple** and **Google** .

Key Figures	Apple	Google
Net income (in millions)	$ 55,256	$ 34,343
Cash dividends declared per common share	$ 3.00	$ 0.00
Common shares outstanding (in millions)	4,443.236	688.335
Weighted-average common shares outstanding (in millions)	4,617.834	692.539
Market value (price) per share	$ 293.65	$1,339.39
Equity applicable to common shares (in millions)	$ 90,488	$ 201,442

Required

1. Compute the basic EPS for each company using these data.
2. Compute the dividend yield for each company using these data.
3. Compute the price-earnings ratio for each company using these data.
4. Based on the PE ratio, for which company do investors have greater expectations about future performance?

EXTENDED ANALYSIS

C3 A1

AA 11-3 Use the following financial information for **Samsung** .

Net income less dividends available to preferred shares (in millions)	$ 18,653
Weighted-average common shares outstanding (in millions)	6,857.575
Equity applicable to common shares (in millions)	$ 123,053

Required

1. Compute earnings per share (EPS) for Samsung.
2. If Samsung buys back outstanding shares from investors, would we expect EPS to increase or decrease from the buyback?

Discussion Questions

1. What are organization expenses? Provide examples.
2. How are organization expenses reported?
3. Who is responsible for overseeing corporate activities?
4. What is the difference between authorized shares and outstanding shares?
5. What is the preemptive right of common stockholders?
6. List the general rights of common stockholders.
7. What is the difference between the market value per share and the par value per share?
8. Identify and explain the importance of the three dates relevant to corporate dividends.
9. How does declaring a stock dividend affect the corporation's assets, liabilities, and total equity? What are the effects of the eventual distribution of that stock?
10. What is the difference between a stock dividend and a stock split?
11. How does the purchase of treasury stock affect the purchaser's assets and total equity?
12. How are EPS results computed for a corporation with a simple capital structure?

Beyond the Numbers

ETHICS CHALLENGE

C3

BTN 11-1 Harriet Moore is an accountant for New World Pharmaceuticals. Her duties include tracking research and development spending in the new product development division. Over the course of the past six months, Harriet has noticed that a great deal of funds have been spent on a particular project for

a new drug. She hears "through the grapevine" that the company is about to patent the drug and expects it to be a major advance in antibiotics. Harriet believes that this new drug will greatly improve company performance and will cause the company's stock to increase in value. Harriet decides to purchase shares of New World in order to benefit from this expected increase.

Required

What are Harriet's ethical responsibilities, if any, with respect to the information she has learned through her duties as an accountant for New World Pharmaceuticals? What are the implications of her planned purchase of New World shares?

COMMUNICATING IN PRACTICE

A1 A2

BTN 11-2 Teams are to select an industry, and each team member is to select a different company in that industry. Each team member then is to acquire the selected company's financial statements (or Form 10-K) from the SEC site (**SEC.gov**). Use these data to identify basic EPS. Use the financial press (or **finance.yahoo.com**) to determine the market price of this stock, and then compute the price-earnings ratio. Communicate with teammates via a meeting, e-mail, or telephone to discuss the meaning of this ratio, how companies compare, and the industry norm. The team must prepare a single memorandum reporting the ratio for each company and identifying the team conclusions or consensus. The memorandum is to be duplicated and distributed to the instructor and teammates.

Hint: Make a slide of each team's memo for a class discussion.

TAKING IT TO THE NET

C1 C3

BTN 11-3 Access the February 22, 2019, filing of the 2018 calendar-year 10-K report of **McDonald's** (ticker: MCD) from **SEC.gov** .

Required

1. Review McDonald's balance sheet and identify how many classes of stock it has issued.
2. What are the par values, number of authorized shares, and number of issued shares of the classes of stock you identified in part 1?
3. Review its statement of cash flows and identify what total amount of cash it paid in 2018 to purchase treasury stock.
4. What amount did McDonald's pay out in common stock cash dividends for 2018?

TEAMWORK IN ACTION

P3

BTN 11-4 This activity requires teamwork to reinforce understanding of accounting for treasury stock.

1. Write a brief team statement (*a*) generalizing what happens to a corporation's financial position when it engages in a stock buyback and (*b*) identifying reasons why a corporation would engage in this activity.
2. Assume that an entity acquires 100 shares of its $100 par value common stock at a cost of $134 cash per share. Discuss the entry to record this acquisition. Next, assign *each* team member to prepare *one* of the following entries (assume each entry applies to all shares).

   a. Reissue treasury shares at cost.

   b. Reissue treasury shares at $150 per share.

   c. Reissue treasury shares at $120 per share; assume the paid-in capital account from treasury shares has a $1,500

balance.

3. In sequence, each member is to present his/her entry to the team and explain the *similarities* and *differences* between that entry and the previous entry.

Hint: Instructor must be sure each team accurately completes part 1 before proceeding.

ENTREPRENEURIAL DECISION

C2 P2

BTN 11-5 Assume that **Eventbrite** decides to launch a new website to market discount bookkeeping services to consumers. This chain, named Aladin, requires $500,000 of start-up capital. The founder contributes $375,000 of personal assets in return for 15,000 shares of common stock, but must raise another $125,000 in cash. There are two alternative plans for raising the additional cash.

- *Plan A* is to sell 3,750 shares of common stock to one or more investors for $125,000 cash.
- *Plan B* is to sell 1,250 shares of cumulative preferred stock to one or more investors for $125,000 cash (this preferred stock would have a $100 par value, have an annual 8% dividend rate, and be issued at par).

1. If the new business is expected to earn $72,000 of after-tax net income in the first year, what rate of return on beginning equity will the founder earn under each alternative plan? Which plan will provide the higher expected return?
2. If the new business is expected to earn $16,800 of after-tax net income in the first year, what rate of return on beginning equity will the founder earn under each alternative plan? Which plan will provide the higher expected return?
3. Analyze and interpret the differences between the results for parts 1 and 2.

12 Reporting Cash Flows

Chapter Preview

BASICS OF CASH FLOW REPORTING

C1 Purpose, measurement, and classification

Noncash activities

P1 Format and preparation

NTK 12-1

CASH FLOWS FROM OPERATING

P2 Indirect method

Illustration of indirect method

Summary of indirect method adjustments

NTK 12-2

CASH FLOWS FROM INVESTING

P3 Three-step analysis of investing flows

Analyzing noncurrent assets

Analyzing other assets

NTK 12-3

CASH FLOWS FROM FINANCING

P3 Three-step analysis of financing flows

Analyzing noncurrent liabilities

Analyzing equity

Summary using T-accounts

A1 Analyzing cash

NTK 12-4

Learning Objectives

CONCEPTUAL

C1 Distinguish between operating, investing, and financing activities, and describe how noncash investing and financing activities are disclosed.

ANALYTICAL

A1 Analyze the statement of cash flows and apply the cash flow on total assets ratio.

PROCEDURAL

P1 Prepare a statement of cash flows.

P2 Compute cash flows from operating activities using the indirect method.

P3 Determine cash flows from both investing and financing activities.

P4 *Appendix 12A* —Illustrate use of a spreadsheet to prepare a statement of cash flows.

P5 *Appendix 12B* —Compute cash flows from operating activities using the direct method.

Show Your Colors

"Follow your strengths"**—Barbara Bradley**

FORT WAYNE, IN—"I never saw myself going into business," recalls Barbara Bradley. Until one day, "we were at the airport when we noticed no one was carrying anything colorful or fun. So we decided to start a company to make handbags and luggage," exclaims Barbara.

Barbara and her co-founder had no cash, so they borrowed $250 and started "cutting fabric out on a Ping-Pong table," explains Barbara. "We decided to name the company **Vera Bradley** (**VeraBradley.com**) after [my mother]."

As business grew, Barbara had to manage cash flows. "The first year, we did $10,000 in sales," proclaims Barbara. "Then things got chaotic." While cash flows from operations were good, the business had to expand to meet demand.

"We went to a bank, seeking a $5,000 loan," says Barbara. The loan was a welcome cash inflow that allowed the company to "build its own building!"

Barbara admits that she's "not a great finance [and accounting] person," but she insists that accounting and attention to cash flows are key to running a successful business. Mixing in Barbara's special talents, her company is reaching new heights.

Although cash may be king, Barbara insists that "business is all about forming relationships. My father always said, 'In business, you sell yourself first, your company second, and the product third,' and he was right."

Sources: *Vera Bradley website,* January 2021; *Vera Bradley Foundation,* January 2021; *Fortune,* October 2015; *Wane.com,* March 2019

Jason Kempin/Getty Images

BASICS OF CASH FLOW REPORTING

C1

Distinguish between operating, investing, and financing activities, and describe how noncash investing and financing activities are disclosed.

Purpose of the Statement of Cash Flows

The **statement of cash flows** reports cash receipts (inflows) and cash payments (outflows) for a period. Cash flows are separated into operating, investing, and financing activities. The details of sources and uses of cash make this statement useful. The statement of cash flows helps answer

- What explains the change in the cash balance?
- How does a company receive its cash?
- Where does a company spend its cash?
- Why do income and cash flows differ?

Importance of Cash Flows

Information about cash flows influences decisions. Cash flows help users decide whether a company has enough cash to pay its debts. They also help evaluate a company's ability to pursue opportunities. Managers use cash flow information to plan day-to-day operations and make long-term investment decisions.

W. T. Grant Co. is a classic example of the importance of cash flows. Grant reported net income of more than $40 million per year for three consecutive years. At that same time, cash outflow was more than $90 million by the end of that three-year period. Grant soon went bankrupt. Users who relied only on Grant's income numbers were caught off guard.

Measurement of Cash Flows

Cash flows include both *cash* and *cash equivalents*. The statement of cash flows explains the difference between the beginning and ending balances of cash and cash equivalents. We continue to use the phrases *cash flows* and the *statement of cash flows,* but remember that both phrases refer to cash *and* cash equivalents. Because cash and cash equivalents are combined, the statement of cash flows does not report transactions *between* cash and cash equivalents, such as

cash paid to purchase cash equivalents and cash received from selling cash equivalents.

A cash equivalent has two criteria: (1) be readily convertible to a known amount of cash and (2) be sufficiently close to its maturity so its market value is unaffected by interest rate changes. **American Express** defines its cash equivalents as including "highly liquid investments with original maturities of 90 days or less."

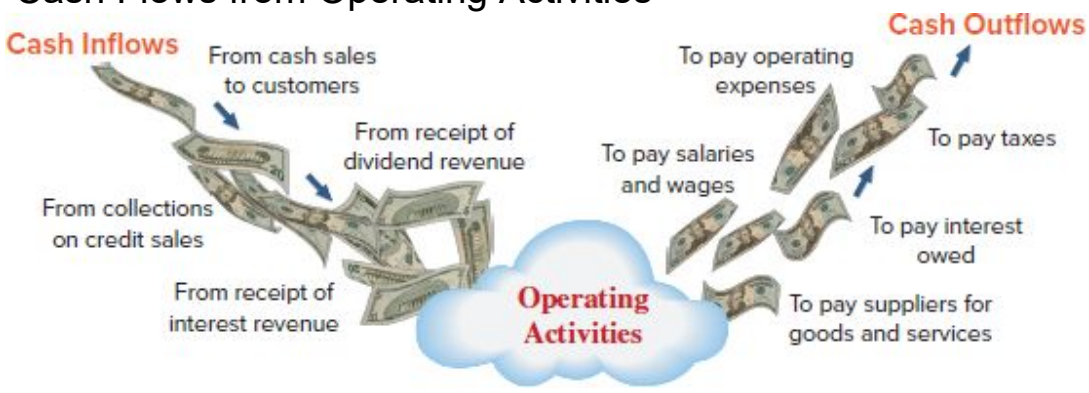
Classification of Cash Flows

Cash receipts and cash payments are classified in one of three categories: operating, investing, or financing activities. A net cash inflow (source) occurs when the receipts in a category exceed the payments. A net cash outflow (use) occurs when the payments in a category exceed the receipts.

Operating Activities **Operating activities** include transactions and events that affect net income. Examples are the production and purchase of inventory, the sale of goods and services to customers, and the expenditures to operate the business. Not all items in income, such as unusual gains and losses, are operating activities (we discuss these exceptions later). Exhibit 12.1 lists common cash inflows and outflows from operating activities.

EXHIBIT 12.1

Cash Flows from Operating Activities



Point: For simplicity, we assume purchases and sales of equity and debt investments are investing activities.

Investing Activities **Investing activities** include transactions and events that come from the purchase and sale of long-term assets. They also include (1) the purchase and sale of investments and (2) lending and collecting money for notes receivable. Exhibit 12.2 lists examples of cash flows from investing activities. Cash from collecting the principal on notes is an investing activity. However, collecting interest on notes is an operating activity; also, if a note results from sales to customers, it is an operating activity.

EXHIBIT 12.2

Cash Flows from Investing Activities

Financing Activities **Financing activities** include transactions and events that affect long-term liabilities and equity. Examples are (1) getting cash from issuing debt and repaying debt and (2) receiving cash from or distributing cash to owners. Borrowing and repaying principal on long-term debt are financing activities. However, payments of interest are operating activities. Exhibit 12.3 lists examples of cash flows from financing activities.

EXHIBIT 12.3

Cash Flows from Financing Activities

Link between Classification of Cash Flows and the Balance Sheet page 461 Operating, investing, and financing activities are loosely linked to different parts of the balance sheet. Operating activities are affected by changes in current assets and current liabilities (and the income statement). Investing activities are affected by changes in long-term assets. Financing activities are affected by changes in long-term liabilities and equity. These links are shown in Exhibit 12.4. Exceptions to these links include (1) current assets *unrelated* to operations—such as short-term notes receivable from noncustomers and from investment securities, which are investing activities, and (2) current liabilities *unrelated* to operations—such as dividends payable, which are financing activities.

EXHIBIT 12.4

Linkage of Cash Flow Classifications to the Balance Sheet

Noncash Investing and Financing

Some investing and financing activities do not affect cash flows. One example is the purchase of long-term assets using a long-term notes payable (loan). This transaction impacts both investing and financing activities but does not impact current-period cash. Such transactions

are reported at the bottom of the statement of cash flows or in a note to the statement—Exhibit 12.5 has examples.

EXHIBIT 12.5

Examples of Noncash Investing and Financing Activities

- Retirement of debt by issuing equity stock.
- Conversion of preferred stock to common stock.
- Lease of assets in a long-term lease transaction.
- Purchase of long-term assets by issuing a note or bond.
- Exchange of noncash assets for other noncash assets.
- Purchase of noncash assets by issuing equity or debt.

Format of the Statement of Cash Flows

P1

Prepare a statement of cash flows.

A statement of cash flows reports cash flows from three activities: operating, investing, and financing. Exhibit 12.6 shows the usual format. The statement shows the net increase or decrease from those activities and ties it into the cash balance. Any noncash investing and financing transactions are disclosed in a note or separate schedule.

EXHIBIT 12.6

Format of the Statement of Cash Flows

COMPANY NAME
Statement of Cash Flows
For *period* Ended *date*

Cash flows from operating activities	
[Compute operating cash flows using indirect or direct method]	
Net cash provided (used) by operating activities	$ #
Cash flows from investing activities	
[List of individual inflows and outflows]	
Net cash provided (used) by investing activities	#
Cash flows from financing activities	
[List of individual inflows and outflows]	
Net cash provided (used) by financing activities	#
Net increase (decrease) in cash	$ #
Cash (and equivalents) balance at prior period-end	#
Cash (and equivalents) balance at current period-end	$ #

Separate schedule or note disclosure of any noncash investing and financing transactions is required.

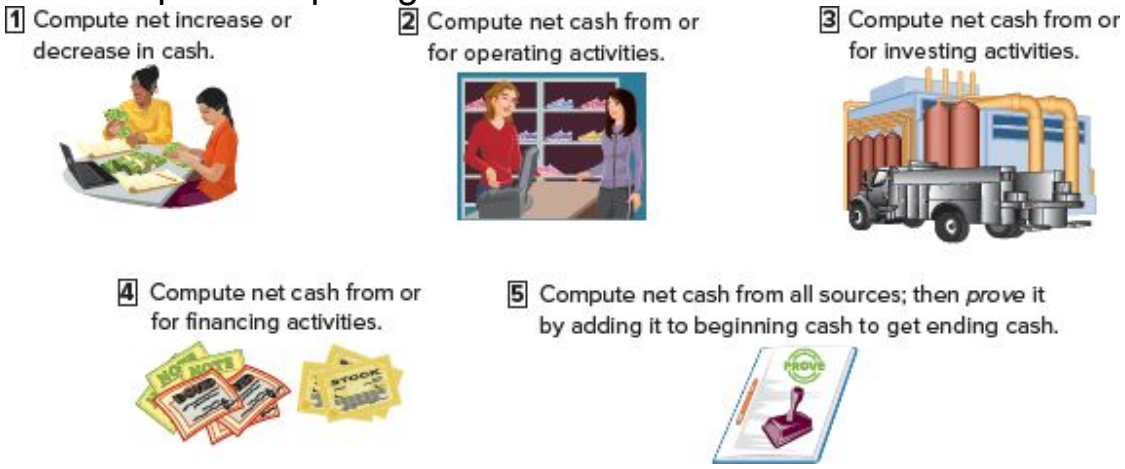
Point: Positive cash flows for a section are titled net cash "provided by" or "from." Negative cash flows are labeled as net cash "used by" or "for."

Preparing the Statement of Cash Flows

Preparing a statement of cash flows has five steps, shown in Exhibit 12.7. Computing the net increase or net decrease in cash is a simple but crucial computation. It equals the current period's cash balance minus the prior period's cash balance. This is the *bottom-line* figure for the statement of cash flows and is a check on accuracy.

EXHIBIT 12.7

Five Steps in Preparing the Statement of Cash Flows



Analyzing the Cash Account A company's cash receipts and cash payments are recorded in its Cash account. The Cash account is one place to look for information about cash flows. The summarized Cash T-account of Genesis, Inc., is in Exhibit 12.8. Preparing a statement of cash flows requires classifying each cash inflow or outflow as an operating, investing, or financing activity.

EXHIBIT 12.8

Summarized Cash Account

Cash			
Balance, Dec. 31, 2020	12,000		
Receipts from customers	570,000	Payments for inventory	319,000
Receipts from asset sales	2,000	Payments for operating exp.	218,000
Receipts from stock issuance	15,000	Payments for interest	8,000
		Payments for taxes	5,000
		Payments for notes retirement	18,000
		Payments for dividends	14,000
Balance, Dec. 31, 2021	17,000		

Analyzing Noncash Accounts A second approach to preparing the statement of cash flows analyzes noncash accounts and uses double-entry accounting. Exhibit 12.9 uses the accounting equation to show the relation between the Cash account and the noncash balance sheet accounts. We can explain changes in cash and prepare a statement of cash flows by analyzing changes in liability accounts, equity accounts, and noncash asset accounts (along with income statement accounts).

EXHIBIT 12.9

Relation between Cash and Noncash Accounts

Cash = Liabilities + Equity − Noncash assets

Information to Prepare the Statement Information to prepare the statement of cash flows comes from three sources: (1) comparative balance sheets, (2) the current income statement, and (3) additional information. Comparative balance sheets are used to compute changes in noncash accounts from the beginning to the end of the period. The current income statement is used to help compute cash flows from operating activities. Additional information includes details that help explain cash flows and noncash activities.

Decision Maker

Entrepreneur You are considering purchasing a start-up business that recently reported a $110,000 annual net loss and a $225,000 annual net cash inflow. How are these results possible? ■ *Answer:* Several factors can explain an increase in net cash flows when a net loss is reported, including (1) early recognition of expenses relative to revenues generated (such as research and development), (2) cash advances on long-term sales contracts not yet recognized in income, (3) issuances of debt or equity for cash to finance expansion, (4) cash sale of assets, (5) delay of cash payments, and (6) cash prepayment on sales.

NEED-TO-KNOW 12-1

Classifying Cash Flows

C1 P1 

Classify each of the following cash flows as operating, investing, or financing activities.

a. Purchase equipment for cash

b. Cash payment of wages

c. Issuance of stock for cash

d. Receipt of cash dividends from investments

e. Cash collections from customers

f. Notes payable issued for cash

g. Cash paid for utilities

h. Cash paid to acquire investments

i. Cash paid to retire debt

j. Cash received as interest on investments

k. Cash received from selling investments

l. Cash received from a bank loan

Solution

a. Investing **c.** Financing **e.** Operating **g.** Operating **i.** Financing **k.** Investing

b. Operating **d.** Operating **f.** Financing **h.** Investing **j.** Operating **l.** Financing

Do More: QS 12-1, QS 12-2, E 12-1

CASH FLOWS FROM OPERATING

P2

Compute cash flows from operating activities using the indirect method.

Indirect and Direct Methods of Reporting

Cash flows provided (used) by operating activities are reported using the *direct method* or the *indirect method.* **These two different methods apply only to the operating activities section.**

- The **direct method** separately lists operating cash receipts (such as cash received from customers) and operating cash payments (such as cash paid for inventory). The cash payments are then subtracted from cash receipts. The direct method is covered in Appendix 12B.
- The **indirect method** reports net income and then adjusts it for items that do not affect cash. It does *not* report individual items of cash inflows and cash outflows from operating activities.

The net cash amount provided by operating activities is identical under both the direct and indirect methods. The difference is with the computation and presentation. The indirect method is arguably easier. Nearly all companies report operating cash flows using the indirect method, including **Apple** , **Google** , and **Samsung** in-Appendix A.

Demonstration Data Exhibit 12.10 shows Genesis's income statement and balance sheets. We use this information to prepare a

statement of cash flows that explains the $5,000 increase in cash.

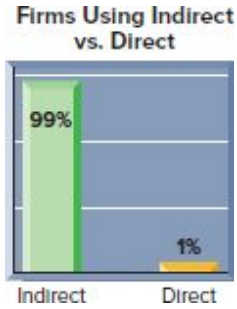


EXHIBIT 12.10

Financial Statements

GENESIS
Income Statement
For Year Ended December 31, 2021

Sales		$590,000
Cost of goods sold	$300,000	
Operating expenses (excluding depreciation)	216,000	
Depreciation expense	24,000	
Interest expense	7,000	(547,000)
		43,000
Other gains (losses)		
Loss on sale of plant assets	(6,000)	
Gain on retirement of notes	16,000	10,000
Income before taxes		53,000
Income taxes expense		(15,000)
Net income		$ 38,000

Additional Information for 2021

a. The accounts payable balances result from inventory purchases.

b. Purchased $60,000 in plant assets by issuing $60,000 of notes payable.

c. Sold plant assets with a book value of $8,000 (original cost of $20,000 and accumulated depreciation of $12,000) for $2,000 cash, yielding a $6,000 loss.

d. Received $15,000 cash from issuing 3,000 shares of common stock.

e. Paid $18,000 cash to retire notes with a $34,000 book value, yielding a $16,000 gain.

f. Declared and paid cash dividends of $14,000.

GENESIS
Balance Sheets

At December 31	2021	2020	Change
Assets			
Current assets			
Cash	$ 17,000	$ 12,000	$ 5,000 Increase
Accounts receivable	60,000	40,000	20,000 Increase
Inventory	84,000	70,000	14,000 Increase
Prepaid expenses	6,000	4,000	2,000 Increase
Total current assets	167,000	126,000	
Long-term assets			
Plant assets	250,000	210,000	40,000 Increase
Accumulated depreciation	(60,000)	(48,000)	12,000 Increase
Total assets	$357,000	$288,000	
Liabilities			
Current liabilities			
Accounts payable	$ 35,000	$ 40,000	$ 5,000 Decrease
Interest payable	3,000	4,000	1,000 Decrease
Income taxes payable	22,000	12,000	10,000 Increase
Total current liabilities	60,000	56,000	
Long-term notes payable	90,000	64,000	26,000 Increase
Total liabilities	150,000	120,000	
Equity			
Common stock, $5 par	95,000	80,000	15,000 Increase
Retained earnings	112,000	88,000	24,000 Increase
Total equity	207,000	168,000	
Total liabilities and equity	$357,000	$288,000	

Applying the Indirect Method

Net income is computed using accrual accounting. Revenues and expenses rarely match the receipt and payment of cash. The indirect method adjusts net income to get the net cash provided or used by operating activities. We begin with Genesis's income of $38,000 and adjust it to get cash provided by operating activities of $20,000—see Exhibit 12.11. There are two types of adjustments: ① Adjustments to income statement items that do not impact cash and ② Adjustments for changes in current assets and current liabilities (linked to operating activities). Nearly all companies group adjustments into these two types, including Apple, Google, and Samsung in Appendix A.

page 464

EXHIBIT 12.11

Operating Activities Section—Indirect Method

GENESIS
Statement of Cash Flows—Operating Section under Indirect Method
For Year Ended December 31, 2021

Cash flows from operating activities		
Net income	$ 38,000	
Adjustments to reconcile net income to net cash provided by operating activities		
① Income statement items not affecting cash		
Depreciation expense	24,000	
Loss on sale of plant assets	6,000	
Gain on retirement of notes	(16,000)	
② Changes in current assets and liabilities		
Increase in accounts receivable	(20,000)	
Increase in inventory	(14,000)	
Increase in prepaid expenses	(2,000)	
Decrease in accounts payable	(5,000)	
Decrease in interest payable	(1,000)	
Increase in income taxes payable	10,000	
Net cash provided by operating activities		**$20,000**

① Adjustments for Income Statement Items Not Affecting Cash Some expenses and losses subtracted from net income are not cash outflows. Examples are depreciation, amortization, depletion, bad debts expense, loss from an asset sale, and loss from retirement of notes payable. The indirect method requires that

page 465

Expenses and losses with no cash outflows are added back to net income.

These expenses and losses did *not* reduce cash, and adding them back cancels their deductions from net income. Any cash received or paid from a transaction that yields a loss, such as from an asset sale or payoff of a note, is reported under investing or financing activities.

When net income has revenues and gains that are not cash inflows, the indirect method requires that

Revenues and gains with no cash inflows are subtracted from net income.

Section ① of Exhibit 12.11 shows three adjustments for items that did not impact cash for Genesis.

Point: An income statement reports revenues, gains, expenses, and losses on an accrual basis. The statement of cash flows reports cash

received and cash paid for operating, financing, and investing activities.

Depreciation Depreciation expense is Genesis's only operating item in net income that had no effect on cash flows. We add back the $24,000 depreciation expense to net income because depreciation did not reduce cash.

Loss on Sale of Plant Assets Genesis reported a $6,000 loss on sale of plant assets that reduced net income but did not affect cash flows. This $6,000 loss is added back to net income because it is not a cash outflow.

Gain on Retirement of Debt A $16,000 gain on retirement of debt increased net income but did not affect cash flows. This $16,000 gain is subtracted from net income because it was not a cash inflow.

② Adjustments for Changes in Current Assets and Current Liabilities

This section covers adjustments for changes in current assets and current liabilities.

Adjustments for Changes in Current Assets

Decreases in current assets are added to net income.

Adjustments for Changes in Current Liabilities

Increases in current liabilities are added to net income.

Decreases in current liabilities are subtracted from net income.

Point: Section ② adjustments.

	Account Increases	Account Decreases
Current assets	Subtract from net income	Add to net income
Current liabilities	Add to net income	Subtract from net income

The lower section of Exhibit 12.11 shows adjustments to the three noncash current assets and three current liabilities for Genesis. We explain each adjustment next.

Accounts Receivable The $20,000 increase in the current asset of accounts receivable is subtracted from income (showing less cash available). This increase means Genesis collects less cash than is reported in sales. To help see this, we use *account analysis.* This involves setting up a T-account, entering **in black** the balances and entries we know, and computing **in red** the cash receipts or payments. We see cash receipts are $20,000 less than sales, which is why we subtract $20,000 from income in computing the cash flow.

Black numbers are from Exhibit 12.10. Red number is computed.

Accounts Receivable			
Bal., Dec. 31, 2020	40,000		
Sales	590,000	Cash receipts = 570,000	← 40,000 + 590,000 − 60,000
Bal., Dec. 31, 2021	60,000		

Inventory The $14,000 increase in inventory is subtracted from income. The T-account shows that purchases are $14,000 more than cost of goods sold. This means that cost of goods sold excludes $14,000 of inventory purchased this year, which is why we subtract $14,000 from income in computing cash flow.

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Inventory			
Bal., Dec. 31, 2020	70,000		
Purchases =	314,000	Cost of goods sold	300,000
Bal., Dec. 31, 2021	84,000		

Prepaid Expenses The $2,000 increase in prepaid expenses, which is related to operating expenses, is subtracted from income. The T-account shows that cash paid is $2,000 more than expenses recorded, which is why we subtract $2,000 from income in computing cash flow.

Prepaid Expenses			
Bal., Dec. 31, 2020	4,000		
Cash payments =	218,000	Operating expenses	216,000
Bal., Dec. 31, 2021	6,000		

Accounts Payable The $5,000 decrease in accounts payable is subtracted from income. The T-account shows that cash paid is $5,000 more than purchases recorded, which is why we subtract $5,000 from income in computing cash flow.

Accounts Payable			
		Bal., Dec. 31, 2020	40,000
Cash payments =	319,000	Purchases	314,000
		Bal., Dec. 31, 2021	35,000

Interest Payable The $1,000 decrease in interest payable is subtracted from income. The T-account shows that cash paid is $1,000 more than interest expense recorded, which is why we subtract $1,000 from income in computing cash flow.

Interest Payable			
		Bal., Dec. 31, 2020	4,000
Cash paid for interest =	8,000	Interest expense	7,000
		Bal., Dec. 31, 2021	3,000

Income Taxes Payable The $10,000 increase in income taxes payable is added to income. The T-account shows that cash paid is $10,000 less than tax expense recorded, which is why we add $10,000 to income in computing cash flow.

Income Taxes Payable			
		Bal., Dec. 31, 2020	12,000
Cash paid for taxes =	5,000	Income taxes expense	15,000
		Bal., Dec. 31, 2021	22,000

Summary of Adjustments for Indirect Method

Exhibit 12.12 summarizes the adjustments to net income under the indirect method.

EXHIBIT 12.12

Summary of Adjustments for Operating Activities—Indirect Method

Net Income (or Loss)

① Adjustments for operating items not providing or using cash

+ Noncash expenses and losses

Examples: Expenses for depreciation, depletion, and amortization; losses from disposal of long-term assets and from retirement of debt

– Noncash revenues and gains

Examples: Gains from disposal of long-term assets and from retirement of debt

② Adjustments for changes in current assets and current liabilities

+ Decrease in noncash current operating assets

– Increase in noncash current operating assets

+ Increase in current operating liabilities

– Decrease in current operating liabilities

Net cash provided (used) by operating activities

Decision Insight

One for the Road Even though **Tesla** reported net losses and large cash outflows, its market value tripled in five years. Tesla now rivals both **GM** and **Ford** as one of the most valued U.S. automakers. Investors are counting on Tesla's Model 3 and Model Y to create positive and sustainable operating cash flows. In the past, Tesla funded its operations with cash inflows from stock and debt issuances. ■

Mark Lenin/AP Images

NEED-TO-KNOW 12-2

Reporting Operating Cash Flows (Indirect)

P2

A company's current-year income statement and selected balance sheet data at December 31 of the current and prior years follow.

Prepare the operating activities section of the statement of cash flows using the indirect method for the current year.

Income Statement For Current Year Ended December 31	
Sales revenue	$120
Expenses: Cost of goods sold	50
Depreciation expense	30
Salaries expense	17
Interest expense	3
Net income	$ 20

Selected Balance Sheet Accounts At December 31	Current Yr	Prior Yr
Accounts receivable	$12	$10
Inventory	6	9
Accounts payable	7	11
Salaries payable	8	3
Interest payable	1	0

Solution

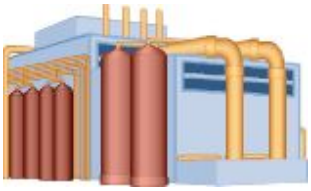
Cash Flows from Operating Activities—Indirect Method For Current Year Ended December 31		
Cash flows from operating activities		
Net income		$20
Adjustments to reconcile net income to net cash provided by operating activities		
Income statement items not affecting cash		
Depreciation expense	$30	
Changes in current assets and current liabilities		
Increase in accounts receivable	(2)	
Decrease in inventory	3	
Decrease in accounts payable	(4)	
Increase in salaries payable	5	
Increase in interest payable	1	33
Net cash provided by operating activities		$53

Do More: QS 12-3 through QS 12-7, and E 12-2 through E 12-7

CASH FLOWS FROM INVESTING

P3

Determine cash flows from both investing and financing activities.



To compute cash flows from investing activities, we analyze changes in (1) all long-term asset accounts and (2) any current accounts for notes receivable and investments in securities. **Reporting of investing activities is identical under the direct method and indirect method.**

Three-Step Analysis

To determine cash provided or used by investing activities: (1) identify changes in investing-related accounts, (2) determine the cash effects using T-accounts and reconstructed entries, and (3) report the cash flow effects.

Analyzing Noncurrent Assets

Genesis both purchased and sold long-term assets during the period. These transactions are investing activities and are analyzed in this section.

Plant Asset Transactions

First Step Analyze Genesis's Plant Assets account and its Accumulated Depreciation account to identify changes in those accounts. Comparative balance sheets in Exhibit 12.10 show a $40,000 increase in plant assets from $210,000 to $250,000 and a $12,000 increase in accumulated depreciation from $48,000 to $60,000.

Point: Investing activities include (1) purchasing and selling longterm assets, (2) lending and collecting on notes receivable, and (3) purchasing and selling investments.

Second Step Items *b* and *c* of the additional information in Exhibit 12.10 relate to plant assets. Recall that the Plant Assets account is impacted by both asset purchases and sales; its

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Accumulated Depreciation account is increased by depreciation and decreased by the removal of accumulated depreciation in asset sales. To explain changes in these accounts and to identify their cash flow effects, we prepare *reconstructed entries, which is our attempt to re-create actual entries previously made by the preparer*. Item *b* says Genesis purchased plant assets of $60,000 by issuing $60,000 in notes payable. The reconstructed entry is

Reconstruction	Plant Assets	60,000	
	Notes Payable		60,000

Item *c* says Genesis sold plant assets costing $20,000 (with $12,000 of accumulated depreciation) for $2,000 cash, resulting in a $6,000 loss. The reconstructed entry is

Reconstruction	Cash	2,000	
	Accumulated Depreciation	12,000	
	Loss on Sale of Plant Assets	6,000	
	Plant Assets		20,000

We also reconstruct the entry for depreciation from the income statement, which does not impact cash.

Reconstruction	Depreciation Expense	24,000	
	Accumulated Depreciation		24,000

The three reconstructed entries are shown in the following T-accounts. This reconstruction analysis is complete in that changes in the long-term asset accounts are entirely explained.

Plant Assets			
Bal., Dec. 31, 2020	210,000		
Purchase	**60,000**	**Sale**	**20,000**
Bal., Dec. 31, 2021	250,000		

Accumulated Depreciation—Plant Assets			
		Bal., Dec. 31, 2020	48,000
Sale	**12,000**	**Depr. expense**	**24,000**
		Bal., Dec. 31, 2021	60,000

Third Step Look at the reconstructed entries to identify cash flows. The identified cash flows are reported in the investing section of the statement.

Cash flows from investing activities	
Cash received from sale of plant assets	$2,000

The $60,000 purchase in item *b,* paid for by issuing notes, is a noncash investing and financing activity. It is reported in a note or in a separate schedule to the statement.

Noncash investing and financing activity	
Purchased plant assets with issuance of notes.	$60,000

Example: If a plant asset costing $40,000 with $37,000 of accumulated depreciation is sold at a $4,000 gain, what is the cash flow? *Answer:* + $7,000

Additional Long-Term Assets Genesis did not have any additional noncurrent assets (or nonoperating current assets). If such assets do exist, we analyze and report investing cash flows using the same three-step process.

Ethical Risk

Location, Location, Location Cash flows can be delayed or accelerated at period-end to improve or reduce current-period cash flows. Cash flows also can be misclassified. We know cash outflows under operating activities are viewed as expense payments. However, cash outflows under investing activities are viewed as a sign of growth potential. This requires investors to review where cash flows are reported. ■

By Steve/Moment Open/Getty Images

NEED-TO-KNOW 12-3

Reporting Investing Cash Flows

P3

Use the following information to determine this company's cash flows from investing activities.

a. Sold a factory (costing $800, with $700 of accumulated depreciation), at a loss of $10.

b. Paid $70 cash for new equipment.

c. Long-term stock investments were sold for $20 cash, yielding a loss of $4.

d. Sold land costing $175 for $160 cash, yielding a loss of $15.

Solution

Cash flows from investing activities	
Cash received from sale of factory (from *a**—also see margin entry)	$ 90
Cash paid for new equipment (from *b*)	(70)
Cash received from sale of long-term investments (from *c*)	20
Cash received from sale of land (from *d*)	160
Net cash provided by investing activities	$200

*Cash received from sale of factory = Cost – Accum. Depr. – Loss = $800 – $700 – $10 = $90.

Reconstruction for part *a*.

Cash	**90**	
Accum. Depreciation	700	
Loss on asset sale	10	
Factory		800

Do More: QS 12-8 through QS 12-13, E 12-9

CASH FLOWS FROM FINANCING

To compute cash flows from financing activities, we analyze changes in all noncurrent liability accounts (including the current portion of any notes and bonds) and equity accounts. These accounts include long-term debt, notes payable, bonds payable, common stock, and

retained earnings. **Reporting of financing activities is identical under the direct method and indirect method.**

Three-Step Analysis

To determine cash provided or used by financing activities: (1) identify changes in financing-related accounts, (2) determine the cash effects using T-accounts and reconstructed entries, and (3) report the cash flow effects.

Analyzing Noncurrent Liabilities

Genesis retired notes payable by paying cash. This is a change in noncurrent liabilities.

Point: Examples of financing activities are (1) receiving cash from issuing debt or repaying amounts borrowed and (2) receiving cash from or distributing cash to owners.

Notes Payable Transactions

First Step Review comparative balance sheets in Exhibit 12.10, which shows an increase in notes payable from $64,000 to $90,000.

Second Step Item *e* of the additional information in Exhibit 12.10 reports that notes with a carrying value of $34,000 are retired for $18,000 cash, resulting in a $16,000 gain. The reconstructed entry is

Reconstruction	Notes Payable	34,000	
	Gain on retirement of debt		16,000
	Cash		18,000

Item *b* of the additional information reports that Genesis purchased plant assets costing $60,000 by issuing $60,000 in notes payable. This $60,000 increase to notes payable is reported as a noncash investing and financing transaction. The Notes Payable account is explained by these reconstructed entries.

Notes Payable			
		Bal., Dec. 31, 2020	64,000
Retired notes	**34,000**	**Issued notes**	**60,000**
		Bal., Dec. 31, 2021	90,000

Third Step Report cash paid for the notes retirement in the financing activities section. page 470

Cash flows from financing activities	
Cash paid to retire notes	$(18,000)

Analyzing Equity

Genesis had two equity transactions. The first is the issuance of common stock for cash. The second is the declaration and payment of cash dividends.

Common Stock Transactions

First Step Review the comparative balance sheets in Exhibit 12.10, which show an increase in common stock from $80,000 to $95,000.

Second Step Item *d* of the additional information in Exhibit 12.10 reports that 3,000 shares of common stock are issued at par for $5 per share. The reconstructed entry and the complete Common Stock T-account follow.

Reconstruction	Cash	15,000	
	Common Stock		15,000

Common Stock		
	Bal., Dec. 31, 2020	80,000
	Issued stock	**15,000**
	Bal., Dec. 31, 2021	95,000

Third Step Report cash received from stock issuance in the financing activities section.

Cash flows from financing activities	
Cash received from issuing stock	$15,000

Retained Earnings Transactions

First Step Review the comparative balance sheets in Exhibit 12.10, which show an increase in retained earnings from $88,000 to $112,000.

Second Step Item *f* of the additional information in Exhibit 12.10 reports that cash dividends of $14,000 are declared and paid. The reconstructed entry follows.

Reconstruction	Retained Earnings	14,000	
	Cash		14,000

Retained Earnings also is impacted by net income of $38,000. (Net income is covered in operating activities.) The reconstructed Retained Earnings account follows.

Retained Earnings			
		Bal., Dec. 31, 2020	88,000
Cash dividend	**14,000**	**Net income**	**38,000**
		Bal., Dec. 31, 2021	112,000

Point: Stock dividends and splits do not impact cash.

Third Step Report cash paid for dividends in the financing activities section.

Cash flows from financing activities	
Cash paid for dividends	$(14,000)

Proving Cash Balances

The final stage in preparing the statement is to report the beginning and ending cash balances and prove that the *net change in cash* is explained by operating, investing, and financing cash flows. The last three rows of Exhibit 12.13 show that the $5,000 net increase in cash, from $12,000 at the beginning of the period to $17,000 at the end, is

reconciled by net cash flows from operating ($20,000 inflow), investing ($2,000 inflow), and financing ($17,000 outflow) activities.

EXHIBIT 12.13

Complete Statement of Cash Flows—Indirect Method

GENESIS
Statement of Cash Flows (Indirect Method)
For Year Ended December 31, 2021

Cash flows from operating activities		
Net income	$ 38,000	
Adjustments to reconcile net income to net cash provided by operating activities		
Income statement items not affecting cash		
Depreciation expense	24,000	
Loss on sale of plant assets	6,000	
Gain on retirement of notes	(16,000)	
Changes in current assets and liabilities		
Increase in accounts receivable	(20,000)	
Increase in inventory	(14,000)	
Increase in prepaid expenses	(2,000)	
Decrease in accounts payable	(5,000)	
Decrease in interest payable	(1,000)	
Increase in income taxes payable	10,000	
Net cash provided by operating activities		$ 20,000
Cash flows from investing activities		
Cash received from sale of plant assets	2,000	
Net cash provided by investing activities		2,000
Cash flows from financing activities		
Cash received from issuing stock	15,000	
Cash paid to retire notes	(18,000)	
Cash paid for dividends	(14,000)	
Net cash used in financing activities		(17,000)
Net increase in cash		$ 5,000
Cash balance at prior year-end		12,000
Cash balance at current year-end		$ 17,000

Decision Maker

Reporter Management is in labor contract negotiations and grants you an interview. It highlights a total net cash outflow of $550,000 (which includes net cash outflows of $850,000 for investing activities and $350,000 for financing activities). What is your assessment of this company? ■ *Answer:* An initial reaction from the $550,000 decrease in net cash is not

positive. However, closer scrutiny shows a more positive picture. Cash flow from operations is $650,000, computed as [?] − $850,000 − $350,000 = $(550,000).

NEED-TO-KNOW 12-4

Reporting Financing Cash Flows

P3

Use the following information to determine cash flows from financing activities.

a. Issued common stock for $40 cash.

b. Paid $70 cash to retire a notes payable at its $70 maturity value.

c. Paid cash dividend of $15.

d. Paid $5 cash to acquire its treasury stock.

Solution

Cash flows from financing activities	
Cash received from issuance of common stock (from *a*)	$ 40
Cash paid to settle notes payable (from *b*)	(70)
Cash paid for dividend (from *c*)	(15)
Cash paid to acquire treasury stock (from *d*)	(5)
Net cash used by financing activities	$(50)

Do More: QS 12-14, QS 12-15, QS 12-16, QS 12-17, E 12-10

SUMMARY USING T-ACCOUNTS

Exhibit 12.14 uses T-accounts to summarize how changes in Genesis's noncash balance sheet accounts affect its cash inflows and outflows (dollar amounts in thousands). The top of the exhibit shows Genesis's Cash T-account, and the lower part shows T-accounts for its remaining balance sheet accounts. We see that the $20,000 net cash provided by operating activities and the $5,000 net increase in

cash shown in the Cash T-account agree with the same figures in the statement of cash flows in Exhibit 12.13. We explain Exhibit 12.14 in five parts.

EXHIBIT 12.14

Balance Sheet T-Accounts to Explain the Change in Cash ($ thousands)

Cash

(1) Net income	38		
Income statement items not affecting cash			
(2) Depreciation	24		
(3) Loss on sale of plant assets	6	(4) Gain on retirement of notes	16
Changes in current assets and liabilities			
		(5) Increase in accounts receivable	20
		(6) Increase in inventory	14
		(7) Increase in prepaid expense	2
		(8) Decrease in accounts payable	5
(10) Increase in income taxes payable	10	(9) Decrease in interest payable	1
Net cash provided by operating activities [O]	20		
(3) Cash received from sale of plant assets [I]	2	(4) Cash paid to retire notes [F]	18
(12) Cash received from issuing stock [F]	15	(13) Cash paid for dividends [F]	14
Net increase in cash	5		

Info to prepare
- Operating cash flows [O]

Info to prepare
- Investing cash flows [I]
- Financing cash flows [F]

Accounts Receivable

Beg.	40		
(5)	20		
End.	60		

Inventory

Beg.	70		
(6)	14		
End.	84		

Prepaid Expenses

Beg.	4		
(7)	2		
End.	6		

Plant Assets

Beg.	210		
		(3)	20
(11)	60		
End.	250		

Accumulated Depreciation

		Beg.	48
(3)	12	(2)	24
		End.	60

Accounts Payable

		Beg.	40
(8)	5		
		End.	35

Interest Payable

		Beg.	4
(9)	1		
		End.	3

Income Taxes Payable

		Beg.	12
		(10)	10
		End.	22

Long-Term Notes Payable

		Beg.	64
(4)	34		
		(11)	60
		End.	90

Common Stock

		Beg.	80
		(12)	15
		End.	95

Retained Earnings

		Beg.	88
		(1)	38
(13)	14		
		End.	112

a. Entry **(1)** records $38 net income on the credit side of the Retained Earnings account and the debit side of the Cash account. This $38 net income in the Cash T-account is adjusted until it reflects the $5 net increase in cash.

b. Entries **(2)** through **(4)** add the $24 depreciation and $6 loss on asset sale to net income and subtract the $16 gain on retirement of notes.

c. Entries **(5)** through **(10)** adjust net income for changes in current asset and current liability accounts.

d. Entry **(11)** records the noncash investing and financing transaction involving a $60 purchase of assets by issuing $60 of notes.

e. Entries **(12)** and **(13)** record the $15 stock issuance and the $14 dividend.

Decision Analysis Cash Flow Analysis

A1

Analyze the statement of cash flows and apply the cash flow on total assets ratio.

Analyzing Cash Sources and Uses

Managers review cash flows for business decisions. Creditors evaluate a company's ability to generate enough cash to pay debt. Investors assess cash flows before buying and selling stock.

To effectively evaluate cash flows, we separately analyze investing, financing, and operating activities. Consider data from three different companies in Exhibit 12.15 that operate in the same industry and have been in business for several years. Each company has the same $15,000 net increase in cash, but its sources and uses of cash flows are different. BMX's operating activities provide net cash flows of $90,000, allowing it to purchase plant assets of $48,000 and repay $27,000 of its debt. ATV's operating activities provide $40,000 of cash flows, limiting its purchase of plant assets to $25,000. Trex's $15,000 net cash increase is due to selling plant assets and incurring additional debt. Its operating activities yield a cash outflow of $24,000. Overall, analysis of cash flows reveals that BMX is more capable of generating future cash flows than is ATV or Trex.

EXHIBIT 12.15

Cash Flows of Competing Companies

$ thousands	BMX	ATV	Trex
Cash provided (used) by operating activities . . .	$90,000	$40,000	$(24,000)
Cash provided (used) by investing activities			
Proceeds from sale of plant assets.			26,000
Purchase of plant assets	(48,000)	(25,000)	
Cash provided (used) by financing activities			
Proceeds from issuance of debt			13,000
Repayment of debt	(27,000)		
Net increase (decrease) in cash	$15,000	$15,000	$ 15,000

Decision Insight

Free Cash Flows Many investors use cash flows to value company stock. However, cash-based valuation models often yield different stock values due to differences in measurement of cash flows. Most models require cash flows that are "free" for distribution to shareholders. These *free cash flows* are defined as cash flows available to shareholders after operating asset reinvestments and debt payments. A company's growth and financial flexibility depend on adequate free cash flows. ■

Point: Cash flow from operations
− Capital expenditures
− Debt repayments
= Free cash flows

Cash Flow on Total Assets

Cash flow information can help measure a company's ability to meet its obligations, pay dividends, expand operations, and obtain financing. The **cash flow on total assets** ratio is in Exhibit 12.16. Average total assets is computed by adding beginning and ending assets for the period and dividing by 2.

EXHIBIT 12.16

Cash Flow on Total Assets

$$\text{Cash flow on total assets} = \frac{\text{Cash flow from operations}}{\text{Average total assets}}$$

This ratio measures actual cash flows and is not affected by accounting recognition and measurement. It can help estimate the amount and timing of cash flows from operating activities.

The cash flow on total assets ratios for competitors **Nike** and **Under Armour** are in Exhibit 12.17. In all years, Nike's cash flow on total assets ratio exceeded Under Armour's ratio. This means that Nike did a better job of generating operating cash flows given its assets. Also, Nike's cash flow on total assets increased each of the last two years, which is a positive result. At the same time, Under Armour's lower and uneven cash flow on total assets makes it difficult to predict the amount and timing of its cash flows.

EXHIBIT 12.17

Cash Flow on Total Assets for Two Competitors

Company	Figure ($ millions)	Current Year	1 Year Ago	2 Years Ago
Nike	Operating cash flows	$ 5,903	$ 4,955	$ 3,846
	Average total assets	$23,127	$22,898	$22,328
	Cash flow on total assets	25.5%	21.6%	17.2%
Under Armour	Operating cash flows	$ 509	$ 628	$ 237
	Average total assets	$ 4,544	$ 4,126	$ 3,825
	Cash flow on total assets	11.2%	15.2%	6.2%

NEED-TO-KNOW 12-5

COMPREHENSIVE

Preparing Statement of Cash Flows—Indirect *and* Direct Methods

Comparative balance sheets, an income statement, and additional information follow.

UMA COMPANY
Balance Sheets

At December 31	Current Yr	Prior Yr
Assets		
Cash	$ 43,050	$ 23,925
Accounts receivable	34,125	39,825
Inventory	156,000	146,475
Prepaid expenses	3,600	1,650
Total current assets	236,775	211,875
Equipment	135,825	146,700
Accum. depreciation—Equipment	(61,950)	(47,550)
Total assets	$310,650	$311,025
Liabilities		
Accounts payable	$ 28,800	$ 33,750
Income taxes payable	5,100	4,425
Dividends payable	0	4,500
Total current liabilities	33,900	42,675
Bonds payable	0	37,500
Total liabilities	33,900	80,175
Equity		
Common stock, $10 par	168,750	168,750
Retained earnings	108,000	62,100
Total liabilities and equity	$310,650	$311,025

UMA COMPANY
Income Statement
For Current Year Ended December 31

Sales		$446,100
Cost of goods sold	$222,300	
Operating expenses (excluding depreciation)	120,300	
Depreciation expense	25,500	(368,100)
		78,000
Other gains (losses)		
Loss on sale of equipment	3,300	
Loss on retirement of bonds	825	(4,125)
Income before taxes		73,875
Income tax expense		(13,725)
Net income		$ 60,150

Additional Information for the Current Year

a. Equipment costing $21,375 with accumulated depreciation of $11,100 is sold for cash.

b. Equipment purchases are for cash.

c. Accumulated Depreciation is affected by depreciation expense and the sale of equipment.

d. The balance of Retained Earnings is affected by dividend declarations and net income.

e. All sales are made on credit.

f. All inventory purchases are on credit.

g. Accounts Payable balances result from inventory purchases.

h. Prepaid expenses relate to Operating Expenses.

Required

1. Prepare a statement of cash flows using the indirect method for the current year.

2.[B] Prepare a statement of cash flows using the direct method for the current year.

SOLUTION

Supporting computations for cash receipts and cash payments for the current year.

(1)	Cost of equipment sold*	$ 21,375
	Accumulated depreciation of equipment sold	(11,100)
	Book value of equipment sold	10,275
	Loss on sale of equipment	(3,300)
	Cash received from sale of equipment	$ 6,975
	Cost of equipment sold	$ 21,375
	Less decrease in the Equipment account balance	(10,875)
	Cash paid for new equipment	$10,500
(2)	Loss on retirement of bonds	$ 825
	Carrying value of bonds retired	37,500
	Cash paid to retire bonds	$38,325

*Supporting T-account analysis for part 1 follows.

Equipment			
Bal., Dec. 31, Prior Year	146,700		
Cash purchase	10,500	Sale	21,375
Bal., Dec. 31, Current Year	135,825		

Accumulated Depreciation—Equipment			
		Bal., Dec. 31, Prior Year	47,550
Sale	11,100	Depr. expense	25,500
		Bal., Dec. 31, Current Year	61,950

(3) Beg. Ret. Earn. + Net Income − Div. Declared = End. Ret. Earn.
$62,100 $60,150 $14,250 $108,000

Beg. Div. Pay. + Div. Declared − Div. Paid = End. Div. Pay.
$4,500 $14,250 $18,750 $ 0

(4)[B]	Sales	$ 446,100
	Add decrease in accounts receivable	5,700
	Cash received from customers	$451,800
(5)[B]	Cost of goods sold	$ 222,300
	Plus increase in inventory	9,525
	Purchases	231,825
	Plus decrease in accounts payable	4,950
	Cash paid for inventory	$236,775
(6)[B]	Operating expenses (excluding depreciation)	$ 120,300
	Plus increase in prepaid expenses	1,950
	Cash paid for operating expenses	$122,250
(7)[B]	Income tax expense	$ 13,725
	Less increase in income taxes payable	(675)
	Cash paid for income taxes	$ 13,050

1. Indirect method.

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UMA COMPANY
Statement of Cash Flows (Indirect Method)
For Current Year Ended December 31

Cash flows from operating activities		
Net income	$ 60,150	
Adjustments to reconcile net income to net cash provided by operating activities		
Income statement items not affecting cash		
Depreciation expense	25,500	
Loss on sale of plant assets	3,300	
Loss on retirement of bonds	825	
Changes in current assets and current liabilities		
Decrease in accounts receivable	5,700	
Increase in inventory	(9,525)	
Increase in prepaid expenses	(1,950)	
Decrease in accounts payable	(4,950)	
Increase in income taxes payable	675	
Net cash provided by operating activities		$ 79,725
Cash flows from investing activities		
Cash received from sale of equipment	6,975	
Cash paid for equipment	(10,500)	
Net cash used in investing activities		(3,525)
Cash flows from financing activities		
Cash paid to retire bonds payable	(38,325)	
Cash paid for dividends	(18,750)	
Net cash used in financing activities		(57,075)
Net increase in cash		$ 19,125
Cash balance at prior year-end		23,925
Cash balance at current year-end		$ 43,050

2.B Direct method (Appendix 12B).

UMA COMPANY
Statement of Cash Flows (Direct Method)
For Current Year Ended December 31

Cash flows from operating activities		
Cash received from customers	$ 451,800	
Cash paid for inventory	(236,775)	
Cash paid for operating expenses	(122,250)	
Cash paid for income taxes	(13,050)	
Net cash provided by operating activities		$ 79,725
Cash flows from investing activities		
Cash received from sale of equipment	6,975	
Cash paid for equipment	(10,500)	
Net cash used in investing activities		(3,525)
Cash flows from financing activities		
Cash paid to retire bonds payable	(38,325)	
Cash paid for dividends	(18,750)	
Net cash used in financing activities		(57,075)
Net increase in cash		$ 19,125
Cash balance at prior year-end		23,925
Cash balance at current year-end		$ 43,050

APPENDIX

Spreadsheet Preparation of the Statement of Cash Flows

12A

P4

Illustrate use of a spreadsheet to prepare a statement of cash flows.

This appendix explains how to use a spreadsheet (work sheet) to prepare the statement of cash flows under the indirect method.

Preparing the Indirect Method Spreadsheet A *spreadsheet,* also called *work sheet,* can help us prepare a statement of cash flows. To demonstrate, we return to the comparative balance sheets and

income statement shown in Exhibit 12.10. We use letters *a* through *g* to code changes in accounts, and letters *h* through *m* for additional information, to prepare the statement of cash flows.

a. Net income is $38,000.

b. Accounts receivable increase by $20,000.

c. Inventory increases by $14,000.

d. Prepaid expenses increase by $2,000.

e. Accounts payable decrease by $5,000.

f. Interest payable decreases by $1,000.

g. Income taxes payable increase by $10,000.

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h. Depreciation expense is $24,000.

i. Plant assets costing $20,000 with accumulated depreciation of $12,000 are sold for $2,000 cash. This yields a loss on sale of assets of $6,000.

j. Notes with a book value of $34,000 are retired with a cash payment of $18,000, yielding a $16,000 gain on retirement.

k. Plant assets costing $60,000 are purchased with an issuance of notes payable for $60,000.

l. Issued 3,000 shares of common stock for $15,000 cash.

m. Paid cash dividends of $14,000.

Exhibit 12A.1 shows the indirect method spreadsheet for Genesis. We enter both beginning and ending balance sheet amounts on the spreadsheet. We also enter information in the Analysis of Changes columns (keyed to the additional information items *a* through *m*) to explain changes in the accounts and determine the cash flows for operating, investing, and financing activities. Information about noncash investing and financing activities is reported near the bottom.

EXHIBIT 12A.1

Spreadsheet for Preparing Statement of Cash Flows—Indirect Method

GENESIS
Spreadsheet for Statement of Cash Flows—Indirect Method
For Year Ended December 31, 2021

	Dec. 31, 2020		Analysis of Changes Debit		Analysis of Changes Credit	Dec. 31, 2021
Balance Sheet—Debit Bal. Accounts						
Cash	$ 12,000					$ 17,000
Accounts receivable	40,000	(b)	$20,000			60,000
Inventory	70,000	(c)	14,000			84,000
Prepaid expenses	4,000	(d)	2,000			6,000
Plant assets	210,000	(k1)	60,000	(i)	$20,000	250,000
	$336,000					$417,000
Balance Sheet—Credit Bal. Accounts						
Accumulated depreciation	$ 48,000	(i)	12,000	(h)	24,000	$ 60,000
Accounts payable	40,000	(e)	5,000			35,000
Interest payable	4,000	(f)	1,000			3,000
Income taxes payable	12,000			(g)	10,000	22,000
Notes payable	64,000	(j)	34,000	(k2)	60,000	90,000
Common stock, $5 par value	80,000			(l)	15,000	95,000
Retained earnings	88,000	(m)	14,000	(a)	38,000	112,000
	$336,000					$417,000
Statement of Cash Flows						
Operating activities						
Net income		(a)	38,000			
Increase in accounts receivable				(b)	20,000	
Increase in inventory				(c)	14,000	
Increase in prepaid expenses				(d)	2,000	
Decrease in accounts payable				(e)	5,000	
Decrease in interest payable				(f)	1,000	
Increase in income taxes payable		(g)	10,000			
Depreciation expense		(h)	24,000			
Loss on sale of plant assets		(i)	6,000			
Gain on retirement of notes				(j)	16,000	
Investing activities						
Receipts from sale of plant assets		(i)	2,000			
Financing activities						
Payment to retire notes				(j)	18,000	
Receipts from issuing stock		(l)	15,000			
Payment of cash dividends				(m)	14,000	
Noncash Investing and Financing Activities						
Purchase of plant assets with notes		(k2)	60,000	(k1)	60,000	
			$317,000		$317,000	

Entering the Analysis of Changes on the Spreadsheet

The following steps are used to complete the spreadsheet after the beginning and ending balances of the balance sheet accounts are entered.

① Enter net income as the first item in the statement of cash flows section for computing operating cash inflow (debit) and as a credit to Retained Earnings. **(Entry *a*)**

② In the statement of cash flows section, adjustments to net income are entered as debits if they increase cash flows and as credits if they decrease cash flows. Applying this rule, adjust net income for the change in each noncash current asset and current liability account related to operating activities. For each adjustment to net income, the offsetting debit or credit must help reconcile the beginning and ending balances of a current asset or current liability account. **(Entries *b* through *g*)**

③ Enter adjustments to net income for income statement items not providing or using cash in the period. For each adjustment, the offsetting debit or credit must help reconcile a noncash balance sheet account. **(Entry *h*)**

④ Adjust net income to eliminate any gains or losses from investing and financing activities. Because the cash from a gain must be excluded from operating activities, the gain is entered as a credit in the operating activities section. Losses are entered as debits. For each adjustment, the related debit and/or credit must help reconcile balance sheet accounts and involve reconstructed entries to show the cash flow from investing or financing activities. **(Entries *i* and *j*)**

⑤ After reviewing any unreconciled balance sheet accounts and related information, enter the remaining reconciling entries for investing and financing activities. Examples are purchases of plant assets, issuances of long-term debt, stock issuances, and dividend payments. Some of these may require entries in the noncash investing and financing section of the spreadsheet. **(Entries *k* through *m*)**

⑥ Check accuracy by totaling the Analysis of Changes columns and by determining that the change in each balance sheet account has been explained (reconciled).

Because adjustments *i, j,* and *k* are more challenging, we show them in the following debit and credit format. These entries are for purposes of our understanding; they are *not* entries made in the journals when preparing the statement. Changes in the Cash account are identified as sources or uses of cash.

i.	Cash—Receipt from sale of plant assets **(source of cash)**	**2,000**	
	Loss from sale of plant assets	6,000	
	Accumulated depreciation	12,000	
	Plant assets		20,000
	Describe sale of plant assets.		
j.	Notes payable	34,000	
	Cash—Payments to retire notes **(use of cash)**		**18,000**
	Gain on retirement of notes		16,000
	Describe retirement of notes.		
k1.	Plant assets	60,000	
	Cash—Purchase of plant assets financed by notes		**60,000**
	Describe purchase of plant assets.		
k2.	Cash—Purchase of plant assets financed by notes	**60,000**	
	Notes payable		60,000
	Issue notes for purchase of assets.		

APPENDIX

Direct Method of Reporting Operating Cash Flows

12B

P5

Compute cash flows from operating activities using the direct method.

We compute operating cash flows under the direct method by adjusting accrual-based income statement items to the cash basis as follows.

Revenue or expense	+ or −	Adjustments for changes in related balance sheet accounts	=	Cash receipts or cash payments

The framework for reporting cash receipts and cash payments for the operating section under the direct method is shown in Exhibit 12B.1.

EXHIBIT 12B.1

Major Classes of Operating Cash Flows

Operating Cash Receipts The financial statements and page 478 additional information reported by Genesis in Exhibit 12.10 show one cash receipt: sales to customers. We start with sales to customers as reported on the income statement and then adjust it to get cash received from customers.

Cash Received from Customers If all sales are for cash, cash received from customers equals the sales reported on the income statement. When some or all sales are on credit, we must adjust the amount of sales for the change in Accounts Receivable. To help us compute cash receipts, we use a T-account that includes accounts receivable balances for Genesis on December 31, 2020 and 2021. The beginning balance is $40,000 and the ending balance is $60,000. Next, the income statement shows sales of $590,000, which is put on the debit side. We now reconstruct the account to determine the cash receipts from customers are $570,000, computed as $40,000 + $590,000 − [?] = $60,000.

Point: An accounts receivable increase implies that cash received from customers is less than sales (the converse is also true).

Reconstructed Entry		
Cash	570,000	
Accts Recble	20,000	
Sales		590,000

Accounts Receivable			
Bal., Dec. 31, 2020	40,000		
Sales	590,000	Cash receipts =	570,000
Bal., Dec. 31, 2021	60,000		

Cash receipts also can be computed as sales of $590,000 minus a $20,000 increase in accounts receivable. This computation is in Exhibit 12B.2. Genesis reports the $570,000 cash received from customers as a cash inflow from operating activities.

EXHIBIT 12B.2

Compute Cash Received from Customers—Direct Method

Cash received from customers = Sales + **Decrease** in accounts receivable
or
– **Increase** in accounts receivable

Other Cash Receipts Other common cash receipts involve rent, interest, and dividends. We compute cash received from these items by subtracting an increase in their receivable or adding a decrease. For example, if rent receivable increases in the period, cash received from renters is less than rent revenue reported on the income statement. If rent receivable decreases, cash received is more than reported rent revenue. The same applies to interest and dividends.

Operating Cash Payments The financial statements and additional information for Genesis in Exhibit 12.10 show four expenses (excluding depreciation) : cost of goods sold; operating expenses; interest expense; and taxes expense. We analyze each expense to compute its cash impact.

Cash Paid for Inventory We compute cash paid for inventory by analyzing both cost of goods sold and inventory. If all inventory purchases are for cash and the balance of Inventory is unchanged, the amount of cash paid for inventory equals cost of goods sold—an uncommon situation. Instead, there normally is some change in the Inventory balance. Also, some or all purchases are often made on credit, which changes the Accounts Payable balance. When the balances of both Inventory and Accounts Payable change, we must adjust the cost of goods sold for changes in both accounts to compute cash paid for inventory. This is a two-step adjustment.

First, we use the change in the account balance of Inventory, along with the cost of goods sold amount, to compute cost of purchases for the period. An increase in inventory means that we bought more than

we sold, and we add this inventory increase to cost of goods sold to compute cost of purchases. A decrease in inventory means that we bought less than we sold, and we subtract the inventory decrease from cost of goods sold to compute purchases. We show the *first step* by reconstructing the Inventory account. We determine purchases to be $314,000, computed as cost of goods sold of $300,000 plus the $14,000 increase in inventory.

Inventory			
Bal., Dec. 31, 2020	70,000		
Purchases =	314,000	Cost of goods sold	300,000
Bal., Dec. 31, 2021	84,000		

The second step uses the change in the balance of Accounts Payable, and the cost of purchases, to compute cash paid for inventory. A decrease in accounts payable means that we paid for more goods than we acquired this period, and we would add the accounts payable decrease to cost of purchases to compute cash paid for inventory. An increase in accounts payable means that we paid for less than the amount of goods acquired, and we would subtract the accounts payable increase from purchases to compute cash paid for inventory. The *second step* is applied to Genesis by reconstructing its Accounts Payable account to get cash paid of $319,000 (or $40,000 + $314,000 − [?] = $35,000).

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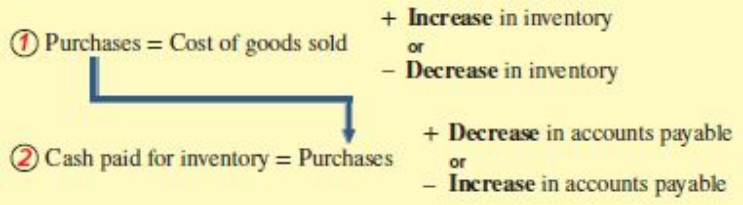
Accounts Payable			
		Bal., Dec. 31, 2020	40,000
Cash payments =	319,000	Purchases	314,000
		Bal., Dec. 31, 2021	35,000

Reconstructed Entry		
Cost of Goods Sold	300,000	
Inventory	14,000	
Accounts Payable	5,000	
Cash		319,000

Alternatively, cash paid for inventory is equal to purchases of $314,000 plus the $5,000 decrease in accounts payable. The $319,000 cash paid for inventory is reported as a cash outflow under operating activities. This two-step adjustment to cost of goods sold to compute cash paid for inventory is in Exhibit 12B.3.

EXHIBIT 12B.3

Cash Paid for Inventory—Direct Method



Cash Paid for Operating Expenses (Excluding Depreciation) The Genesis income statement shows operating expenses of $216,000 (see Exhibit 12.10. To compute cash paid for operating expenses, we adjust for any changes in related balance sheet accounts. We begin by looking for any prepaid expenses and accrued liabilities in the balance sheets in Exhibit 12.10. The balance sheets show prepaid expenses but no accrued liabilities. Thus, the adjustment is only for the change in prepaid expenses. The adjustment is computed by assuming that all cash paid for operating expenses is initially debited to Prepaid Expenses. This assumption allows us to reconstruct the Prepaid Expenses account to get cash paid of $218,000.

Point: A decrease in prepaid expenses implies that reported expenses include an amount(s) that did not require a cash outflow in the period.

Prepaid Expenses			
Bal., Dec. 31, 2020	4,000		
Cash payments =	218,000	Operating expenses	216,000
Bal., Dec. 31, 2021	6,000		

Reconstructed Entry

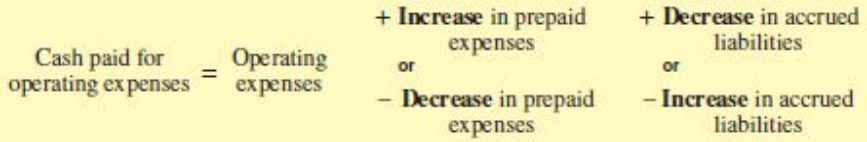
Operating Expenses	216,000	
Prepaid Expenses	2,000	
Cash		218,000

Cash paid also can be calculated as reported expenses of $216,000 plus the $2,000 increase in prepaid expenses.

Exhibit 12B.4 summarizes the adjustments to operating expenses.

EXHIBIT 12B.4

Cash Paid for Operating Expenses—Direct Method



Cash Paid for Accrued Liabilities The Genesis balance sheet did not report accrued liabilities, but we include them in the formula to explain the adjustment to cash when they do exist. A decrease in accrued liabilities means that we paid cash for more goods or services than received this period, so cash paid is higher than the recorded expense. Alternatively, an increase in accrued liabilities implies that we paid less cash than what was received, so cash paid is less than the recorded expense.

Cash Paid for Interest and Income Taxes Computing operating cash flows for interest and taxes requires adjustments for amounts reported on the income statement for changes in related balance sheet accounts. The Genesis income statement shows interest expense of $7,000 and income taxes expense of $15,000. To compute the cash paid, we adjust interest expense for the change in interest payable and adjust income taxes expense for the change in income taxes payable. These computations involve reconstructing both liability accounts and show cash paid for interest of $8,000 and cash paid for income taxes of $5,000.

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Reconstructed Entry

Interest Expense	7,000	
Interest Payable	1,000	
Cash		8,000

Reconstructed Entry

Income Tax Expense	15,000	
Income Tax Payable		10,000
Cash		5,000

Interest Payable

	Bal., Dec. 31, 2020	4,000
Cash paid for interest = 8,000	Interest expense	7,000
	Bal., Dec. 31, 2021	3,000

Income Taxes Payable

	Bal., Dec. 31, 2020	12,000
Cash paid for taxes = 5,000	Income taxes expense	15,000
	Bal., Dec. 31, 2021	22,000

The formulas to compute these amounts are in Exhibit 12B.5. Both of these cash payments are reported as operating cash outflows.

EXHIBIT 12B.5

Cash Paid for Both Interest and Taxes—Direct Method

Cash paid for interest	= Interest expense	+ **Decrease** in interest payable or – **Increase** in interest payable
Cash paid for taxes	= Income taxes expense	+ **Decrease** in income taxes payable or – **Increase** in income taxes payable

Analyzing Additional Expenses, Gains, and Losses Genesis has three more items reported on its income statement: depreciation, loss

on sale of assets, and gain on retirement of debt. We consider each for its potential cash effects.

Depreciation Expense Depreciation expense is $24,000. It is often called a *noncash expense* because depreciation has no cash flows. Depreciation expense is *never* reported on a statement of cash flows using the direct method; nor is depletion or amortization expense.

Loss on Sale of Assets Sales of assets frequently result in gains and losses reported as part of net income, but the amount of recorded gain or loss does *not* impact cash. Thus, the loss or gain on a sale of assets is *never* reported on a statement of cash flows using the direct method.

Gain on Retirement of Debt Retirement of debt usually yields a gain or loss reported as part of net income, but that gain or loss does *not* impact cash. Thus, the loss or gain from retirement of debt is *never* reported on a statement of cash flows using the direct method.

Point : The FASB requires a reconciliation of net income to net cash provided (used) by operating activities when the direct method is used. This reconciliation follows the operating activities section using the indirect method.

Summary of Adjustments for Direct Method Exhibit 12B.6 summarizes common adjustments for net income to yield net cash provided (used) by operating activities under the direct method.

EXHIBIT 12B.6

Summary of Selected Adjustments for Direct Method

Item	From Income Statement	Adjustments to Obtain Cash Flow Numbers
Receipts		
From sales	Sales Revenue	+ Decrease in Accounts Receivable – Increase in Accounts Receivable
From rent	Rent Revenue	+ Decrease in Rent Receivable – Increase in Rent Receivable
From interest	Interest Revenue	+ Decrease in Interest Receivable – Increase in Interest Receivable
From dividends	Dividend Revenue	+ Decrease in Dividends Receivable – Increase in Dividends Receivable
Payments		
To suppliers	Cost of Goods Sold	+ Increase in Inventory – Decrease in Inventory + Decrease in Accounts Payable – Increase in Accounts Payable
For operations	Operating Expense	+ Increase in Prepaids – Decrease in Prepaids + Decrease in Accrued Liabilities – Increase in Accrued Liabilities
To employees	Wages (Salaries) Expense	+ Decrease in Wages (Salaries) Payable – Increase in Wages (Salaries) Payable
For interest	Interest Expense	+ Decrease in Interest Payable – Increase in Interest Payable
For taxes	Income Tax Expense	+ Decrease in Income Tax Payable – Increase in Income Tax Payable

Direct Method Format of Operating Activities Section

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Exhibit 12B.7 shows the Genesis statement of cash flows using the direct method. Operating cash outflows are subtracted from operating cash inflows to get net cash provided (used) by operating activities.

EXHIBIT 12B.7

Statement of Cash Flows—Direct Method

GENESIS Statement of Cash Flows (Direct Method) For Year Ended December 31, 2021		
Cash flows from operating activities		
Cash received from customers	$ 570,000	
Cash paid for inventory	(319,000)	
Cash paid for operating expenses	(218,000)	
Cash paid for interest	(8,000)	
Cash paid for taxes	(5,000)	
Net cash provided by operating activities		$ 20,000
Cash flows from investing activities		
Cash received from sale of plant assets	2,000	
Net cash provided by investing activities		2,000
Cash flows from financing activities		
Cash received from issuing stock	15,000	
Cash paid to retire notes	(18,000)	
Cash paid for dividends	(14,000)	
Net cash used in financing activities		(17,000)
Net increase in cash		$ 5,000
Cash balance at prior year-end		12,000
Cash balance at current year-end		$ 17,000

NEED-TO-KNOW 12-6

Reporting Operating Cash Flows (Direct)

P5

A company's current-year income statement and selected balance sheet data at December 31 of the current and prior years follow. Prepare the operating activities section of the statement of cash flows using the direct method for the current year.

Income Statement For Current Year Ended December 31	
Sales revenue	$120
Expenses: Cost of goods sold	50
Depreciation expense	30
Salaries expense	17
Interest expense	3
Net income	$ 20

Selected Balance Sheet Accounts At December 31	Current Yr	Prior Yr
Accounts receivable	$12	$10
Inventory	6	9
Accounts payable	7	11
Salaries payable	8	3
Interest payable	1	0

Solution

Cash Flows from Operating Activities—Direct Method For Current Year Ended December 31		
Cash flows from operating activities*		
Cash received from customers	$118	
Cash paid for inventory	(51)	
Cash paid for salaries	(12)	
Cash paid for interest	(2)	
Net cash provided by operating activities		$53

*Supporting computations:

Cash received from customers = Sales of $120 − Accounts Receivable increase of $2.

Cash paid for inventory = COGS of $50 − Inventory decrease of $3 + Accounts Payable decrease of $4.

Cash paid for salaries = Salaries Expense of $17 − Salaries Payable increase of $5.

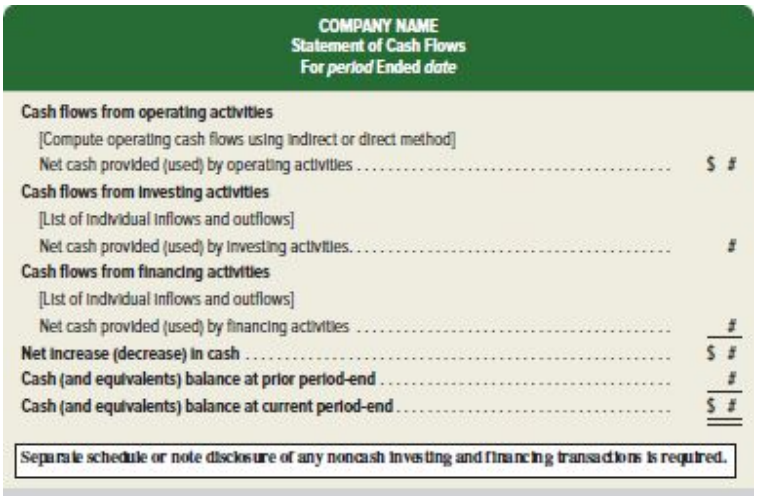
Cash paid for interest = Interest Expense of $3 − Interest Payable increase of $1.

Do More: QS 12-22 through QS 12-28, E 12-17 through E 12-21

Summary: Cheat Sheet

BASICS OF CASH FLOW REPORTING

Format for statement of cash flows:



COMPANY NAME
Statement of Cash Flows
For *period* Ended *date*

Cash flows from operating activities	
[Compute operating cash flows using indirect or direct method]	
Net cash provided (used) by operating activities	$ #
Cash flows from investing activities	
[List of individual inflows and outflows]	
Net cash provided (used) by investing activities	#
Cash flows from financing activities	
[List of individual inflows and outflows]	
Net cash provided (used) by financing activities	#
Net increase (decrease) in cash	$ #
Cash (and equivalents) balance at prior period-end	#
Cash (and equivalents) balance at current period-end	$ #

Separate schedule or note disclosure of any noncash investing and financing transactions is required.

Noncash investing and financing activities: Some investing and financing activities do not affect cash flows, such as the purchase of long-term assets using a long-term notes payable (loan). Such transactions are reported at the bottom of the statement of cash flows or in a note to the statement.

CASH FLOWS FROM OPERATING—INDIRECT

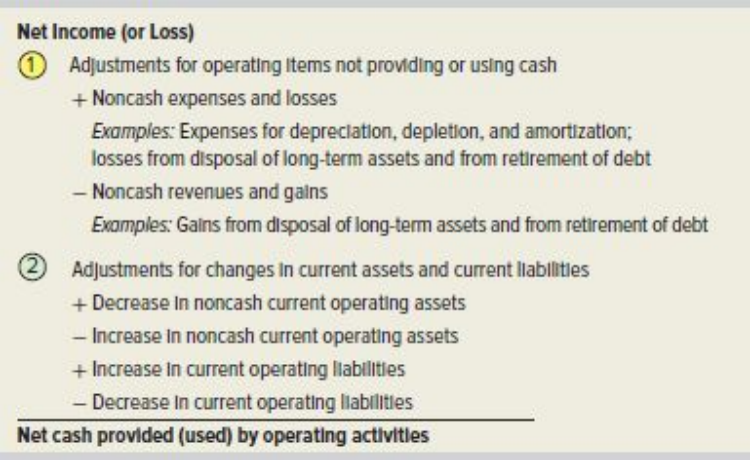
Operating activities: Generally include transactions and events that affect net income.

Operating cash inflow examples: Cash sales to customers, collections on credit sales, receipt of dividend revenue, receipt of interest revenue.

Operating cash outflow examples: Cash to pay operating expenses, including that to pay salaries and wages, pay suppliers for goods and services, pay for rent, pay interest owed, pay taxes.

Indirect method: Reports net income and then adjusts it for items that do not affect cash. Indirect method only affects the presentation of operating cash flows, not investing or financing sections.

Summary of adjustments for *indirect* method:



CASH FLOWS FROM INVESTING

Investing activities: Generally include transactions and events that come from the purchase and sale of long-term assets.

Investing cash inflow examples: Cash from selling plant assets, selling intangible assets, selling investments, collecting principal (but *not* interest) on notes receivable.

Investing cash outflow examples: Cash to buy plant assets, buy intangible assets, buy investments, loan money in return for notes receivable.

Example of investing section format:

Cash flows from investing activities		
Cash received from sale of plant assets	$2,000	
Net cash provided by investing activities		$2,000

CASH FLOWS FROM FINANCING

Financing activities: Generally include transactions and events that affect long-term liabilities and equity.

Financing cash inflow examples: Cash from issuing common and preferred stock, issuing long-term debt (notes payable and bonds payable), reissuing treasury stock.

Financing cash outflow examples: Cash to pay dividends to shareholders, pay off long-term debt (notes payable and bonds payable), purchase treasury stock.

Example of financing section format:

Cash flows from financing activities		
Cash received from issuing stock	$ 15,000	
Cash paid to retire notes	(18,000)	
Cash paid for dividends	(14,000)	
Net cash used in financing activities		$(17,000)

CASH FLOWS FROM OPERATING—DIRECT

Direct method: Separately lists operating cash receipts and operating cash payments. Cash payments are subtracted from cash receipts. Unlike the indirect method, it does not start with net income. This only affects the operating section of the statement of cash flows.

Summary of adjustments for *direct* method:

Item	From Income Statement	Adjustments to Obtain Cash Flow Numbers
Receipts		
From sales	Sales Revenue	+ Decrease in Accounts Receivable – Increase in Accounts Receivable
From rent	Rent Revenue	+ Decrease in Rent Receivable – Increase in Rent Receivable
From interest	Interest Revenue	+ Decrease in Interest Receivable – Increase in Interest Receivable
From dividends	Dividend Revenue	+ Decrease in Dividends Receivable – Increase in Dividends Receivable
Payments		
To suppliers	Cost of Goods Sold	+ Increase in Inventory – Decrease in Inventory + Decrease in Accounts Payable – Increase in Accounts Payable
For operations	Operating Expense	+ Increase in Prepaids – Decrease in Prepaids + Decrease in Accrued Liabilities – Increase in Accrued Liabilities
To employees	Wages (Salaries) Expense	+ Decrease in Wages (Salaries) Payable – Increase in Wages (Salaries) Payable
For interest	Interest Expense	+ Decrease in Interest Payable – Increase in Interest Payable
For taxes	Income Tax Expense	+ Decrease in Income Tax Payable – Increase in Income Tax Payable

Key Terms

Cash flow on total assets (473)

Direct method (463)

Financing activities (460)

Indirect method (463)

Investing activities (460)

Operating activities (460)

Multiple Choice Quiz

1. Use the following information to determine the net cash provided or used by operating activities under the indirect method.

Net income	$15,200
Depreciation expense	10,000
Cash payment on notes payable	8,000
Gain on sale of land	3,000
Increase in inventory	1,500
Increase in accounts payable	2,850

a. $23,550 used by operating activities

b. $23,550 provided by operating activities

c. $15,550 provided by operating activities

d. $42,400 provided by operating activities

e. $20,850 provided by operating activities

2. A machine with a cost of $175,000 and accumulated depreciation of $94,000 is sold for $87,000 cash. The amount reported as a source of cash under cash flows from investing activities is

a. $81,000.

b. $6,000.

c. $87,000.

d. $0; this is a financing activity.

e. $0; this is an operating activity.

3. A company settles a long-term notes payable plus interest by paying $68,000 cash toward the principal amount and $5,440 cash for interest. The amount reported as a use of cash under cash flows from financing activities is

a. $73,440.

b. $68,000.

c. $5,440.

d. $0; this is an investing activity.

e. $0; this is an operating activity.

4. The following information is available regarding a company's annual salaries and wages. What amount of cash is paid for salaries and wages?

Salaries and wages expense	$255,000
Salaries and wages payable, prior year-end	8,200
Salaries and wages payable, current year-end	10,900

a. $252,300

b. $257,700

c. $255,000

d. $274,100

e. $235,900

5. The following information is available for a company. What amount of cash is paid for inventory for the current year?

Cost of goods sold	$545,000
Inventory, prior year-end	105,000
Inventory, current year-end	112,000
Accounts payable, prior year-end	98,500
Accounts payable, current year-end	101,300

a. $545,000

b. $554,800

c. $540,800

d. $535,200

e. $549,200

ANSWERS TO MULTIPLE CHOICE QUIZ

1. b;

Net income	$15,200
Depreciation expense	10,000
Gain on sale of land	(3,000)
Increase in inventory	(1,500)
Increase in accounts payable	2,850
Net cash provided by operations	$23,550

2. c; Cash from sale of machine is reported as an investing activity.
3. b; FASB requires cash interest paid be reported under operating.
4. a; Cash paid for salaries and wages = $255,000 + $8,200 − $10,900 = $252,300
5. e; Increase in inventory = $112,000 − $105,000 = $7,000

   Increase in accounts payable = $101,300 − $98,500 = $2,800

   Cash pai d for inventory = $545,000 + $7,000 − $2,800 = $549,200

Superscript letter A or B denotes assignments based on Appendix 12A or 12B.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

connect

QUICK STUDY

QS 12-1

Classifying transactions by activity

C1

Classify the following cash flows as either operating, investing, or financing activities.

1. Sold stock investments for cash.

2. Received cash payments from customers.
3. Paid cash for wages and salaries.
4. Purchased inventories with cash.
5. Paid cash dividends.
6. Issued common stock for cash.
7. Received cash interest on a note.
8. Paid cash interest on outstanding notes.
9. Received cash from sale of land.
10. Paid cash for property taxes on building.

QS 12-2

Statement of cash flows

P1

Label the following headings, line items, and notes with the numbers *1* through *13* according to their sequential order (from top to bottom) for presentation on the statement of cash flows.

_____ **a.** "Cash flows from investing activities" title

_____ **b.** "For *period* Ended *date* " heading

_____ **c.** "Cash flows from operating activities" title

_____ **d.** Company name

_____ **e.** Schedule or note disclosure of noncash investing and financing transactions

_____ **f.** "Statement of Cash Flows" heading

_____ **g.** Net increase (decrease) in cash $

_____ **h.** Net cash provided (used) by operating activities $

_____ **i.** Cash (and equivalents) balance at prior period-end $

_____ **j.** Net cash provided (used) by financing activities $

_____ **k.** "Cash flows from financing activities" title

____ **l.** Net cash provided (used) by investing activities $

____ **m.** Cash (and equivalents) balance at current period-end $

QS 12-3

Indirect: Computing cash flows from operations **P2**

Bryant Co. reports net income of $20,000. For the year, depreciation expense is $7,000 and the company reports a gain of $3,000 from sale of machinery. It also had a $2,000 loss from retirement of notes. Compute cash flows from operations using the *indirect method* .

QS 12-4

Indirect: Computing cash flows from operations **P2**

Cain Inc. reports net income of $15,000. Its comparative balance sheet shows the following changes: accounts receivable increased $6,000; inventory decreased $8,000; prepaid insurance decreased $1,000; accounts payable increased $3,000; and taxes payable decreased $2,000. Compute cash flows from operations using the *indirect method* .

QS 12-5

Indirect: Computing cash flows from operations

P2

For each separate company, compute cash flows from operations using the *indirect method.*

	Twix	Dots	Skor
Net income	$ 4,000	$100,000	$72,000
Depreciation expense	30,000	8,000	24,000
Accounts receivable increase (decrease)	40,000	20,000	(4,000)
Inventory increase (decrease)	(20,000)	(10,000)	10,000
Accounts payable increase (decrease)	24,000	(22,000)	14,000
Accrued liabilities increase (decrease)	(44,000)	12,000	(8,000)

QS 12-6

Indirect: Computing cash from operations **P2**

Use the following information to determine cash flows from operating activities using the *indirect method.*

MOSS COMPANY
Income Statement
For Year Ended December 31, 2021

Sales	$515,000
Cost of goods sold	331,600
Gross profit	183,400
Operating expenses (excluding depreciation)	121,500
Depreciation expense	36,000
Income before taxes	25,900
Income taxes expense	7,700
Net income	$ 18,200

MOSS COMPANY
Selected Balance Sheet Information

At December 31	2021	2020
Current assets		
Cash	$84,650	$26,800
Accounts receivable	25,000	32,000
Inventory	60,000	54,100
Current liabilities		
Accounts payable	30,400	25,700
Income taxes payable	2,050	2,200

QS 12-7

Indirect: Computing cash from operations **P2**

CRUZ, INC.
Income Statement
For Year Ended December 31, 2021

Sales	$488,000
Cost of goods sold	314,000
Gross profit	174,000
Operating expenses (excluding depreciation)	89,100
Depreciation expense	37,600
Income before taxes	47,300
Income taxes expense	17,300
Net income	$ 30,000

CRUZ, INC.
Comparative Balance Sheets

At December 31	2021	2020
Assets		
Cash	$ 94,800	$ 24,000
Accounts receivable, net	41,000	51,000
Inventory	85,800	95,800
Prepaid expenses	5,400	4,200
Total current assets	227,000	175,000
Furniture	109,000	119,000
Accum. depreciation—Furniture	(17,000)	(9,000)
Total assets	$319,000	$285,000
Liabilities and Equity		
Accounts payable	$ 15,000	$ 21,000
Wages payable	9,000	5,000
Income taxes payable	1,400	2,600
Total current liabilities	25,400	28,600
Notes payable (long-term)	29,000	69,000
Total liabilities	54,400	97,600
Equity		
Common stock, $5 par value	229,000	179,000
Retained earnings	35,600	8,400
Total liabilities and equity	$319,000	$285,000

Required

Use the *indirect method* to prepare the operating activities section of Cruz's statement of cash flows.

QS 12-8

Computing cash from asset sales

P3

The following information is from Ellerby Company's comparative balance sheets. The current-year income statement reports depreciation expense on furniture of $18,000. During the year, furniture costing $52,500 was sold for its book value. Compute cash received from the sale of furniture.

At December 31	Current Year	Prior Year
Furniture	$132,000	$ 184,500
Accumulated depreciation—Furniture	(88,700)	(110,700)

QS 12-9

Computing investing cash flows

P3

Indicate the effect each separate transaction has on *investing* cash flows.

a. Sold a truck costing $40,000, with $22,000 of accumulated depreciation, for $8,000 cash. The sale results in a $10,000 loss.

b. Sold a machine costing $10,000, with $8,000 of accumulated depreciation, for $5,000 cash. The sale results in a $3,000 gain.

c. Purchased stock investments for $16,000 cash. The purchaser believes the stock is worth at least $30,000.

QS 12-10

Computing investing cash flows

P3

The plant assets section of the comparative balance sheets of Anders Company is reported below.

ANDERS COMPANY
Comparative Year-End Balance Sheets

Plant assets	2021	2020
Equipment	$ 180,000	$ 270,000
Accumulated depreciation—Equipment	(100,000)	(210,000)
Equipment, net	$ 80,000	$ 60,000
Buildings	$ 380,000	$ 400,000
Accumulated depreciation—Buildings	(100,000)	(285,000)
Buildings, net	$ 280,000	$ 115,000

Refer to the balance sheet data above from Anders Company. During 2021, equipment with a book value of $40,000 and an original cost of $210,000 was sold at a loss of $3,000.

1. How much cash did Anders receive from the sale of equipment?
2. How much depreciation expense was recorded on equipment during 2021?
3. What was the cost of new equipment purchased by Anders during 2021?

QS 12-11

Computing investing cash flows

P3

Refer to the balance sheet data in QS 12-10 from Anders Company. During 2021, a building with a book value of $70,000 and an original cost of $300,000 was sold at a gain of $60,000.

1. How much cash did Anders receive from the sale of the building?
2. How much depreciation expense was recorded on buildings during 2021?
3. What was the cost of buildings purchased by Anders during 2021?

QS 12-12

Computing cash flows from investing

P3

Compute cash flows from investing activities using the following company information.

Sale of investments	$ 6,000	Cash purchase of used equipment	$5,000
Cash collections from customers	16,000	Depreciation expense	2,000

QS 12-13

Computing cash from asset sales **P3**

Refer to the data in QS 12-7.

Furniture costing $55,000 is sold at its book value in 2021. Acquisitions of furniture total $45,000 cash, on which no depreciation is necessary because it is acquired at year-end. What is the cash inflow from the sale of furniture?

QS 12-14

Computing financing cash flows

P3

Indicate the effect, if any, that each separate transaction has on *financing* cash flows.

a. Long-term notes payable with a carrying value of $15,000 are retired for $16,000 cash, resulting in a $1,000 loss.

b. Paid cash dividends of $11,000 to common stockholders.

c. Acquired $20,000 worth of machinery in exchange for common stock.

QS 12-15

Computing financing cash flows

P3

The following information is from Princeton Company's comparative balance sheets.

At December 31	Current Year	Prior Year
Common stock, $10 par value	$105,000	$100,000
Paid-in capital in excess of par	567,000	342,000
Retained earnings	313,500	287,500

The company's net income for the current year ended December 31 was $48,000.

1. Compute the cash received from the sale of its common stock during the current year.
2. Compute the cash paid for dividends during the current year.

QS 12-16

Computing cash flows from financing

P3

Compute cash flows from financing activities using the following company information.

Cash received from long-term notes payable	$20,000	Cash dividends paid	$16,000
Purchase of investments	5,000	Interest paid	8,000

QS 12-17

Computing financing cash outflows **P3**

Refer to the data in QS 12-7.

1. Assume that all common stock is issued for cash. What amount of cash dividends is paid during 2021?
2. Assume that no additional notes payable are issued in 2021. What cash amount is paid to reduce the notes payable balance in 2021?

QS 12-18

Indirect: Preparing statement of cash flows

P2 P3

Use the following information for VPI Co. to prepare a statement of cash flows for the year ended December 31 using the *indirect method*
.

Cash balance at prior year-end	$40,000	Gain on sale of machinery	$ 2,000
Increase in inventory	5,000	Cash received from sale of machinery	9,500
Depreciation expense	4,000	Increase in accounts payable	1,500
Cash received from issuing stock	8,000	Net income	23,000
Cash paid for dividends	1,000	Decrease in accounts receivable	3,000

QS 12-19

Interpreting disclosures on sources and uses of cash

A1

Financial data from three competitors in the same industry follow.

1. Rank the three companies from high to low on cash from operating activities.
2. Which company has the largest cash outflow for investing activities?
3. Which company has the largest cash inflow from financing activities?
4. Which company has the highest cash flow on total assets ratio?

	Mancala	Yahtzee	Cluedo
Cash provided (used) by operating activities	$ 70,000	$ 60,000	$ (24,000)
Cash provided (used) by investing activities	(28,000)	(34,000)	26,000
Cash provided (used) by financing activities	(6,000)	0	23,000
Net increase (decrease) in cash	$ 36,000	$ 26,000	$ 25,000
Average total assets	$790,000	$625,000	$300,000

QS 12-20

Computing and analyzing cash flow on total assets

A1

Revo Co. reports average total assets of $200,000, revenue of $90,000, net income of $30,000, and cash flow from operations of $38,000.

1. Compute its cash flow on total assets.

2. Is Revo's cash flow on total assets better than the 8% for its competitor, Epix Co.?

QS 12-21[A]

Recording entries in a spreadsheet

P4

A company uses a spreadsheet to prepare its statement of cash flows. Indicate whether each of the following items would be recorded in the Debit column or Credit column of the spreadsheet's *statement of cash flows section* .

a. Decrease in accounts payable

b. Payment of cash dividends

c. Increase in accounts receivable

d. Loss on sale of machinery

e. Net income

f. Increase in interest payable

QS 12-22[B]

Direct: Computing cash receipts from operations

P5

Russell Co. reports sales revenue of $30,000 and interest revenue of $5,000. Its comparative balance sheet shows that accounts receivable decreased $4,000 and interest receivable increased $1,000. Compute cash provided by operating activities using the *direct method* .

QS 12-23B

Direct: Computing cash payments to suppliers **P5**

Bioware Co. reports cost of goods sold of $42,000. Its comparative balance sheet shows that inventory decreased $7,000 and accounts

payable increased $5,000. Compute cash payments to suppliers using the *direct method* .

QS 12-24B

Direct: Computing cash paid for operations **P5**

BTN Inc. reports operating expenses of $27,000. Its comparative balance sheet shows that accrued liabilities decreased $6,000 and prepaid expenses increased $2,000. Compute cash used in operating activities using the *direct method* .

QS 12-25B

Direct: Computing cash flows

P5

For each separate case, compute the required cash flow information for BioClean.

Case A: Compute cash interest received		**Case B:** Compute cash paid for wages	
Interest revenue	$5,000	Wages expense	$9,000
Interest receivable, beginning of year	600	Wages payable, beginning of year	2,200
Interest receivable, end of year	1,700	Wages payable, end of year	1,000

QS 12-26B

Direct: Computing cash received from customers

P5

Refer to the data in QS 12-7.

1. How much cash is received from sales to customers for year 2021?
2. What is the net increase or decrease in the Cash account for year 2021?

QS 12-27[B]

Direct: Computing operating cash outflows

P5

Refer to the data in QS 12-7.

1. How much cash is paid to acquire inventory during year 2021?
2. How much cash is paid for operating expenses (excluding depreciation) during year 2021? *Hint:* Examine prepaid expenses and wages payable.

QS 12-28[B]

Direct: Computing cash from operations **P5**

Refer to the data in QS 12-7.

Use the *direct method* to prepare the operating activities section of Cruz's statement of cash flows.

EXERCISES

Exercise 12-1

Indirect: Classifying cash flows

C1

Indicate where each item would appear on a statement of cash flows using the *indirect method* by placing an *x* in the appropriate column.

	Statement of Cash Flows			Noncash Investing and Financing Activities	Not Reported on Statement or In Notes
	Operating Activities	Investing Activities	Financing Activities		
a. Declared and paid a cash dividend					
b. Recorded depreciation expense					
c. Paid cash to settle long-term notes payable					
d. Prepaid expenses increased in the year					
e. Accounts receivable decreased in the year					
f. Purchased land by issuing common stock					
g. Inventory increased in the year					
h. Sold equipment for cash, yielding a loss					
i. Accounts payable decreased in the year					
j. Income taxes payable increased in the year					

Exercise 12-2

Indirect: Reporting cash flows from operations

P2

Hampton Company reports the following information for its recent calendar year. Prepare the operating activities section of the statement of cash flows using the *indirect method* .

Income Statement Data	
Sales	$160,000
Expenses: Cost of goods sold	100,000
Salaries expense	24,000
Depreciation expense	12,000
Net income	$ 24,000

Selected Year-End Balance Sheet Data	
Accounts receivable increase	$10,000
Inventory decrease	16,000
Salaries payable increase	1,000

Exercise 12-3

Indirect: Reporting cash flows from operations

P2

Arundel Company disclosed the following information for its recent calendar year. Prepare the operating activities section of the statement of cash flows using the *indirect method* .

Income Statement Data	
Revenues	$100,000
Expenses: Salaries expense	84,000
Utilities expense	14,000
Depreciation expense	14,600
Interest expense	3,400
Net loss	$ (16,000)

Selected Year-End Balance Sheet Data	
Accounts receivable decrease	$24,000
Purchased a machine for cash	10,000
Salaries payable increase	18,000
Interest payable decrease	8,000

Exercise 12-4

Indirect: Cash flows from operating activities

P2

Using the following income statement and additional year-end information, prepare the operating activities section of the statement of cash flows using the *indirect method* .

SONAD COMPANY
Income Statement
For Year Ended December 31

Sales		$1,828,000
Cost of goods sold		991,000
Gross profit		837,000
Operating expenses		
Salaries expense	$245,535	
Depreciation expense	44,200	
Rent expense	49,600	
Amortization expense—Patents	4,200	
Utilities expense	18,125	361,660
		475,340
Gain on sale of equipment		6,200
Net income		$ 481,540

Selected Year-End Balance Sheet Data	
Accounts receivable	$30,500 increase
Inventory	25,000 increase
Accounts payable	12,500 decrease
Salaries payable	3,500 decrease

Exercise 12-5

Indirect: Cash flows from operating activities

P2

Fitz Company reports the following information. Use the *indirect method* to prepare the operating activities section of its statement of cash flows for the year ended December 31.

Selected Annual Income Statement Data	
Net income	$374,000
Depreciation expense	44,000
Amortization expense	7,200
Gain on sale of plant assets	6,000

Selected Year-End Balance Sheet Data	
Accounts receivable decrease	$17,100
Inventory decrease	42,000
Prepaid expenses increase	4,700
Accounts payable decrease	8,200
Salaries payable increase	1,200

Exercise 12-6

Indirect: Cash flows from operating activities

P2

Salud Company reports the following information. Use the *indirect method* to prepare the operating activities section of its statement of cash flows for the year ended December 31.

Selected Annual Income Statement Data	
Net income	$400,000
Depreciation expense	80,000
Gain on sale of machinery	20,000

Selected Year-End Balance Sheet Data	
Accounts receivable increase	$40,000
Prepaid expenses decrease	12,000
Accounts payable increase	6,000
Wages payable decrease	2,000

Exercise 12-7

Indirect: Reporting cash flows from operations

P2

Prepare the operating activities section of the statement of cash flows for GreenGarden using the *indirect method* .

Annual Income Statement Data	
Sales	$50,000
Expenses: Cost of goods sold	30,000
Wages expense	10,000
Amortization expense	1,500
Net income	$ 8,500

Selected Year-End Balance Sheet Data	
Wages payable decrease	$3,000
Inventory increase	500
Accounts payable decrease	1,000

Exercise 12-8

Indirect: Inferring net income from operating cash flows

P2

Cain Co. reports net cash provided by operating activities of $30,000. It also reports the following information under "Adjustments to reconcile net income to net cash provided by operating activities" on its statement of cash flows (using the *indirect method*). Determine Cain's net income.

Gain on sale of equipment	$8,000	Decrease in inventory	$4,000
Increase in accounts receivable	3,000	Increase in prepaid expenses	2,000
Depreciation expense	5,000	Decrease in wages payable	1,000

Exercise 12-9

Cash flows from investing activities

P3

Use the following information to determine cash flows from investing activities.

a. Equipment with a book value of $65,300 and an original cost of $133,000 was sold at a loss of $14,000.

b. Paid $89,000 cash for a new truck.

c. Sold land costing $154,000 for $198,000 cash, yielding a gain of $44,000.

d. Stock investments were sold for $60,800 cash, yielding a gain of $4,150.

Exercise 12-10

Cash flows from financing activities

P3

Use the following information to determine cash flows from financing activities.

a. Net income was $35,000.

b. Issued common stock for $64,000 cash.

c. Paid cash dividend of $14,600.

d. Paid $50,000 cash to settle a long-term notes payable at its $50,000 maturity value.

e. Paid $12,000 cash to acquire its treasury stock.

f. Purchased equipment for $39,000 cash.

Exercise 12-11

Reconstructed entries

P3

For each of the following separate transactions, (*a*) prepare the reconstructed journal entry and (*b*) identify the effect it has, if any, on the *investing section* or *financing section* of the statement of cash flows.

1. Sold a building costing $30,000, with $20,000 of accumulated depreciation, for $8,000 cash, resulting in a $2,000 loss.

2. Acquired machinery worth $10,000 by issuing $10,000 in notes payable.

3. Issued 1,000 shares of common stock at par for $2 per share.

4. Long-term notes payable with a carrying value of $40,000 were retired for $47,000 cash, resulting in a $7,000 loss.

Exercise 12-12

Indirect: Preparing statement of cash flows

A1 P2 P3

The following financial statements and additional information are reported. (1) Prepare a statement of cash flows using the *indirect method* for the year ended June 30, 2021. (2) Compute the company's cash flow on total assets ratio for fiscal year 2021.

IKIBAN INC.
Income Statement
For Year Ended June 30, 2021

Sales	$678,000
Cost of goods sold	411,000
Gross profit	267,000
Operating expenses (excluding depreciation)	67,000
Depreciation expense	58,600
	141,400
Other gains (losses)	
Gain on sale of equipment	2,000
Income before taxes	143,400
Income taxes expense	43,890
Net income	$ 99,510

Additional Information

a. A $30,000 notes payable is retired at its $30,000 carrying (book) value in exchange for cash.
b. The only changes affecting retained earnings are net income and cash dividends paid.
c. New equipment is acquired for $57,600 cash.
d. Received cash for the sale of equipment that had cost $48,600, yielding a $2,000 gain.
e. Prepaid Expenses and Wages Payable relate to Operating Expenses on the income statement.
f. All purchases and sales of inventory are on credit.

IKIBAN INC.
Comparative Balance Sheets

At June 30	2021	2020
Assets		
Cash	$ 87,500	$ 44,000
Accounts receivable, net	65,000	51,000
Inventory	63,800	86,500
Prepaid expenses	4,400	5,400
Total current assets	220,700	186,900
Equipment	124,000	115,000
Accum. depreciation—Equipment	(27,000)	(9,000)
Total assets	$317,700	$292,900
Liabilities and Equity		
Accounts payable	$ 25,000	$ 30,000
Wages payable	6,000	15,000
Income taxes payable	3,400	3,800
Total current liabilities	34,400	48,800
Notes payable (long term)	30,000	60,000
Total liabilities	64,400	108,800
Equity		
Common stock, $5 par value	220,000	160,000
Retained earnings	33,300	24,100
Total liabilities and equity	$317,700	$292,900

Check (1b) Cash paid for dividends, $90,310 (1d) Cash received from equip. sale, $10,000

Exercise 12-13

Indirect: Preparing statement of cash flows

P2 P3

Use the following information to prepare a statement of cash flows for the current year using the *indirect method.*

MONTGOMERY INC.
Comparative Balance Sheets

At December 31	Current Year	Prior Year
Assets		
Cash	$ 30,400	$ 30,550
Accounts receivable, net	10,050	12,150
Inventory	90,100	70,150
Total current assets	130,550	112,850
Equipment	49,900	41,500
Accum. depreciation—Equipment	(22,500)	(15,300)
Total assets	$157,950	$139,050
Liabilities and Equity		
Accounts payable	$ 23,900	$ 25,400
Salaries payable	500	600
Total current liabilities	24,400	26,000
Equity		
Common stock, no par value	110,000	100,000
Retained earnings	23,550	13,050
Total liabilities and equity	$157,950	$139,050

MONTGOMERY INC.
Income Statement
For Current Year Ended December 31

Sales	$45,575
Cost of goods sold	(18,950)
Gross profit	26,625
Salaries expense	5,550
Depreciation expense	7,200
Income before taxes	13,875
Income tax expense	3,375
Net income	$10,500

Additional Information on Current-Year Transactions

a. No dividends are declared or paid.

b. Issued additional stock for $10,000 cash.

c. Purchased equipment for cash; no equipment was sold.

Exercise 12-14

Using the Cash account to determine cash flows

P3

Use the following Cash account to determine (*a*) cash flows used by investing activities and (*b*) cash flows provided by financing activities.

Cash

Balance, Dec. 31, prior year	10,000		
Receipts from customers	60,000	Payments for inventory	31,000
Receipts from equipment sale	26,000	Payments for salaries	20,000
Receipts from issuing stock	40,000	Payments for land	50,000
		Payments for a copyright	17,000
		Payments for dividends	3,000
Balance, Dec. 31, current year	15,000		

Exercise 12-15

Analyzing cash flow on total assets **A1**

A company reported average total assets of $1,240,000 in Year 1 and $1,510,000 in Year 2. Its net operating cash flow was $102,920 in Year 1 and $138,920 in Year 2. (1) Calculate its cash flow on total

assets ratio for both years. (2) Did its cash flow on total assets improve in Year 2 versus Year 1?

Exercise 12-16[A]

Indirect: Cash flows spreadsheet

P4

Complete the following spreadsheet in preparation of the statement of cash flows. (The statement of cash flows is not required.) Prepare the spreadsheet as in Exhibit 12A.1 under the *indirect method*. Identify the debits and credits in the Analysis of Changes columns with letters that correspond to the following transactions and events *a* through *h* .

a. Net income for the year was $100,000.

b. Dividends of $80,000 cash were declared and paid.

c. The only noncash expense was $70,000 of depreciation.

d. Purchased plant assets for $90,000 cash.

e. Notes payable of $20,000 were issued for $20,000 cash.

f. $50,000 increase in accounts receivable.

g. $30,000 decrease in inventory.

h. $10,000 decrease in accounts payable.

SCORETECK CORPORATION Spreadsheet for Statement of Cash Flows—Indirect Method For Year Ended December 31, 2021		Analysis of Changes		
	Dec. 31, 2020	Debit	Credit	Dec. 31, 2021
Balance Sheet—Debit Bal. Accounts				
Cash	$ 80,000			$ 70,000
Accounts receivable	120,000			170,000
Inventory	250,000			220,000
Plant assets	600,000			690,000
	$1,050,000			$1,150,000
Balance Sheet—Credit Bal. Accounts				
Accumulated depreciation	$ 100,000			$ 170,000
Accounts payable	150,000			140,000
Notes payable	370,000			390,000
Common stock	200,000			200,000
Retained earnings	230,000			250,000
	$1,050,000			$1,150,000
Statement of Cash Flows				
Operating activities				
Net income				
Increase in accounts receivable				
Decrease in inventory				
Decrease in accounts payable				
Depreciation expense				
Investing activities				
Cash paid to purchase plant assets				
Financing activities				
Cash paid for dividends				
Cash from issuance of notes				

Exercise 12-17[B]

Direct: Classifying cash flows

C1 P5

Indicate where each item would appear on a statement of cash flows using the *direct method* by placing an *x* in the appropriate column.

	Statement of Cash Flows			Noncash Investing and Financing Activities	Not Reported on Statement or in Notes
	Operating Activities	Investing Activities	Financing Activities		
a. Retired long-term notes payable by issuing common stock	____	____	____	____	____
b. Paid cash toward accounts payable	____	____	____	____	____
c. Sold inventory for cash	____	____	____	____	____
d. Paid cash dividends	____	____	____	____	____
e. Accepted note receivable in exchange for plant assets	____	____	____	____	____
f. Recorded depreciation expense	____	____	____	____	____
g. Paid cash to acquire treasury stock	____	____	____	____	____
h. Collected cash from sales	____	____	____	____	____
i. Borrowed cash from bank by signing a nine-year notes payable	____	____	____	____	____
j. Paid cash to purchase a patent	____	____	____	____	____

Exercise 12-18[B]

Direct: Computing cash flows

P5

For each of the following separate cases, compute the required cash flow information.

Case X: Compute cash received from customers

Sales	$515,000
Accounts receivable, Beginning balance	27,200
Accounts receivable, Ending balance	33,600

Case Y: Compute cash paid for rent

Rent expense	$139,800
Rent payable, Beginning balance	7,800
Rent payable, Ending balance	6,200

Case Z: Compute cash paid for inventory

Cost of goods sold	$525,000
Inventory, Beginning balance	158,600
Accounts payable, Beginning balance	66,700
Inventory, Ending balance	130,400
Accounts payable, Ending balance	82,000

Exercise 12-19[B]

Direct: Preparing statement of cash flows **P5**

Refer to the information in Exercise 12-12. Using the *direct method,* prepare the statement of cash flows for the year ended June 30, 2021. *Hint:* Prepaid Expenses and Wages Payable relate to Operating Expenses on the income statement.

Exercise 12-20[B]

Direct: Cash flows from operating activities **P5**

Refer to information in Exercise 12-4. Use the *direct method* to prepare the operating activities section of Sonad's statement of cash flows.

Exercise 12-21[B]

Direct: Preparing statement of cash flows and supporting note

P5

Use the following information about Ferron Company to prepare a complete statement of cash flows (*direct method*) for the current year ended December 31. Use a note disclosure for any noncash investing and financing activities.

Cash and cash equivalents, Dec. 31 prior year-end	$ 40,000	Cash received from sale of equipment	$ 60,250
Cash and cash equivalents, Dec. 31 current year-end	148,000	Land purchased by issuing long-term notes payable	105,250
Cash received as interest	3,500	Cash paid for store equipment	24,750
Cash paid for salaries	76,500	Cash dividends paid	10,000
Bonds payable retired by issuing common stock (no gain or loss on retirement)	185,500	Cash paid for other expenses	20,000
Cash paid to retire long-term notes payable	65,000	Cash received from customers	495,000
		Cash paid for inventory	254,500

Exercise 12-22[B]

Direct: Preparing statement of cash flows from Cash T-account

P1 P3 P5

The following Cash T-account shows the total debits and total credits to the Cash account of Thomas Corporation for the current year.

1. Prepare a complete statement of cash flows for the current year using the *direct method.*

2. Refer to the statement of cash flows prepared for part 1 to answer the following questions. (*a*) Which section—operating, investing, or financing—shows the largest cash (i) inflow and (ii) outflow? (*b*) What is the largest individual item among the investing cash outflows? (*c*) Are the cash proceeds larger from issuing notes or issuing stock? (*d*) Does the company have a net cash inflow or outflow from borrowing activities?

Cash			
Balance, Dec. 31, prior year	333,000		
Receipts from customers	5,000,000	Payments for inventory	2,590,000
Receipts from dividends	208,400	Payments for wages	550,000
Receipts from land sale	220,000	Payments for rent	320,000
Receipts from machinery sale	710,000	Payments for interest	218,000
Receipts from issuing stock	1,540,000	Payments for taxes	450,000
Receipts from borrowing	3,600,000	Payments for machinery	2,236,000
		Payments for stock investments	1,260,000
		Payments for long-term notes payable	386,000
		Payments for dividends	500,000
		Payments for treasury stock	218,000
Balance, Dec. 31, current year	?		

connect

PROBLEM SET A

Problem 12-1A

Indirect: Computing cash flows from operations

P2

Lansing Company's current-year income statement and selected balance sheet data at December 31 of the current and prior years follow.

LANSING COMPANY Selected Balance Sheet Accounts At December 31	Current Year	Prior Year
Accounts receivable	$5,600	$5,800
Inventory	1,980	1,540
Accounts payable	4,400	4,600
Salaries payable	880	700
Utilities payable	220	160
Prepaid insurance	260	280
Prepaid rent	220	180

LANSING COMPANY Income Statement For Current Year Ended December 31	
Sales revenue	$97,200
Expenses	
Cost of goods sold	42,000
Depreciation expense	12,000
Salaries expense	18,000
Rent expense	9,000
Insurance expense	3,800
Interest expense	3,600
Utilities expense	2,800
Net income	$ 6,000

Required

Prepare the operating activities section of the statement of cash flows using the *indirect method* for the current year.

Check Cash from operating activities, $17,780

Problem 12-2A[B]

Direct: Computing cash flows from operations

P5

Refer to the information in Problem 12-1A.

Required

Prepare the operating activities section of the statement of cash flows using the *direct method* for the current year.

Problem 12-3A

Indirect: Statement of cash flows

A1 P2 P3

Forten Company's current-year income statement, comparative balance sheets, and additional information follow. For the year, (1) all sales are credit sales, (2) all credits to Accounts Receivable reflect cash receipts from customers, (3) all purchases of inventory are on

credit, and (4) all debits to Accounts Payable reflect cash payments for inventory.

FORTEN COMPANY
Income Statement
For Current Year Ended December 31

Sales		$582,500
Cost of goods sold		285,000
Gross profit		297,500
Operating expenses (excluding depreciation)	$132,400	
Depreciation expense	20,750	153,150
Other gains (losses)		
Loss on sale of equipment		(5,125)
Income before taxes		139,225
Income taxes expense		24,250
Net income		$114,975

Additional Information on Current-Year Transactions

a. The loss on the cash sale of equipment was $5,125 (details in *b*).
b. Sold equipment costing $46,875, with accumulated depreciation of $30,125, for $11,625 cash.
c. Purchased equipment costing $96,375 by paying $30,000 cash and signing a long-term notes payable for the balance.
d. Paid $46,125 cash to reduce the long-term notes payable.
e. Issued 2,500 shares of common stock for $20 cash per share.
f. Declared and paid cash dividends of $50,100.

FORTEN COMPANY
Comparative Balance Sheets

At December 31	Current Year	Prior Year
Assets		
Cash	$ 49,800	$ 73,500
Accounts receivable	65,810	50,625
Inventory	275,656	251,800
Prepaid expenses	1,250	1,875
Total current assets	392,516	377,800
Equipment	157,500	108,000
Accum. depreciation—Equipment	(36,625)	(46,000)
Total assets	$513,391	$439,800
Liabilities and Equity		
Accounts payable	$ 53,141	$114,675
Long-term notes payable	75,000	54,750
Total liabilities	128,141	169,425
Equity		
Common stock, $5 par value	162,750	150,250
Paid-in capital in excess of par, common stock	37,500	0
Retained earnings	185,000	120,125
Total liabilities and equity	$513,391	$439,800

Required

1. Prepare a complete statement of cash flows using the *indirect method* for the current year. Disclose any noncash investing and financing activities in a note.

Check Cash from operating activities, $40,900

Analysis Component

2. Analyze and discuss the statement of cash flows prepared in part 1, giving special attention to the wisdom of the cash dividend payment.

Problem 12-4A[A]

Indirect: Cash flows spreadsheet

P4

Refer to the information reported about Forten Company in Problem 12-3A.

Required

Prepare a complete statement of cash flows using a spreadsheet as in Exhibit 12A.1 using the *indirect method*. Identify the debits and credits in the Analysis of Changes columns with letters that correspond to the following list of transactions and events.

a. Net income was $114,975.

b. Accounts receivable increased.

c. Inventory increased.

d. Prepaid expenses decreased.

e. Accounts payable decreased.

f. Depreciation expense was $20,750.

g. Sold equipment costing $46,875, with accumulated depreciation of $30,125, for $11,625 cash. This yielded a loss of $5,125.

h. Purchased equipment costing $96,375 by paying $30,000 cash and **(i.)** by signing a long-term notes payable for the balance.

j. Paid $46,125 cash to reduce the long-term notes payable.

k. Issued 2,500 shares of common stock for $20 cash per share.

l. Declared and paid cash dividends of $50,100.

Problem 12-5A[B]

Direct: Statement of cash flows **P5**

Refer to Forten Company's financial statements and related information in Problem 12-3A.

Required

Prepare a complete statement of cash flows using the *direct method.* Disclose any noncash investing and financing activities in a note.

Check Cash used in financing activities, $(46,225)

Problem 12-6A

Indirect: Statement of cash flows

P2 P3

Golden Corp.'s current-year income statement, comparative balance sheets, and additional information follow. For the year, (1) all sales are credit sales, (2) all credits to Accounts Receivable reflect cash receipts from customers, (3) all purchases of inventory are on credit, (4) all debits to Accounts Payable reflect cash payments for inventory, and (5) any change in Income Taxes Payable reflects the accrual and cash payment of taxes.

GOLDEN CORPORATION
Comparative Balance Sheets

At December 31	Current Year	Prior Year
Assets		
Cash	$ 164,000	$107,000
Accounts receivable	83,000	71,000
Inventory	601,000	526,000
Total current assets	848,000	704,000
Equipment	335,000	299,000
Accum. depreciation—Equipment	(158,000)	(104,000)
Total assets	$1,025,000	$899,000
Liabilities and Equity		
Accounts payable	$ 87,000	$ 71,000
Income taxes payable	28,000	25,000
Total current liabilities	115,000	96,000
Equity		
Common stock, $2 par value	592,000	568,000
Paid-in capital in excess of par value, common stock	196,000	160,000
Retained earnings	122,000	75,000
Total liabilities and equity	$1,025,000	$899,000

GOLDEN CORPORATION
Income Statement
For Current Year Ended December 31

Sales	$1,792,000
Cost of goods sold	1,086,000
Gross profit	706,000
Operating expenses (excluding depreciation)	494,000
Depreciation expense	54,000
Income before taxes	158,000
Income taxes expense	22,000
Net income	$ 136,000

Additional Information on Current-Year Transactions

a. Purchased equipment for $36,000 cash.

b. Issued 12,000 shares of common stock for $5 cash per share.

c. Declared and paid $89,000 in cash dividends.

Required

Prepare a complete statement of cash flows using the *indirect method* for the current year.

Check Cash from operating activities, $122,000

Problem 12-7A[A]

Indirect: Cash flows spreadsheet

P4

Refer to the information reported about Golden Corporation in Problem 12-6A.

Required

Prepare a complete statement of cash flows using a spreadsheet as in Exhibit 12A.1 under the *indirect method*. Identify the debits and credits in the Analysis of Changes columns with letters that correspond to the following list of transactions and events.

a. Net income was $136,000.

b. Accounts receivable increased.

c. Inventory increased.

d. Accounts payable increased.

e. Income taxes payable increased.

f. Depreciation expense was $54,000.

g. Purchased equipment for $36,000 cash.

h. Issued 12,000 shares at $5 cash per share.

i. Declared and paid $89,000 of cash dividends.

Check Analysis of Changes column totals, $481,000

Problem 12-8A[B]

Direct: Statement of cash flows **P5**

Refer to Golden Corporation's financial statements and related information in Problem 12-6A.

Required

Prepare a complete statement of cash flows using the *direct method* for the current year.

Check Cash used in financing activities, $(29,000)

PROBLEM SET B

Problem 12-1B

Indirect: Computing cash flows from operations

P2

Salt Lake Company's current-year income statement and selected balance sheet data at December 31 of the current and prior years follow.

SALT LAKE COMPANY
Income Statement
For Current Year Ended December 31

Sales revenue	$156,000
Expenses	
Cost of goods sold	72,000
Depreciation expense	32,000
Salaries expense	20,000
Rent expense	5,000
Insurance expense	2,600
Interest expense	2,400
Utilities expense	2,000
Net income	$ 20,000

SALT LAKE COMPANY
Selected Balance Sheet Accounts

At December 31	Current Year	Prior Year
Accounts receivable	$3,600	$3,000
Inventory	860	980
Accounts payable	2,400	2,600
Salaries payable	900	600
Utilities payable	200	0
Prepaid insurance	140	180
Prepaid rent	100	200

Required

Prepare the operating activities section of the statement of cash flows using the *indirect method* for the current year.

Check Cash from operating activities, $51,960

Problem 12-2B[B]

Direct: Computing cash flows from operations

P5

Refer to the information in Problem 12-1B.

Required

Prepare the operating activities section of the statement of cash flows using the *direct method* for the current year.

Problem 12-3B

Indirect: Statement of cash flows

A1 P2 P3

Gazelle Corporation's current-year income statement, comparative balance sheets, and additional information follow. For the year, (1) all sales are credit sales, (2) all credits to Accounts Receivable reflect cash receipts from customers, (3) all purchases of inventory are on credit, and (4) all debits to Accounts Payable reflect cash payments for inventory.

GAZELLE CORPORATION
Comparative Balance Sheets

At December 31	Current Year	Prior Year
Assets		
Cash	$123,450	$ 61,550
Accounts receivable	77,100	80,750
Inventory	240,600	250,700
Prepaid expenses	15,100	17,000
Total current assets	456,250	410,000
Equipment	262,250	200,000
Accum. depreciation—Equipment	(110,750)	(95,000)
Total assets	$607,750	$515,000
Liabilities and Equity		
Accounts payable	$ 17,750	$102,000
Long-term notes payable	115,000	87,500
Total liabilities	132,750	189,500
Equity		
Common stock, $5 par	215,000	200,000
Paid-in capital in excess of par, common stock	30,000	0
Retained earnings	230,000	125,500
Total liabilities and equity	$607,750	$515,000

GAZELLE CORPORATION
Income Statement
For Current Year Ended December 31

Sales	$1,185,000
Cost of goods sold	595,000
Gross profit	590,000
Operating expenses (excluding depreciation)	362,850
Depreciation expense	38,600
	188,550
Other gains (losses)	
Loss on sale of equipment	(2,100)
Income before taxes	186,450
Income taxes expense	28,350
Net income	$ 158,100

Additional Information on Current-Year Transactions

a. The loss on the cash sale of equipment was $2,100 (details in *b*).
b. Sold equipment costing $51,000, with accumulated depreciation of $22,850, for $26,050 cash.
c. Purchased equipment costing $113,250 by paying $43,250 cash and signing a long-term notes payable for the balance.
d. Paid $42,500 cash to reduce the long-term notes payable.
e. Issued 3,000 shares of common stock for $15 cash per share.
f. Declared and paid cash dividends of $53,600.

Required

page 497

1. Prepare a complete statement of cash flows using the *indirect method* for the current year. Disclose any noncash investing and financing activities in a note.

Analysis Component

2. Analyze and discuss the statement of cash flows prepared in part 1, giving special attention to the wisdom of the cash dividend

payment.

Check Cash from operating activities, $130,200

Problem 12-4B[A]

Indirect: Cash flows spreadsheet

P4

Refer to the information reported about Gazelle Corporation in Problem 12-3B.

Required

Prepare a complete statement of cash flows using a spreadsheet as in Exhibit 12A.1 using the *indirect method.* Identify the debits and credits in the Analysis of Changes columns with letters that correspond to the following list of transactions and events.

a. Net income was $158,100.

b. Accounts receivable decreased.

c. Inventory decreased.

d. Prepaid expenses decreased.

e. Accounts payable decreased.

f. Depreciation expense was $38,600.

g. Sold equipment costing $51,000, with accumulated depreciation of $22,850, for $26,050 cash. This yielded a loss of $2,100.

h. Purchased equipment costing $113,250 by paying $43,250 cash and **(i.)** by signing a long-term notes payable for the balance.

j. Paid $42,500 cash to reduce the long-term notes payable.

k. Issued 3,000 shares of common stock for $15 cash per share.

l. Declared and paid cash dividends of $53,600.

Problem 12-5B[B]

Direct: Statement of cash flows **P5**

Refer to Gazelle Corporation's financial statements and related information in Problem 12-3B.

Required

Prepare a complete statement of cash flows using the *direct method.* Disclose any noncash investing and financing activities in a note.

Check Cash used in financing activities, $(51,100)

Problem 12-6B

Indirect: Statement of cash flows

P2 P3

Satu Company's current-year income statement, comparative balance sheets, and additional information follow. For the year, (1) all sales are credit sales, (2) all credits to Accounts Receivable reflect cash-receipts from customers, (3) all purchases of inventory are on credit, (4) all debits to Accounts Payable reflect cash payments for inventory, and (5) any change in Income Taxes Payable reflects the accrual and cash payment of taxes.

SATU COMPANY
Comparative Balance Sheets

At December 31	Current Year	Prior Year
Assets		
Cash	$ 58,750	$ 28,400
Accounts receivable	20,222	25,860
Inventory	165,667	140,320
Total current assets	244,639	194,580
Equipment	107,750	77,500
Accum. depreciation—Equipment	(46,700)	(31,000)
Total assets	$305,689	$241,080
Liabilities and Equity		
Accounts payable	$ 20,372	$157,530
Income taxes payable	2,100	6,100
Total current liabilities	22,472	163,630
Equity		
Common stock, $5 par value	40,000	25,000
Paid-in capital in excess of par, common stock	68,000	20,000
Retained earnings	175,217	32,450
Total liabilities and equity	$305,689	$241,080

SATU COMPANY
Income Statement
For Current Year Ended December 31

Sales	$750,800
Cost of goods sold	269,200
Gross profit	481,600
Operating expenses (excluding depreciation)	173,933
Depreciation expense	15,700
Income before taxes	291,967
Income taxes expense	89,200
Net income	$202,767

Additional Information on Current-Year Transactions

a. Purchased equipment for $30,250 cash.

b. Issued 3,000 shares of common stock for $21 cash per share.

c. Declared and paid $60,000 of cash dividends.

Required

page 498

Prepare a complete statement of cash flows using the *indirect method* for the current year.

Check Cash from operating activities, $57,600

Problem 12-7B[A]

Indirect: Cash flows spreadsheet

P4

Refer to the information reported about Satu Company in Problem 12-6B.

Required

Prepare a complete statement of cash flows using a spreadsheet as in Exhibit 12A.1 under the *indirect method.* Identify the debits and credits in the Analysis of Changes columns with letters that correspond to the following list of transactions and events.

a. Net income was $202,767.

b. Accounts receivable decreased.

c. Inventory increased.

d. Accounts payable decreased.

e. Income taxes payable decreased.

f. Depreciation expense was $15,700.

g. Purchased equipment for $30,250 cash.

h. Issued 3,000 shares at $21 cash per share.

i. Declared and paid $60,000 of cash dividends.

Check Analysis of Changes column totals, $543,860

Problem 12-8B[B]

Direct: Statement of cash flows **P5**

Check Analysis of Changes column totals, $543,860

Refer to Satu Company's financial statements and related information in Problem 12-6B.

Required

Prepare a complete statement of cash flows using the *direct method* for the current year.

SERIAL PROBLEM

Business Solutions **(Indirect)**

P2 P3

Alexander Image/Shutterstock

Serial problem began in Chapter 1. If previous chapter segments were not completed, the serial problem can begin at this point. It is available in Connect with an algorithmic option.

SP 12 Santana Rey, owner of **Business Solutions** , decides to prepare a statement of cash flows for her business. (Although the serial problem allowed for various ownership changes in earlier chapters, we will prepare the statement of cash flows using the following financial data.)

BUSINESS SOLUTIONS
Income Statement
For Three Months Ended March 31, 2022

Computer services revenue		$25,307
Net sales		18,693
Total revenue		44,000
Cost of goods sold	$14,052	
Depreciation expense—Office equipment	400	
Depreciation expense—Computer equipment	1,250	
Wages expense	3,250	
Insurance expense	555	
Rent expense	2,475	
Computer supplies expense	1,305	
Advertising expense	600	
Mileage expense	320	
Repairs expense—Computer	960	
Total expenses		25,167
Net income		$18,833

BUSINESS SOLUTIONS
Comparative Balance Sheets

	Mar. 31, 2022	Dec. 31, 2021
Assets		
Cash	$ 68,057	$48,372
Accounts receivable	22,867	5,668
Inventory	704	0
Computer supplies	2,005	580
Prepaid insurance	1,110	1,665
Prepaid rent	825	825
Total current assets	95,568	57,110
Office equipment	8,000	8,000
Accumulated depreciation—Office equipment	(800)	(400)
Computer equipment	20,000	20,000
Accumulated depreciation—Computer equipment	(2,500)	(1,250)
Total assets	$120,268	$83,460
Liabilities and Equity		
Accounts payable	$ 0	$ 1,100
Wages payable	875	500
Unearned computer service revenue	0	1,500
Total current liabilities	875	3,100
Equity		
Common stock	98,000	73,000
Retained earnings	21,393	7,360
Total liabilities and equity	$120,268	$83,460

Required

page 499

Prepare a statement of cash flows for Business Solutions using the *indirect method* for the three months ended March 31, 2022. Recall that owner Santana Rey contributed $25,000 to the business in exchange for additional stock in the first quarter of 2022 and has received $4,800 in cash dividends.

Check Cash flows used by operations: $(515)

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect** and all are auto-gradable.

Tableau DA 12-1 Quick Study , Computing net increase (decrease) in cash, **C1** —similar to QS 12-1

Tableau DA 12-2 Exercise , Analyzing cash flows, **P2** , **P3** —similar to Exercise 12-1

Tableau DA 12-3 Mini-Case , Analyzing cash flows, **P2** , **P3** —similar to Exercise 12-12

connect

GENERAL LEDGER

General Ledger (GL) Assignments expose students to general ledger software similar to that in practice. **GL** is part of **Connect** , and **GL** assignments are auto-gradable and have algorithmic options.

GL 12-1, GL 12-2, GL 12-3 Prepare journal entries, general ledger, trial balance, and statement of cash flows (indirect & direct).

Accounting Analysis connect

COMPANY ANALYSIS

A1

AA 12-1 Use **Apple** 's financial statements in Appendix A to answer the following.

1. Is Apple's statement of cash flows prepared under the direct method or the indirect method?
2. For each fiscal year 2019, 2018, and 2017, identify the amount of cash provided by operating activities and cash paid for dividends.
3. In 2019, did Apple have sufficient cash flows from operations to pay dividends?
4. Did Apple spend more or less cash to repurchase common stock in 2019 versus 2018?

COMPARATIVE ANALYSIS

A1

AA 12-2 Key figures for **Apple** and **Google** follow.

$ millions	Apple			Google		
	Current Year	1 Year Prior	2 Years Prior	Current Year	1 Year Prior	2 Years Prior
Operating cash flows	$ 69,391	$ 77,434	$ 64,225	$ 54,520	$ 47,971	$ 37,091
Total assets	338,516	365,725	375,319	275,909	232,792	197,295

Required

1. Compute the recent two years' cash flow on total assets ratios for Apple and Google.
2. For the current year, which company has the better cash flow on total assets ratio?
3. For the current year, does cash flow on total assets outperform or underperform the industry (assumed) average of 15% for (*a*) Apple and (*b*) Google?

EXTENDED ANALYSIS

C1

AA 12-3 Key comparative information for **Samsung** , **Apple** , and **Google** follows.

$ millions	Samsung			Apple		Google	
	Current Year	1 Year Prior	2 Years Prior	Current Year	1 Year Prior	Current Year	1 Year Prior
Operating cash flows	$ 38,940	$ 57,515	$ 56,500	$ 69,391	$ 77,434	$ 54,520	$ 47,971
Total assets	302,511	291,179	274,268	338,516	365,725	275,909	232,792

Required

page 500

1. Compute the recent two years' cash flow on total assets ratio for Samsung.

2. Is the change in Samsung's cash flow on total assets ratio favorable or unfavorable?
3. For the current year, is Samsung's cash flow on total assets ratio better or worse than (*a*) Apple's and (*b*) Google's?

Discussion Questions

1. What is the reporting purpose of the statement of cash flows? Identify at least two questions that this statement can answer.
2. What are some investing activities reported on the statement of cash flows?
3. What are some financing activities reported on the statement of cash flows?
4. **B** Describe the direct method of reporting cash flows from operating activities.
5. **B** When a statement of cash flows is prepared using the direct method, what are some of the operating cash flows?
6. Describe the indirect method of reporting cash flows from operating activities.
7. Where on the statement of cash flows is the payment of cash dividends reported?
8. Assume that a company purchases land for $1,000,000, paying $400,000 cash and borrowing the remainder with a long-term notes payable. How should this transaction be reported on a statement of cash flows?
9. On June 3, a company borrows $200,000 cash by giving its bank a 90-day, interest-bearing note. On the statement of cash flows, where should this be reported?
10. If a company reports positive net income for the year, can it also show a net cash outflow from operating activities? Explain.
11. Is depreciation a source of cash flow?

Beyond the Numbers

ETHICS CHALLENGE

C1 A1

BTN 12-1 Katie Murphy is preparing for a meeting with her banker. Her business is finishing its fourth year of operations. In the first year, it had negative cash flows from operations. In the second and third years, cash flows from operations were positive. However, inventory costs rose significantly in Year 4, and cash flows from operations will probably be down 25%. Murphy wants to secure a line of credit from her banker as a financing buffer. From experience, she knows the banker will scrutinize operating cash flows for Years 1 through 4 and will want a projected number for Year 5. Murphy knows that a steady progression upward in operating cash flows for Years 1 through 4 will help her case. She decides to use her discretion as owner and considers several business actions that will turn her operating cash flow in Year 4 from a decrease to an increase.

Required

1. Identify two business actions Murphy might take to improve cash flows from operations.
2. Comment on the ethics and possible consequences of Murphy's decision to pursue these actions.

COMMUNICATING IN PRACTICE

C1

BTN 12-2 Your friend, Diana Wood, recently completed the second year of her business and just received annual financial statements from her accountant. Wood finds the income statement and balance sheet informative but does not understand the statement of cash flows. She says the first section is especially confusing because it contains a lot of additions and subtractions that do not make sense to her. Wood adds, "The

income statement tells me the business is more profitable than last year and that's most important. If I want to know how cash changes, I can look at comparative balance sheets."

Required

Write a half-page memorandum to your friend explaining the purpose of the statement of cash flows. Speculate as to why the first section is so confusing and how it might be rectified.

TEAMWORK IN ACTION

C1 A1 P2 P5

BTN 12-3 Team members are to coordinate and independently answer one question within each of the following three sections. Team members should then report to the team and confirm or correct teammates' answers.

1. Answer *one* of the following questions about the statement of cash flows: (*a*) What are this statement's reporting objectives? (*b*) What two methods are used to prepare it? Identify similarities and differences between them. (*c*) What steps are followed to prepare the statement? (*d*) What types of analyses are often made from this statement's information?
2. Identify and explain the adjustment from net income to obtain cash flows from operating activities using the indirect method for *one* of the following items: (*a*) Noncash operating revenues and expenses. (*b*) Nonoperating gains and losses. (*c*) Increases and decreases in noncash current assets. (*d*) Increases and decreases in current liabilities.
3. **B** Identify and explain the formula for computing cash flows from operating activities using the direct method for *one* of the following items: (*a*) Cash receipts from sales to customers. (*b*) Cash paid for inventory. (*c*) Cash paid for wages and operating expenses. (*d*) Cash paid for interest and taxes.

Note: For teams of more than four, some pairing within teams is necessary. Use as an in-class activity or as an assignment. If

used in class, specify a time limit on each part. Conclude with reports to the entire class, using team rotation. Each team can prepare responses on a transparency

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ENTREPRENEURIAL DECISION

C1 A1

BTN 12-4 Review the chapter's opener involving **Vera Bradley** and its founder, Barbara Bradley.

Required

1. In a business such as Vera Bradley, monitoring cash flow is always a priority. Explain how cash flow can lag behind net income.
2. What are potential sources of financing for Vera Bradley's future expansion?

ENTREPRENEURIAL DECISION

C1 A1

BTN 12-5 Jenna and Matt Wilder are completing their second year operating Mountain High, a downhill ski area and resort. Mountain High reports a net loss of $(10,000) for its second year, which includes an $85,000 unusual loss from fire. This past year also involved major purchases of plant assets for renovation and expansion, yielding a year-end total asset amount of $800,000. Mountain High's net cash outflow for its second year is $(5,000); a summarized version of its statement of cash flows follows.

Net cash flow provided by operating activities	$ 295,000
Net cash flow used by investing activities	(310,000)
Net cash flow provided by financing activities	10,000

Required

Write a one-page memorandum to the Wilders evaluating Mountain High's current performance and assessing its future.

Give special emphasis to cash flow data and their interpretation.

13 Analysis of Financial Statements

page 502

Chapter Preview

BASICS OF ANALYSIS

C1 Analysis purpose

Building blocks

Standards for comparisons

Analysis tools

HORIZONTAL ANALYSIS

P1 Comparative balance sheets

Comparative income statements

Trend analysis

Data Visualizations

NTK 13-1

VERTICAL ANALYSIS

Common-size balance sheet

P2 Common-size income statement

Data Visualizations

NTK 13-2

RATIO ANALYSIS AND REPORTING

P3 Liquidity and efficiency

Solvency

Profitability

Market prospects

A1 Analysis reports

NTK 13-3

Learning Objectives

CONCEPTUAL

C1 Define the building blocks of analysis and the standards for comparisons.

ANALYTICAL

A1 Summarize and report results of analysis.

A2 *Appendix 13A* —Explain the form and assess the content of a complete income statement.

PROCEDURAL

P1 Explain and apply methods of horizontal analysis.

P2 Describe and apply methods of vertical analysis.

P3 Define and apply ratio analysis.

Accounting Analytics

"Expect to win!"**—Carla Harris**

NEW YORK—"I grew up as an only child in a no-nonsense, no-excuses household," recalls Carla Harris. "My parents gave me the sense that I was supposed to do well." Fast-forward and Carla is now vice chair of **Morgan Stanley** 's (**MorganStanley.com**) prized Global Wealth Management division and past chair of the Morgan Stanley Foundation.

Carla Harris and her colleagues at Morgan Stanley analyze financial statements for profit. One of Morgan Stanley's key tools for analysis is *ModelWare*. ModelWare is a framework to analyze the nuts and bolts of companies' financial statements and then to compare those companies head-to-head.

Morgan Stanley uses the accounting numbers in financial statements to produce comparable metrics using techniques such as horizontal and vertical analysis. It also computes financial ratios for analysis and interpretation. Those ratios include return on equity, return on assets, asset turnover, profit margin, price-to-earnings, and many other accounting measures. The focus is to uncover the drivers of profitability and to predict future levels of those drivers.

Carla has experienced much success through analyzing financial statements. As Carla likes to say, "I'm tough and analytical!" She says that people do not take full advantage of information available in financial statements.

Carla plays by the rules and asserts that those with accounting skills earn profits from financial statement analysis and interpretation.

Carla is proud of her success and adds: “Always start from a place of doing the right thing.”

Sources: *Morgan Stanley website,* January 2021; *MorganStanleyIQ,* November 2007; *Alumni.HBS.edu/Stories,* September 2006; *Fortune,* August 2013 and March 2016

Marla Aufmuth/Getty Images

BASICS OF ANALYSIS

C1

Define the building blocks of analysis and the standards for comparisons.

Financial statement analysis applies analytical tools to financial statements and related data for making business decisions.

Purpose of Analysis

Internal users of accounting information manage and operate the company. They include managers, officers, and internal auditors. The purpose of financial statement analysis for internal users is to provide information to improve efficiency and effectiveness.

External users of accounting information are *not* directly involved in running the company. External users use financial statement analysis to pursue their own goals. Shareholders and creditors assess company performance to make investing and lending decisions. A board of directors analyzes financial statements to monitor management's performance. External auditors use financial statements to assess "fair presentation" of financial results.

The common goal of these users is to evaluate company performance and financial condition. This includes evaluating past and current performance, current financial position, and future performance and risk.

Point: Financial statement analysis is a topic on the CPA, CMA, CIA, and CFA exams.

Building Blocks of Analysis

Financial statement analysis focuses on one or more of the four *building blocks* of financial statement analysis. The four building blocks cover different, but interrelated, aspects of financial condition or performance.

- **Liquidity** and **efficiency** —ability to meet short-term obligations and efficiently generate revenues.
- **Solvency** —ability to meet long-term obligations and generate future revenues.
- **Profitability** —ability to provide financial rewards to attract and retain financing.
- **Market prospects** —ability to generate positive market expectations.

Information for Analysis

Financial analysis uses **general-purpose financial statements** that include the (1) income statement, (2) balance sheet, (3) statement of stockholders' equity (or statement of retained earnings), (4) statement of cash flows, and (5) notes to these statements.

Financial reporting is the communication of financial information useful for making investment, credit, and other business decisions. Financial reporting includes general-purpose financial statements, information from SEC 10-K and other filings, press releases, shareholders' meetings, forecasts, management letters, and auditors' reports.

Management's Discussion and Analysis (MD&A) is one example of useful information outside usual financial statements. **Apple** 's MD&A (available at **Investor.Apple.com** , see "Item 7" in the annual report) begins with an overview, followed by critical accounting policies and estimates. It then discusses operating results followed by financial condition (liquidity, capital resources, and cash flows). The final few parts discuss risks. The MD&A is an excellent starting point in understanding a company's business.

Standards for Comparisons

When analyzing financial statements, we use the following standards (benchmarks) for comparisons. Benchmarks from a competitor or group of competitors are often best. Intracompany and industry measures are also good. Guidelines can be applied, but only if they seem reasonable given recent experience.

- *Intracompany* —The company's current performance is compared to its prior performance and its relations between financial items. Apple's current net income, for example, can be compared with its prior years' net income and in relation to its revenues or total assets.
- *Competitor* —Competitors provide standards for comparisons. **Coca-Cola** 's profit margin can be compared with **PepsiCo** 's profit margin.
- *Industry* —Industry statistics provide standards of comparisons. **Intel** 's profit margin can be compared with the industry's profit margin.
- *Guidelines (rules of thumb)* —Standards of comparison can develop from experience. Examples are the 2:1 level for the current ratio or 1:1 level for the acid-test ratio.

Point: Each chapter's Accounting Analysis assignments cover *intracompany* analysis. *Comparative Analysis* and *Extended Analysis* problems cover competitor analysis (Apple vs. Google vs. Samsung).

Tools of Analysis

There are three common tools of financial statement analysis. This chapter describes these analysis tools and how to apply them.

1. **Horizontal analysis** —comparison of financial condition and performance across time.
2. **Vertical analysis** —comparison of financial condition and performance to a base amount.
3. **Ratio analysis** —measurement of key relations between financial statement items.

Decision Insight

Play the Market *Blue chips* are stocks of big, established companies. The phrase comes from poker, where the most valuable chips are blue. *Brokers* execute orders to buy or sell stock. The term comes from wine retailers— individuals who broach (break) wine casks. ■

HORIZONTAL ANALYSIS

P1

Explain and apply methods of horizontal analysis.

Horizontal analysis is the review of financial statement data *across time*. *Horizontal* comes from the left-to-right (or right-to-left) movement of our eyes as we review comparative financial statements across time.

Comparative Statements

Comparative financial statements show financial amounts in side-by-side columns on a single statement, called a *comparative format*. Using **Apple** 's financial statements, this section explains how to compute dollar changes and percent changes for comparative statements.

Dollar Changes and Percent Changes Comparing page 505 financial statements is often done by analyzing dollar amount changes and percent changes in line items. Both analyses are relevant because small dollar changes can yield large percent changes inconsistent with their importance. A 50% change from a base figure of $100 is less important than a 50% change from a base amount of $100,000. We compute the *dollar change* for a financial statement item as follows.

Dollar change = Analysis period amount − Base period amount

Analysis period refers to the financial statements under analysis, and *base period* refers to the financial statements used for comparison.

The prior year is commonly used as a base period. We compute the *percent change* as follows.

$$\text{Percent change (\%)} = \frac{\text{Analysis period amount} - \text{Base period amount}}{\text{Base period amount}} \times 100$$

We must know a few rules in working with percent changes. Let's look at four separate cases.

- **Cases A and B:** When a negative amount is in one period and a positive amount is in the other, we cannot compute a meaningful percent change.
- **Case C:** When no amount is in the base period, no percent change is computable.
- **Case D:** When a positive amount is in the base period and zero is in the analysis period, the decrease is 100%.

Case	Analysis Period	Base Period	Change Analysis	
			Dollar	Percent
A	$ 1,500	$(4,500)	$ 6,000	—
B	(1,000)	2,000	(3,000)	—
C	8,000	—	8,000	—
D	0	10,000	(10,000)	(100%)

Example: When there is a value in the base period and zero in the analysis period, the decrease is 100%. Why isn't the reverse situation an increase of 100%? *Answer:* A 100% increase of zero is still zero.

Comparative Balance Sheets Analysis of comparative financial statements begins by focusing on large dollar and percent changes. We then identify the reasons and implications for these changes. We also review small changes when we expected large changes.

Exhibit 13.1 shows comparative balance sheets for Apple Inc. (ticker: AAPL). A few items stand out on the asset side. Apple's long-term marketable securities decreased by $65,458 million, or 38.3%, in the current year. This substantial decrease is partially the result of

many of these securities maturing or being sold. The substantial decrease also coincides with large increases in cash and cash equivalents and in short-term marketable securities. Cash and cash equivalents increased 88.5% and short-term marketable securities increased 28.0% in the current year. Looking at these changes, a user of accounting information could assume that Apple is shifting away from investing in long-term securities, and instead choosing to hold cash and cash equivalents or invest in short-term securities. This strategy has led to an increase in current assets of 24.0%, or $31,480 million, even while total assets decreased.

EXHIBIT 13.1

Comparative Balance Sheets

APPLE INC.
Comparative Year-End Balance Sheets

$ millions	Current Year	Prior Year	Dollar Change	Percent Change
Assets				
Cash and cash equivalents	$ 48,844	$ 25,913	$ 22,931	88.5%
Short-term marketable securities	51,713	40,388	11,325	28.0%
Accounts receivable, net	22,926	23,186	(260)	(1.1)%
Inventories	4,106	3,956	150	3.8%
Vendor nontrade receivables	22,878	25,809	(2,931)	(11.4)%
Other current assets	12,352	12,087	265	2.2%
Total current assets	162,819	131,339	31,480	24.0%
Long-term marketable securities	105,341	170,799	(65,458)	(38.3)%
Property, plant and equipment, net	37,378	41,304	(3,926)	(9.5)%
Other noncurrent assets	32,978	22,283	10,695	48.0%
Total assets	$338,516	$365,725	$(27,209)	(7.4)%
Liabilities				
Accounts payable	$ 46,236	$ 55,888	$ (9,652)	(17.3)%
Other current liabilities	37,720	33,327	4,393	13.2%
Deferred revenue	5,522	5,966	(444)	(7.4)%
Commercial paper	5,980	11,964	(5,984)	(50.0)%
Current portion of long-term debt	10,260	8,784	1,476	16.8%
Total current liabilities	105,718	115,929	(10,211)	(8.8)%
Long-term debt	91,807	93,735	(1,928)	(2.1)%
Other noncurrent liabilities	50,503	48,914	1,589	3.2%
Total Liabilities	248,028	258,578	(10,550)	(4.1)%
Stockholders' Equity				
Common stock	45,174	40,201	4,973	12.4%
Retained earnings	45,898	70,400	(24,502)	(34.8)%
Accumulated other comprehensive income	(584)	(3,454)	2,870	—
Total stockholders' equity	90,488	107,147	(16,659)	(15.5)%
Total liabilities and stockholders' equity	$338,516	$365,725	$(27,209)	(7.4)%

Looking at Apple's financing side, we see that total liabilities and equity declined by 7.4%, or $27,209 million. The 4.1% decrease in total liabilities is largely driven by a decrease in accounts payable, suggesting Apple made significant payments to suppliers in the current year or is potentially making fewer purchases on credit. The 15.5% reduction in equity is caused by a marked decrease in retained earnings, which results from Apple's share buyback and dividend plan. In reviewing Apple's financial statements in Appendix A, we see that dividends of $14,129 million and common stock repurchases of $67,101 million reduced retained earnings.

Comparative Income Statements Exhibit 13.2 shows Apple's comparative income statements. Apple reports a slight decrease in net sales of 2.0% and an 11.4% increase in total operating expenses, neither of which is favorable. The increase in operating expenses is mainly driven by the 13.9% increase in research and development costs, from which management and investors hope to reap page 506 future income. We also see a decline in the provision for income taxes, which is the result of corporate tax decrease along with a lower income. Apple's net income decreased by 7.2%. However, its basic earnings per share only decreased 0.3%, mostly due to fewer shares outstanding because of Apple's share buyback policy.

Point: Percent change is also computed by dividing the current period by the prior period and then subtracting 1.0.

EXHIBIT 13.2

Comparative Income Statements

APPLE INC.
Comparative Income Statements

$ millions, except per share data	Current Year	Prior Year	Dollar Change	Percent Change
Net sales	$260,174	$265,595	$(5,421)	(2.0)%
Cost of sales	161,782	163,756	(1,974)	(1.2)%
Gross margin	98,392	101,839	(3,447)	(3.4)%
Research and development	16,217	14,236	1,981	13.9%
Selling, general and administrative	18,245	16,705	1,540	9.2%
Total operating expenses	34,462	30,941	3,521	11.4%
Operating income	63,930	70,898	(6,968)	(9.8)%
Other income, net	1,807	2,005	(198)	(9.9)%
Income before provision for income taxes	65,737	72,903	(7,166)	(9.8)%
Provision for income taxes	10,481	13,372	(2,891)	(21.6)%
Net income	$ 55,256	$ 59,531	(4,275)	(7.2)%
Basic earnings per share	$ 11.97	$ 12.01	$ (0.04)	(0.3)%
Diluted earnings per share	$ 11.89	$ 11.91	$ (0.02)	(0.2)%

Trend Analysis

page 507

Trend analysis is computing trend percents that show patterns in data across periods. Trend percent is computed as follows.

$$\text{Trend percent (\%)} = \frac{\text{Analysis period amount}}{\text{Base period amount}} \times 100$$

Trend analysis is shown in Exhibit 13.3 using data from Apple's current and prior financial statements.

EXHIBIT 13.3

Sales and Expenses

$ millions	Current Yr	1 Yr Ago	2 Yrs Ago	3 Yrs Ago	4 Yrs Ago
Net sales	$260,174	$265,595	$229,234	$215,639	$233,715
Cost of sales	161,782	163,756	141,048	131,376	140,089
Operating expenses	34,462	30,941	26,842	24,239	22,396

The trend percents—using data from Exhibit 13.3—are shown in Exhibit 13.4. The base period is the number reported four years ago, and the trend percent is computed for each year by dividing that year's amount by the base period amount. For example, the net sales trend percent for the current year is 111.3%, computed as $260,174/$233,715.

EXHIBIT 13.4

Trend Percents for Sales and Expenses

In trend percent	Current Yr	1 Yr Ago	2 Yrs Ago	3 Yrs Ago	4 Yrs Ago
Net sales	111.3%	113.6%	98.1%	92.3%	100.0%
Cost of sales	115.5%	116.9%	100.7%	93.8%	100.0%
Operating expenses	153.9%	138.2%	119.9%	108.2%	100.0%

Point: Trend analysis expresses a percent of base, not a percent of change.

Exhibit 13.5 shows the trend percents from Exhibit 13.4 in a *line graph,* which helps us see trends and detect changes in direction or magnitude. It shows that the trend line for operating expenses exceeds net sales in each of the recent 3 years shown. This is not positive for Apple. Apple's net income will suffer if expenses rise faster than sales.

EXHIBIT 13.5

Trend Percent Lines for Sales and Expenses

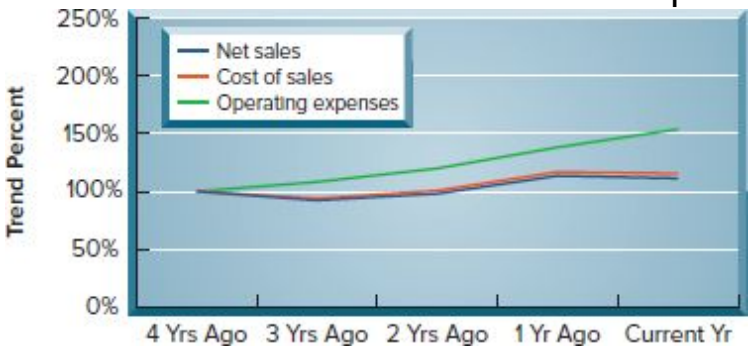
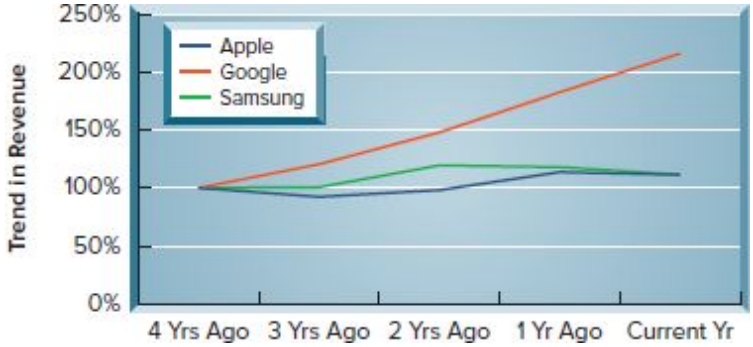


Exhibit 13.6 compares Apple's revenue trend line to those of **Google** and **Samsung**. Google was able to grow revenue in each year relative to the base year. Apple and Samsung were able to grow revenue overall in the last five years, but at a slower pace than Google.

EXHIBIT 13.6

Revenue Trend Percent Lines



Trend analysis can show relations between items on different financial statements. Exhibit 13.7 compares Apple's net sales and total assets. The increase in total assets (16.6%) has exceeded the increase in net sales (11.3%). Is this result favorable or not? One interpretation is that Apple was *less* efficient in using its assets in the current year versus four years ago.

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EXHIBIT 13.7

Sales and Asset Data

$ millions	Current Yr	4 Yrs Ago	Change
Net sales	$260,174	$233,715	11.3%
Total assets . . .	338,516	290,345	16.6%

Decision Maker

Auditor Your tests reveal a 3% increase in sales from $200,000 to $206,000 and a 4% decrease in expenses from $190,000 to $182,400. Both changes are within your "reasonableness" criterion of ± 5%, and thus you don't pursue additional tests. The audit partner in charge questions your lack of follow-up and mentions the *joint relation* between sales and expenses. What is the partner referring to? ■ *Answer:* Both individual accounts (sales and expenses) yield percent changes within the ± 5% acceptable range. However, a joint analysis shows an increase in sales and a decrease in expenses producing a more than 5% increase in income. This client's profit margin is 11.46% ([$206,000 − $182,400]/$206,000) for the current year compared with 5.0% ([$200,000 − $190,000]/$200,000) for the prior year—a 129% increase!

NEED-TO-KNOW 13-1

Horizontal Analysis

P1

Compute trend percents for the following accounts using 3 Years Ago as the base year. Indicate whether the trend appears to be favorable or unfavorable for each account.

$ millions	Current Yr	1 Yr Ago	2 Yrs Ago	3 Yrs Ago
Sales	$500	$350	$250	$200
Cost of goods sold	400	175	100	50

Solution

$ millions	Current Yr	1 Yr Ago	2 Yrs Ago	3 Yrs Ago
Sales	250% ($500/$200)	175% ($350/$200)	125% ($250/$200)	100% ($200/$200)
Cost of goods sold	800% ($400/$50)	350% ($175/$50)	200% ($100/$50)	100% ($50/$50)

Analysis: The trend in sales is favorable; however, we need more information about economic conditions and competitors' performances to better assess it. Cost of goods sold also is rising (as expected with increasing sales). However, cost of goods sold is rising faster than the increase in sales, which is bad news.

Do More: QS 13-3, QS 13-4, QS 13-5, QS 13-6, E 13-3

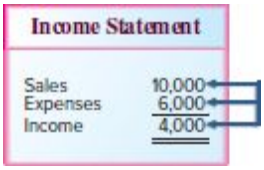
VERTICAL ANALYSIS

P2

Describe and apply methods of vertical analysis.

Vertical analysis, or *common-size analysis,* is used to evaluate individual financial statement items or a group of items. *Vertical* comes from the up-down [or down-up] movement of our eyes as we review common-size financial statements.

Common-Size Statements



The comparative statements in Exhibits 13.1 and 13.2 show the change in each item over time. **Common-size financial statements** show changes in the relative importance of each financial statement item. All individual amounts in common-size statements are shown in common-size percents. A *common-size percent* is calculated as

$$\text{Common-size percent (\%)} = \frac{\text{Analysis amount}}{\text{Base amount}} \times 100$$

Point: Numerator and denominator in common-size percent are taken from the same financial statement and from the same period.

Common-Size Balance Sheets

page 509

Common-size statements show each item as a percent of a *base amount,* which for a common-size balance sheet is total assets. The base amount is assigned a value of 100%. (Total liabilities plus equity also equals 100% because this amount equals total assets.) We then compute a common-size percent for each asset, liability, and equity item using total assets as the base amount.

Exhibit 13.8 shows common-size comparative balance sheets for **Apple**. Two results that stand out on both a magnitude and percentage basis include (1) an increase in cash and cash equivalents and in short-term marketable securities and (2) a decrease in long-term marketable securities. These changes may represent a shift in Apple strategy to keep excess funds in cash and cash equivalents and short-term securities, instead of long-term securities.

EXHIBIT 13.8

Common-Size Comparative Balance Sheets

APPLE INC.
Common-Size Comparative Balance Sheets

$ millions	Current Year	Prior Year	Common-Size Percents* Current Year	Common-Size Percents* Prior Year
Assets				
Cash and cash equivalents	$ 48,844	$ 25,913	14.4%	7.1%
Short-term marketable securities	51,713	40,388	15.3%	11.0%
Accounts receivable, net	22,926	23,186	6.8%	6.3%
Inventories	4,106	3,956	1.2%	1.1%
Vendor nontrade receivables	22,878	25,809	6.8%	7.1%
Other current assets	12,352	12,087	3.6%	3.3%
Total current assets	162,819	131,339	48.1%	35.9%
Long-term marketable securities	105,341	170,799	31.1%	46.7%
Property, plant and equipment, net	37,378	41,304	11.0%	11.3%
Other noncurrent assets	32,978	22,283	9.7%	6.1%
Total assets	$338,516	$365,725	100.0%	100.0%
Liabilities				
Accounts payable	$ 46,236	$ 55,888	13.7%	15.3%
Other current liabilities	37,720	33,327	11.1%	9.1%
Deferred revenue	5,522	5,966	1.6%	1.6%
Commercial Paper	5,980	11,964	1.8%	3.3%
Current portion of long-term debt	10,260	8,784	3.0%	2.4%
Total current liabilities	105,718	115,929	31.2%	31.7%
Long-term debt	91,807	93,735	27.1%	25.6%
Other noncurrent liabilities	50,503	48,914	14.9%	13.4%
Total Liabilities	248,028	258,578	73.3%	70.7%
Stockholders' Equity				
Common stock	45,174	40,201	13.3%	11.0%
Retained earnings	45,898	70,400	13.6%	19.2%
Accumulated other comprehensive income	(584)	(3,454)	(0.2)%	(0.9)%
Total stockholders' equity	90,488	107,147	26.7%	29.3%
Total liabilities and stockholders' equity	$338,516	$365,725	100.0%	100.0%

*Percents are rounded to tenths and thus may not exactly sum to totals and subtotals.

The common-size percents also reveal Apple's smaller retained earnings balance, which is the result of cash dividends and stock buybacks. Relatively minor changes across the rest of the balance sheet are common among mature companies such as Apple.

Common-Size Income Statements Analysis also involves the use of a common-size income statement. Revenue is the base amount, which is assigned a value of 100%. Each income statement item is shown as a percent of revenue. If we think of the 100%

revenue amount as representing one sales dollar, the remaining items show how each revenue dollar is distributed among costs, expenses, and income.

Exhibit 13.9 shows common-size comparative income statements for each dollar of Apple's net sales. The past two years' common-size numbers are similar with two exceptions. One is the increase of 0.8 cents in research and development costs, which can be a positive development if these costs lead to future revenues. Another is the decrease in provision for income taxes, which mainly results from a lower corporate tax rate.

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EXHIBIT 13.9

Common-Size Comparative Income Statements

APPLE INC.
Common-Size Comparative Income Statements

$ millions	Current Yr	Prior Yr	Common Size Percents* Current Yr	Common Size Percents* Prior Yr
Net sales	$260,174	$265,595	100.0%	100.0%
Cost of sales	161,782	163,756	62.2%	61.7%
Gross margin	98,392	101,839	37.8%	38.3%
Research and development	16,217	14,236	6.2%	5.4%
Selling, general and administrative	18,245	16,705	7.0%	6.3%
Total operating expenses	34,462	30,941	13.2%	11.6%
Operating income	63,930	70,898	24.6%	26.7%
Other income, net	1,807	2,005	0.7%	0.8%
Income before provision for income taxes	65,737	72,903	25.3%	27.4%
Provision for income taxes	10,481	13,372	4.0%	5.0%
Net income	$ 55,256	$ 59,531	21.2%	22.4%

*Percents are rounded to tenths and thus may not exactly sum to totals and subtotals.

Data Visualizations

Data visualizations reveal trends and insights not easily seen by looking at numbers. **Tableau Dashboard Activities** (available in **Connect**) have students practice interpreting graphics and making business decisions. Exhibit 13.10 is a graphic of Apple's current year common-size income statement. This pie chart shows the contribution of each cost component of net sales for net income.

EXHIBIT 13.10

Common-Size Graphic of Income Statement

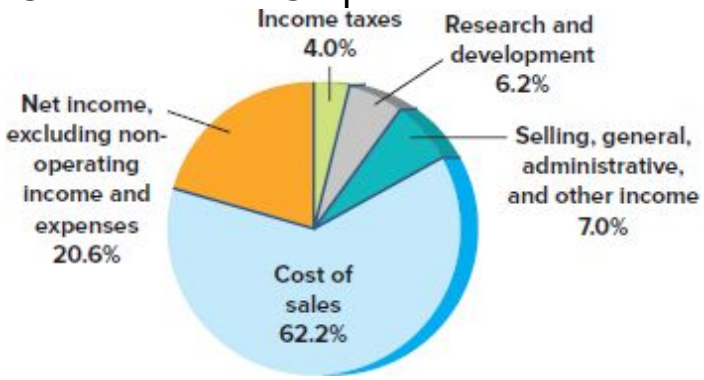
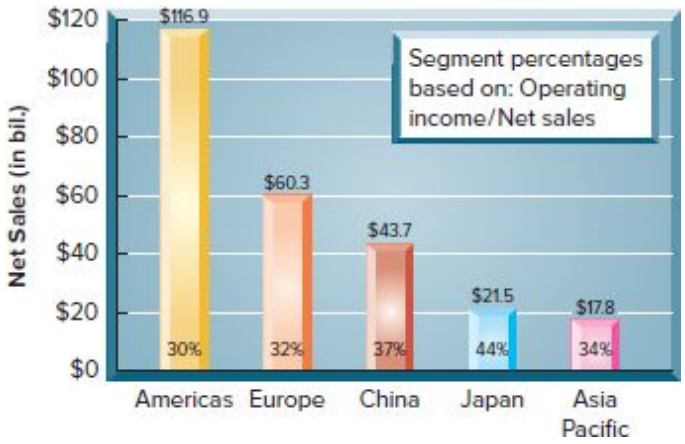


Exhibit 13.11 takes data from Apple's *Segments* footnote. The figshows the level of net sales for each of Apple's five operating segments. Its Americas segment generates $116.9 billion net sales, which is roughly 45% of its total sales ($116.9 bil./$260_174">Exhibit shows the level of net sales for each of Apple's five operating segments. Its Americas segment generates $116.9 billion net sales, which is roughly 45% of its total sales ($116.9 bil./$260.174 bil.). Within each bar is that segment's operating income margin (Operating income/Segment net sales). The Americas segment has a 30% operating income margin. This type of graphic can raise questions about the profitability of each segment and lead to discussion of further expansions into more profitable segments. For example, the Japan segment has an operating margin of 44%. A natural question for management is what potential is there to expand sales into the Japan segment and maintain this operating margin? This type of analysis can help determine strategic plans.

EXHIBIT 13.11

Sales and Operating Income Margin by Segment



Visualizations also are used to identify (1) sources of financing, including the distribution among current liabilities, noncurrent liabilities, and equity capital, and (2) types of investing activities, including the distribution among current and noncurrent assets. Exhibit 13.12 shows a visualization of Apple's assets, a high percentage of which are in securities, followed by property, plant and equipment.

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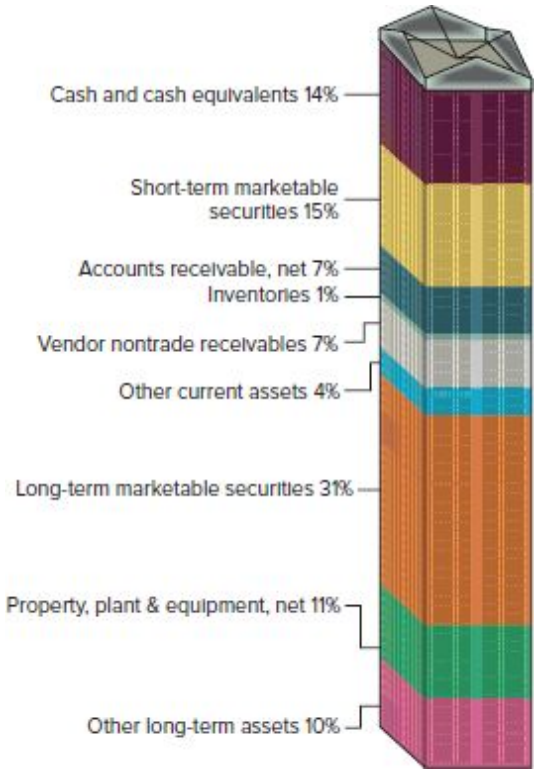
EXHIBIT 13.12

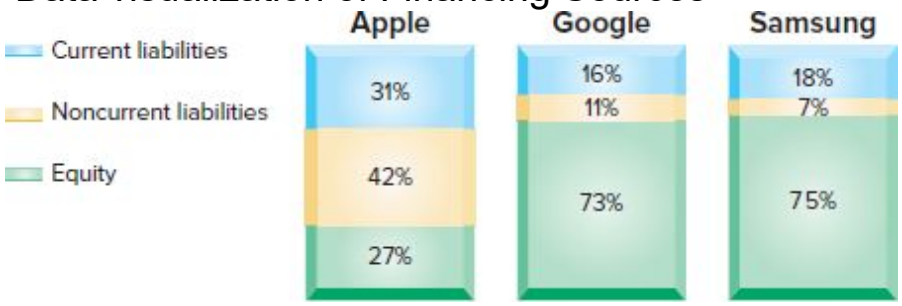
Data visualization of Asset Components



Common-size financial statements are useful in comparing companies. Exhibit 13.13 shows visualizations of Apple, **Google** , and **Samsung** on financing sources. This graphic shows the larger percent of equity financing for Google and Samsung versus Apple. It also shows the larger noncurrent debt financing of Apple versus Google and Samsung. Comparison of a company's common-size statements with competitors' or industry common-size statistics alerts us to differences in the structure of its financing.

EXHIBIT 13.13

Data visualization of Financing Sources



Ethical Risk

To Tell The Truth In a survey of nearly 200 CFOs of large companies, roughly 20% say that firms use accounting tools to report earnings that do not fully reflect the firms' underlying operations. One goal of financial analysis is to see through such ploys. The top reasons CFOs gave for this were to impact stock price, hit an earnings target, and influence executive pay (*Wall Street Journal*). ■

NEED-TO-KNOW 13-2

Vertical Analysis

P2

Express the following comparative income statements in common-size percents and assess whether this company's situation has improved in the current year.

Comparative Income Statements For Years Ended December 31	Current Yr	Prior Yr
Sales	$800	$500
Total expenses	560	400
Net income	$240	$100

Solution

	Current Yr	Prior Yr
Sales	100% ($800/$800)	100% ($500/$500)
Total expenses	70% ($560/$800)	80% ($400/$500)
Net income	30%	20%

Analysis: This company's situation has improved. This is evident from its substantial increase in net income as a percent of sales for the current year (30%) relative to the prior year (20%). Further, the company's sales increased from $500 to $800 (while expenses declined as a percent of sales from 80% to 70%).

Do More: QS 13-7, QS 13-8, E 13-4, E 13-5, E 13-6

RATIO ANALYSIS

P3

Define and apply ratio analysis.

Ratios are used to uncover conditions and trends difficult to detect by looking at individual amounts. A ratio shows a relation between two amounts. It can be shown as a percent, rate, or proportion. A change from $100 to $250 can be shown as (1) 150% increase, (2) 2.5 times, or (3) 2.5 to 1 (or 2.5:1). To be useful, a ratio must show an

economically important relation. For example, a ratio of cost of goods sold to sales is useful, but a ratio of freight costs to patents is not.

This section covers important financial ratios organized into the four building blocks of financial statement analysis: (1) liquidity and efficiency, (2) solvency, (3) profitability, and (4) market prospects. We use four standards for comparison: intracompany, competitor, industry, and guidelines.

Liquidity and Efficiency

Liquidity is the availability of resources to pay short-term cash requirements. It is affected by the timing of cash inflows and outflows along with prospects for future performance. A lack of liquidity often is linked to lower profitability. To creditors, lack of liquidity can cause delays in collecting payments. *Efficiency* is how productive a company is in using its assets. Inefficient use of assets can cause liquidity problems. This section covers key ratios used to assess liquidity and efficiency.

Working Capital and Current Ratio The amount of current assets minus current liabilities is called **working capital** , or *net working capital.* A company that runs low on working capital is less likely to pay debts or to continue operating. When evaluating a company's working capital, we look at the dollar amount of current assets minus current liabilities *and* at their ratio. The *current ratio* is defined as follows (see Chapter 3 for additional explanation).

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

Current ratio

Google = 3.37

Samsung = 2.84

Industry = 2.5

Apple 's working capital and current ratio are shown in Exhibit 13.14. Also, **Google** 's (3.37), **Samsung** 's (2.84), and the industry's (2.5) current ratios are shown in the margin. Although its ratio (1.54) is lower than competitors' ratios, Apple is not in danger of defaulting on loan payments. A high current ratio suggests a strong ability to meet current obligations. An excessively high current ratio can mean that the company has invested too much in current assets compared to current obligations. An excessive investment in current assets is not an efficient use of funds because current assets normally earn a low return on investment (compared with long-term assets).

EXHIBIT 13.14

Working Capital and Current Ratio

$ millions	Current Yr	Prior Yr
Current assets	$162,819	$131,339
Current liabilities	105,718	115,929
Working capital	$ 57,101	$ 15,410
Current ratio		
$162,819/$105,718 =	1.54 to 1	
$131,339/$115,929 =		1.13 to 1

Many analysts use a guideline of 2:1 (or 1.5:1) for the current ratio. A 2:1 or higher ratio is considered low risk in the short run. Analysis of the current ratio, and many other ratios, must consider type of business, composition of current assets, and turnover rate of current asset components.

- **Business Type** A service company that grants little or no credit and carries few inventories can probably operate on a current ratio

of less than 1:1 if its revenues generate enough cash to pay its current liabilities. On the other hand, a company selling high-priced clothing or furniture requires a higher ratio because of difficulties in judging customer demand and cash receipts.

- **Asset Composition** The composition of assets is important to assess short-term liquidity. For instance, cash, cash equivalents, and short-term investments are more liquid than accounts and notes receivable. An excessive amount of receivables and inventory weakens a company's ability to pay current liabilities.
- **Turnover Rate** Asset turnover measures efficiency in using assets. A measure of asset efficiency is revenue generated.

Global: Ratio analysis is unaffected by currency but is affected by differences in accounting principles.

Decision Maker

Banker A company requests a one-year, $200,000 loan for expansion. This company's current ratio is 4:1, with current assets of $160,000. Key competitors have a current ratio of 1.9:1. Using this information, do you approve the loan? ■ *Answer:* The loan application is likely approved for at least two reasons. First, the current ratio suggests an ability to meet short-term obligations. Second, current assets of $160,000 and a current ratio of 4:1 imply current liabilities of $40,000 (one-fourth of current assets) and a working capital excess of $120,000. The working capital is 60% of the loan.

Anton Violin/Shutterstock

Acid-Test Ratio Quick assets are cash, short-term investments, and current receivables. These are the most liquid types of current assets. The *acid-test ratio,* also called *quick ratio* and introduced in Chapter 4, evaluates a company's short-term liquidity.

$$\text{Acid-test ratio} = \frac{\text{Cash} + \text{Short-term investments} + \text{Current receivables}}{\text{Current liabilities}}$$

Apple's acid-test ratio is computed in Exhibit 13.15. Apple's acid-test ratio (1.17) is lower than those for Google (3.21) and Samsung (2.32), but it is higher than the 1:1 guideline for an acceptable acid-test ratio. As with analysis of the current ratio, we must consider other factors. How frequently a company converts its current assets into cash also affects its ability to pay current obligations. This means analysis of short-term liquidity should consider receivables and inventories, which we cover next.

EXHIBIT 13.15

Acid-Test Ratio

$ millions	Current Yr	Prior Yr
Cash and equivalents	$ 48,844	$ 25,913
Short-term securities	51,713	40,388
Current receivables	22,926	23,186
Total quick assets	$123,483	$ 89,487
Current liabilities	$105,718	$115,929
Acid-test ratio		
$123,483/$105,718 =	1.17 to 1	
$89,487/$115,929 =		0.77 to 1

Acid-test ratio

Google = 3.21

Samsung = 2.32

Industry = 0.9

Accounts Receivable Turnover *Accounts receivable turnover* measures how frequently a company converts its receivables into cash. This ratio is defined as follows (see Chapter 7 for additional explanation). Apple's accounts receivable turnover is computed next to the formula ($ millions). Apple's turnover of 11.3 exceeds Google's 7.0 and Samsung's 6.7 turnover. Accounts receivable turnover is high when accounts receivable are quickly collected. A high turnover

is favorable because it means the company does not tie up assets in accounts receivable. However, accounts receivable turnover can be too high; this can occur when credit terms are so restrictive that they decrease sales.

$$\text{Accounts receivable turnover} = \frac{\text{Net sales}}{\text{Average accounts receivable, net}} = \frac{\$260{,}174}{(\$23{,}186 + \$22{,}926)/2} = 11.3 \text{ times}$$

Accounts receivable turnover

Google = 7.0

Samsung = 6.7

Industry = 5.0

Inventory Turnover *Inventory turnover* measures how long a company holds inventory before selling it. It is defined as follows (see Chapter 5 for additional explanation). Next to the formula we compute Apple's inventory turnover at 40.1. Apple's inventory turnover is higher than Samsung's 5.3 but lower than Google's 68.3. A company with a high turnover requires a smaller investment in inventory than one producing the same sales with a lower turnover. However, high inventory turnover can be bad if inventory is so low that stock-outs occur.

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average inventory}} = \frac{\$161{,}782}{(\$3{,}956 + \$4{,}106)/2} = 40.1 \text{ times}$$

Inventory turnover

Google = 68.3

Samsung = 5.3

Industry = 7.0

Days' Sales Uncollected *Days' sales uncollected* measures how frequently a company collects accounts receivable and is defined as

follows (Chapter 6 provides additional explanation). Apple's days' sales uncollected of 32.2 days is shown next to the formula. Both Google's days' sales uncollected of 57.1 days and Samsung's 62.3 days are more than the 32.2 days for Apple. Days' sales uncollected is more meaningful if we know company credit terms. A rough guideline is that days' sales uncollected should not exceed $1\frac{1}{3}$ times the days in its (1) credit period, *if* discounts are not offered, or (2) discount period, *if* favorable discounts are offered.

$$\text{Days' sales uncollected} = \frac{\text{Accounts receivable, net}}{\text{Net sales}} \times 365 = \frac{\$22{,}926}{\$260{,}174} \times 365 = 32.2 \text{ days}$$

Visual China Group/Getty Images

Days' sales uncollected

Google = 57.1

Samsung = 62.3

Days' Sales in Inventory *Days' sales in inventory* is page 514 used to evaluate inventory liquidity. We compute days' sales in inventory as follows (Chapter 5 provides additional explanation). Apple's days' sales in inventory of 9.3 days is shown next to the formula. If the products in Apple's inventory are in demand by customers, this formula estimates that its inventory will be converted into receivables (or cash) in 9.3 days. If all of Apple's sales were credit sales, the conversion of inventory to receivables in 9.3 days *plus* the conversion of receivables to cash in 32.2 days implies that inventory will be converted to cash in about 41.5 days (9.3 + 32.2).

$$\text{Days' sales in inventory} = \frac{\text{Ending inventory}}{\text{Cost of goods sold}} \times 365 = \frac{\$4{,}106}{\$161{,}782} \times 365 = 9.3 \text{ days}$$

Point: *Average collection period* is estimated by dividing 365 by the accounts receivable turnover ratio. For example, 365 divided by an accounts receivable turnover of 8.8 indicates a 41-day average collection period.

Days' sales in inventory

Google = 5.1

Samsung = 66.4

Industry = 35

Total Asset Turnover *Total asset turnover* measures a company's ability to use its assets to generate sales and reflects on operating efficiency. The definition of this ratio follows (Chapter 8 offers additional explanation). Apple's total asset turnover of 0.74 is shown next to the formula. Apple's turnover is greater than that for Google (0.64) and Samsung (0.67).

$$\text{Total asset turnover} = \frac{\text{Net sales}}{\text{Average total assets}} = \frac{\$260{,}174}{(\$338{,}516 + \$365{,}725)/2} = 0.74 \text{ times}$$

Total asset turnover

Google = 0.64

Samsung = 0.67

Industry = 1.1

Solvency

Solvency is a company's ability to meet long-term obligations and generate future revenues. Analysis of solvency is long term and uses

broader measures than liquidity. An important part of solvency analysis is a company's capital structure. *Capital structure* is a company's makeup of equity and debt financing. Our analysis here focuses on a company's ability to both meet its obligations and provide security to its creditors *over the long run* .

Debt Ratio and Equity Ratio One part of solvency analysis is to assess a company's mix of debt and equity financing. The *debt ratio* (described in Chapter 2) shows total liabilities as a percent of total assets. The **equity ratio** shows total equity as a percent of total assets. Apple's debt and equity ratios follow. Apple's ratios reveal more debt than equity. A company is considered less risky if its capital structure (equity plus debt) has more equity. Debt is considered more risky because of its required payments for interest and principal. Stockholders cannot require payment from the company. However, debt can increase income for stockholders if the company earns a higher return than interest paid on the debt.

Apple, $ millions	Current Year	Ratios	
Total liabilities	$248,028	73.3%	[Debt ratio]
Total equity	90,488	26.7%	[Equity ratio]
Total liabilities and equity	$338,516	100.0%	

Point: Total of debt and equity ratios equals 100%.

Debt ratio :: Equity ratio

Google = 27.0% :: 73.0%

Samsung = 25.4% :: 74.6%

Industry = 35% :: 65%

Debt-to-Equity Ratio The *debt-to-equity* ratio is another measure of solvency. We compute the ratio as follows (Chapter 10 offers additional explanation). Apple's debt-to-equity ratio of 2.74 is shown next to the formula. Apple's ratio is higher than those of Google (0.37) and Samsung (0.34), and greater than the industry ratio of 0.6. Apple's capital structure has more debt than equity. Debt must be

repaid with interest, while equity does not. Debt payments can be burdensome when the industry and/or the economy experience a downturn.

$$\text{Debt-to-equity ratio} = \frac{\text{Total liabilities}}{\text{Total equity}} = \frac{\$248{,}028}{\$90{,}488} = 2.74$$

Debt-to-equity

page 515

Google = 0.37

Samsung = 0.34

Industry = 0.6

Times Interest Earned The amount of income before subtracting interest expense and income tax expense is the amount available to pay interest expense. The following *times interest earned* ratio measures a company's ability to pay interest (see Chapter 9 for additional explanation).

$$\text{Times interest earned} = \frac{\text{Income before interest expense and income tax expense}}{\text{Interest expense}}$$

The larger this ratio is, the less risky the company is for creditors. One guideline says that creditors are reasonably safe if the company has a ratio of two or more. Apple's times interest earned ratio of 19.4 follows. It suggests that creditors have little risk of nonrepayment.

$$\frac{\$55{,}256 + \$3{,}576 + \$10{,}481}{\$3{,}576} = 19.4 \text{ times}$$

Times interest earned

Google = 397.3

Samsung = 46.3

Profitability

Profitability is a company's ability to earn an adequate return. This section covers key profitability measures.

Gross Margin Ratio Gross margin ratio is a company's percent of gross margin in each dollar of net sales. Gross margin is net sales minus cost of goods sold. The gross margin ratio is the amount of each dollar left over to cover all other operating expenses and still yield a profit. Apple's gross margin ratio is 37.8% ; see its calculation next to the formula. Apple's 37.8% profit margin is lower than Google's 55.6% but higher than Samsung's 36.1% and the industry's 30% margin.

$$\text{Gross margin ratio} = \frac{\text{Net sales} - \text{Cost of goods sold}}{\text{Net sales}} = \frac{\$260{,}174 - \$161{,}782}{\$260{,}174} = 37.8\%$$

Gross margin

Google = 55.6%

Samsung = 36.1%

Industry = 30%

Profit Margin *Profit margin* measures a company's ability to earn net income from sales (Chapter 3 offers additional explanation). Apple's profit margin of 21.2% is shown next to the formula. To evaluate profit margin, we must consider the industry. For instance, an appliance company might require a profit margin of 15%, whereas a retail supermarket might require a profit margin of 2%. Apple's 21.2% profit margin is the same as Google's 21.2%, but higher than Samsung's 9.4% and the industry's 11% margin.

$$\text{Profit margin} = \frac{\text{Net income}}{\text{Net sales}} = \frac{\$55{,}256}{\$260{,}174} = 21.2\%$$

Profit margin

Google = 21.2%

Samsung = 9.4%

Industry = 11%

Return on Total Assets *Return on total assets* is defined as follows. Apple's return on total assets of 15.7% is shown next to the formula. Apple's 15.7% return on total assets is higher than Google's 13.5%, Samsung's 6.3%, and the industry's 8%. We also should evaluate any trend in the return.

$$\text{Return on total assets} = \frac{\text{Net income}}{\text{Average total assets}} = \frac{\$55{,}256}{(\$338{,}516 + \$365{,}725)/2} = 15.7\%$$

Return on total assets

Google = 13.5%

Samsung = 6.3%

Industry = 8%

The relation between profit margin, total asset turnover, and return on total assets follows.

$$\text{Profit margin} \times \text{Total asset turnover} = \text{Return on total assets}$$

$$\frac{\text{Net income}}{\text{Net sales}} \times \frac{\text{Net sales}}{\text{Average total assets}} = \frac{\text{Net income}}{\text{Average total assets}}$$

Both profit margin and total asset turnover affect operating efficiency, as measured by return on total assets. This formula is applied to Apple as follows. This analysis shows that Apple's superior return on assets versus that of Google is driven by its higher asset turnover.

page 516

$$21.2\% \times 0.74 = 15.7\% \text{ (with rounding)}$$

Google = 21.2% × 0.64 ≃ 13.6%

Samsung = 9.4% × 0.67 ≃ 6.3%

(with rounding)

Return on Equity An important goal in operating a company is to earn income for its owner(s). *Return on equity* measures a company's ability to earn income for its stockholders and is defined as follows.

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Average total equity}}$$

Apple's return on equity is computed as follows. Apple's 55.9% return on equity is superior to Google's 18.1% and Samsung's 8.4%.

$$\frac{\$55{,}256}{(\$107{,}147 + \$90{,}488)/2} = 55.9\%$$

Return on equity

Google = 18.1%

Samsung = 8.4%

Industry = 15%

Decision Insight

Shiver Me Timbers *Wall Street* is synonymous with financial markets, but its name comes from the street location of the original New York Stock Exchange. The street's name comes from stockades built by early settlers to protect New York from pirate attacks. ■

Market Prospects

Point: Low expectations = low PE.
High expectations = high PE.

Market measures are useful for analyzing corporations with publicly traded stock. These market measures use stock price, which reflects the market's (public's) expectations for the company. This includes market expectations of both company return and risk.

Price-Earnings Ratio Computation of the *price-earnings ratio* follows (Chapter 11 provides additional explanation). This ratio is used to measure market expectations for future growth. The market price of Apple's common stock at the start of the current fiscal year was $293.65. Using Apple's $11.97 basic earnings per share, we compute its price-earnings ratio as follows. Apple's price-earnings ratio is less than that for Google, but it is higher than that for Samsung and the industry.

$$\text{Price-earnings ratio} = \frac{\text{Market price per common share}}{\text{Earnings per share}} = \frac{\$293.65}{\$11.97} = 24.5$$

PE (year-end)

Google = 27.0

Samsung = 17.6

Industry = 11

Dividend Yield *Dividend yield* is used to compare the dividend-paying performance of different companies. We compute dividend yield as follows (Chapter 11 offers additional explanation). Apple's dividend yield of 1.0%, based on its fiscal year-end market price per share of $293.65 and its $3.00 cash dividends per share, is shown next to the formula. Some companies, such as Google, do not pay

dividends because they reinvest the cash to grow their businesses in the hope of generating greater future earnings and dividends.

$$\text{Dividend yield} = \frac{\text{Annual cash dividends per share}}{\text{Market price per share}} = \frac{\$3.00}{\$293.65} = 1.0\%$$

Dividend yield

Google = 0.0%

Samsung = 2.5%

Reinhard Dachlauer/Amirphoto/ Panther Media GmbH/Alamy Stock Photo

Decision Insight

Bulls and Bears A *bear market* is a declining market. The phrase comes from bear-skin hunters who sold the skins before the bears were caught. The term *bear* was then used to describe investors who sold shares they did not own in anticipation of a price decline. A *bull market* is a rising market. This phrase comes from the once-popular sport of bear and bull baiting. The term *bull* means the opposite of *bear.* ■

Summary of Ratios

Exhibit 13.16 summarizes the ratios in this chapter and many of those in the book to this point.

EXHIBIT 13.16

Financial Statement Analysis Ratios

Ratio	Formula	Measure of
Liquidity and Efficiency		
Current ratio	$= \frac{\text{Current assets}}{\text{Current liabilities}}$	Short-term debt-paying ability
Acid-test ratio	$= \frac{\text{Cash + Short-term investments + Current receivables}}{\text{Current liabilities}}$	Immediate short-term debt-paying ability
Accounts receivable turnover	$= \frac{\text{Net sales}}{\text{Average accounts receivable, net}}$	Efficiency of collection
Inventory turnover	$= \frac{\text{Cost of goods sold}}{\text{Average inventory}}$	Efficiency of inventory management
Days' sales uncollected	$= \frac{\text{Accounts receivable, net}}{\text{Net sales}} \times 365$	Liquidity of receivables
Days' sales in inventory	$= \frac{\text{Ending inventory}}{\text{Cost of goods sold}} \times 365$	Liquidity of inventory
Total asset turnover	$= \frac{\text{Net sales}}{\text{Average total assets}}$	Efficiency of assets in producing sales
Solvency		
Debt ratio	$= \frac{\text{Total liabilities}}{\text{Total assets}}$	Creditor financing and leverage
Equity ratio	$= \frac{\text{Total equity}}{\text{Total assets}}$	Owner financing
Debt-to-equity ratio	$= \frac{\text{Total liabilities}}{\text{Total equity}}$	Debt versus equity financing
Times interest earned	$= \frac{\text{Income before interest expense and income tax expense}}{\text{Interest expense}}$	Protection in meeting interest payments
Profitability		
Profit margin ratio	$= \frac{\text{Net income}}{\text{Net sales}}$	Net income in each sales dollar
Gross margin ratio	$= \frac{\text{Net sales} - \text{Cost of goods sold}}{\text{Net sales}}$	Gross margin in each sales dollar
Return on total assets	$= \frac{\text{Net income}}{\text{Average total assets}}$	Overall profitability of assets
Return on equity	$= \frac{\text{Net income}}{\text{Average total equity}}$	Profitability of owner investment
Basic earnings per share	$= \frac{\text{Net income} - \text{Preferred dividends}}{\text{Weighted-average common shares outstanding}}$	Net income per common share
Market Prospects		
Price-earnings ratio	$= \frac{\text{Market price per common share}}{\text{Earnings per share}}$	Market value relative to earnings
Dividend yield	$= \frac{\text{Annual cash dividends per share}}{\text{Market price per share}}$	Cash return per common share

NEED-TO-KNOW 13-3

Ratio Analysis

P3

For each ratio listed, identify whether the change in ratio value from the prior year to the current year is favorable or unfavorable.

Ratio	Current Yr	Prior Yr	Ratio	Current Yr	Prior Yr
1. Profit margin	6%	8%	4. Accounts receivable turnover	8.8	9.4
2. Debt ratio	50%	70%	5. Basic earnings per share	$2.10	$2.00
3. Gross margin	40%	36%	6. Inventory turnover	3.6	4.0

Solution

Ratio	Current Yr	Prior Yr	Change
1. Profit margin ratio	6%	8%	Unfavorable
2. Debt ratio	50%	70%	Favorable
3. Gross margin ratio	40%	36%	Favorable
4. Accounts receivable turnover	8.8	9.4	Unfavorable
5. Basic earnings per share	$2.10	$2.00	Favorable
6. Inventory turnover	3.6	4.0	Unfavorable

Do More: QS 13-9 through QS 13-17, E 13-7 through E 13-16

Decision Analysis Analysis Reporting

A1

Summarize and report results of analysis.

A *financial statement analysis report* usually consists of six sections.

1. **Executive summary** —brief analysis of results and conclusions.
2. **Analysis overview** —background on the company, its industry, and the economy.
3. **Evidential matter** —financial statements and information used in the analysis, including ratios, trends, comparisons, and all

analytical measures used.

4. **Assumptions** —list of assumptions about a company's industry and economic environment, and other assumptions underlying estimates.
5. **Key factors** —list of favorable and unfavorable factors, both quantitative and qualitative, for company performance; usually organized by areas of analysis.
6. **Inferences** —forecasts, estimates, interpretations, and conclusions of the analysis report.

We must remember that the user dictates relevance, meaning that the analysis report should include a brief table of contents to help readers focus on those areas most relevant to their decisions. Finally, writing is important. Mistakes in grammar and errors of fact compromise the report's credibility.

Decision Insight

Going Short *Short selling* refers to selling stock before you buy it. Here's an example: You borrow 100 shares of **Nike** stock, sell them at $55 each, and receive money from their sale. You then wait. You hope that Nike's stock price falls to, say, $50 each and you can replace the borrowed stock for less than you sold it, reaping a profit of $5 each less any transaction costs. ■

NEED-TO-KNOW 13-4

COMPREHENSIVE

Applying Horizontal, Vertical, and Ratio Analyses

Use the following financial statements of Precision Co. to complete these requirements.

1. Prepare comparative income statements showing the percent increase or decrease for the current year in comparison to the prior year.
2. Prepare common-size comparative balance sheets for both years.

3. Compute the following ratios for the current year and identify each one's building block category for financial statement analysis.

a. Current ratio

b. Acid-test ratio

c. Accounts receivable turnover

d. Days' sales uncollected

e. Inventory turnover

f. Debt ratio

g. Debt-to-equity ratio

h. Times interest earned

i. Profit margin ratio

j. Total asset turnover

k. Return on total assets

l. Return on equity

PRECISION COMPANY
Comparative Income Statements

For Years Ended December 31	Current Yr	Prior Yr
Sales	$2,486,000	$2,075,000
Cost of goods sold	1,523,000	1,222,000
Gross profit	963,000	853,000
Operating expenses		
Advertising expense	145,000	100,000
Sales salaries expense	240,000	280,000
Office salaries expense	165,000	200,000
Insurance expense	100,000	45,000
Supplies expense	26,000	35,000
Depreciation expense	85,000	75,000
Miscellaneous expenses	17,000	15,000
Total operating expenses	778,000	750,000
Operating income	185,000	103,000
Interest expense	44,000	46,000
Income before taxes	141,000	57,000
Income tax expense	47,000	19,000
Net income	$ 94,000	$ 38,000
Earnings per share	$ 0.99	$ 0.40

PRECISION COMPANY
Comparative Year-End Balance Sheets

At December 31	Current Yr	Prior Yr
Assets		
Current assets		
Cash	$ 79,000	$ 42,000
Short-term investments	65,000	96,000
Accounts receivable, net	120,000	100,000
Merchandise inventory	250,000	265,000
Total current assets	514,000	503,000
Plant assets		
Store equipment, net	400,000	350,000
Office equipment, net	45,000	50,000
Buildings, net	625,000	675,000
Land	100,000	100,000
Total plant assets	1,170,000	1,175,000
Total assets	$1,684,000	$1,678,000
Liabilities		
Current liabilities		
Accounts payable	$ 164,000	$ 190,000
Short-term notes payable	75,000	90,000
Taxes payable	26,000	12,000
Total current liabilities	265,000	292,000
Long-term liabilities		
Notes payable	400,000	420,000
Total liabilities	665,000	712,000
Stockholders' Equity		
Common stock, $5 par value	475,000	475,000
Retained earnings	544,000	491,000
Total stockholders' equity	1,019,000	966,000
Total liabilities and equity	$1,684,000	$1,678,000

SOLUTION

1.

PRECISION COMPANY
Comparative Income Statements

For Years Ended December 31	Current Yr	Prior Yr	Dollar Change	Percent Change
Sales	$2,486,000	$2,075,000	$411,000	19.8%
Cost of goods sold	1,523,000	1,222,000	301,000	24.6
Gross profit	963,000	853,000	110,000	12.9
Operating expenses				
Advertising expense	145,000	100,000	45,000	45.0
Sales salaries expense	240,000	280,000	(40,000)	(14.3)
Office salaries expense	165,000	200,000	(35,000)	(17.5)
Insurance expense	100,000	45,000	55,000	122.2
Supplies expense	26,000	35,000	(9,000)	(25.7)
Depreciation expense	85,000	75,000	10,000	13.3
Miscellaneous expenses	17,000	15,000	2,000	13.3
Total operating expenses	778,000	750,000	28,000	3.7
Operating income	185,000	103,000	82,000	79.6
Interest expense	44,000	46,000	(2,000)	(4.3)
Income before taxes	141,000	57,000	84,000	147.4
Income tax expense	47,000	19,000	28,000	147.4
Net income	$ 94,000	$ 38,000	$ 56,000	147.4
Earnings per share	$ 0.99	$ 0.40	$ 0.59	147.5

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2.

PRECISION COMPANY
Common-Size Comparative Year-End Balance Sheets

At December 31	Current Yr	Prior Yr	Common-Size Percents Current Yr*	Common-Size Percents Prior Yr*
Assets				
Current assets				
Cash	$ 79,000	$ 42,000	4.7%	2.5%
Short-term investments	65,000	96,000	3.9	5.7
Accounts receivable, net	120,000	100,000	7.1	6.0
Merchandise inventory	250,000	265,000	14.8	15.8
Total current assets	514,000	503,000	30.5	30.0
Plant assets				
Store equipment, net	400,000	350,000	23.8	20.9
Office equipment, net	45,000	50,000	2.7	3.0
Buildings, net	625,000	675,000	37.1	40.2
Land	100,000	100,000	5.9	6.0
Total plant assets	1,170,000	1,175,000	69.5	70.0
Total assets	$1,684,000	$1,678,000	100.0%	100.0%
Liabilities				
Current liabilities				
Accounts payable	$ 164,000	$ 190,000	9.7%	11.3%
Short-term notes payable	75,000	90,000	4.5	5.4
Taxes payable	26,000	12,000	1.5	0.7
Total current liabilities	265,000	292,000	15.7	17.4
Long-term liabilities				
Notes payable	400,000	420,000	23.8	25.0
Total liabilities	665,000	712,000	39.5	42.4
Stockholders' Equity				
Common stock, $5 par value	475,000	475,000	28.2	28.3
Retained earnings	544,000	491,000	32.3	29.3
Total stockholders' equity	1,019,000	966,000	60.5	57.6
Total liabilities and equity	$1,684,000	$1,678,000	100.0%	100.0%

*Columns do not always exactly add to 100 due to rounding.

3. Ratios:

a. Current ratio: $514,000/$265,000 = 1.9:1 (liquidity and efficiency)

b. Acid-test ratio: ($79,000 + $65,000 + $120,000)/$265,000 = 1.0:1 (liquidity and efficiency)

c. Average receivables: ($120,000 + $100,000)/2 = $110,000

Accounts receivable turnover: $2,486,000/$110,000 = 22.6 times (liquidity and efficiency)

d. Days' sales uncollected: ($120,000/$2,486,000) × 365 = 17.6 days (liquidity and efficiency)

e. Average inventory: ($250,000 + $265,000)/2 = $257,500

Inventory turnover: $1,523,000/$257,500 = 5.9 times (liquidity and efficiency)

f. Debt ratio: $665,000/$1,684,000 = 39.5% (solvency)

g. Debt-to-equity ratio: $665,000/$1,019,000 = 0.65 (solvency)

h. Times interest earned: $185,000/$44,000 = 4.2 times (solvency)

i. Profit margin ratio: $94,000/$2,486,000 = 3.8% (profitability)

j. Average total assets: ($1,684,000 + $1,678,000)/2 = $1,681,000

Total asset turnover: $2,486,000/$1,681,000 = 1.48 times (liquidity and efficiency)

k. Return on total assets: $94,000/$1,681,000 = 5.6% or 3.8% × 1.48 = 5.6% (profitability)

l. Average total equity: ($1,019,000 + $966,000)/2 = $992,500

Return on equity: $94,000/$992,500 = 9.5% (profitability)

APPENDIX

13A

A2

Explain the form and assess the content of a complete income statement.

Sustainable Income

When a company's activities include income-related events not part of its normal, continuing operations, it must disclose these events. To alert users to these activities, companies separate the income statement into continuing operations, discontinued segments, comprehensive income, and earnings per share. Exhibit 13A.1 shows such an income statement for ComUS. These separations help us measure *sustainable income,* which is the income level most likely to continue into the future. Sustainable income is commonly used in performance measures.

EXHIBIT 13A.1

Income Statement (all-inclusive) for a Corporation

ComUS
Income Statement
For Year Ended December 31

	Net sales		$8,478,000
	Operating expenses		
	Cost of goods sold	$5,950,000	
	Depreciation expense	35,000	
	Other selling, general, and administrative expenses	515,000	
	Interest expense	20,000	
①	Total operating expenses		(6,520,000)
	Other unusual and/or infrequent gains (losses)		
	Loss on plant relocation		(45,000)
	Gain on sale of surplus land		72,000
	Income from continuing operations before taxes		1,985,000
	Income tax expense		(595,500)
	Income from continuing operations		1,389,500
	Discontinued segment		
②	Income from operating Division A (net of $180,000 taxes)	420,000	
	Loss on disposal of Division A (net of $66,000 tax benefit)	(154,000)	266,000
	Net income		$ 1,655,500
	Earnings per common share (200,000 outstanding shares)		
③	Income from continuing operations		$ 6.95
	Discontinued operations		1.33
	Net income (basic earnings per share)		$ 8.28

① **Continuing Operations** Section ① shows revenues, expenses, and income from continuing operations. This information is used to

predict future operations, and most view this section as the most important.

Gains and losses that are normal and frequent are reported as part of continuing operations. Gains and losses that are either unusual and/or infrequent are reported as part of continuing operations *but after* the normal revenues and expenses. Items considered unusual and/or infrequent include (1) property taken away by a foreign government, (2) condemning of property, (3) prohibiting use of an asset from a new law, (4) losses and gains from an unusual and infrequent calamity ("act of God"), and (5) financial effects of labor strikes.

② **Discontinued Segments** A **business segment** is a part of a company that is separated by its products/services or by geographic location. A segment has assets, liabilities, and financial results of operations that can be separated from those of other parts of the company. A gain or loss from selling or closing down a segment is separately reported. Section ② of Exhibit 13A.1 reports both (a) income from operating the discontinued segment before its disposal and (b) the loss from disposing of the segment's net assets. The income tax effects of each are reported separately from the income tax expense in section ①.

③ **Earnings per Share** Section ③ of Exhibit 13A.1 reports earnings per share for both continuing operations and discontinued segments (when they both exist).

Changes in Accounting Principles Changes in accounting principles require retrospective application to prior periods' financial statements. *Retrospective application* means applying a different accounting principle to prior periods as if that principle had always been used. Retrospective application enhances the consistency of financial information between periods, which improves the usefulness of information, especially with comparative analyses.

Point: FASB no longer allows extraordinary items.

Small Business Owner You own an orange grove near Jacksonville, Florida. A bad frost destroys about one-half of your oranges. You are currently preparing an income statement for a bank loan. Where on the income statement do you report the loss of oranges? ■ *Answer:* The frost loss is likely unusual, meaning it is reported in the nonrecurring section of continuing operations. Managers would highlight this loss apart from ongoing, normal results so that the bank views it separately from normal operations.

Summary: Cheat Sheet

BASICS OF ANALYSIS

Liquidity and efficiency: Ability to meet short-term obligations and-efficiently generate revenues.

Solvency: Ability to meet long-term obligations and generate future revenues.

Profitability: Ability to provide financial rewards to attract and retain financing.

Market prospects: Ability to generate positive market expectations.

General-purpose financial statements: Include the (1) income statement, (2) balance sheet, (3) statement of stockholders' equity (or statement of retained earnings), (4) statement of cash flows, and (5) notes to these statements.

HORIZONTAL ANALYSIS

Comparative financial statements: Show financial amounts in side-by-side columns on a single statement.

Analysis period: The financial statements under analysis.

Base period: The financial statements used for comparison. The prior year is commonly used as a base period.

Dollar change formula :

$$\text{Dollar change} = \text{Analysis period amount} - \text{Base period amount}$$

Percent change formula :

$$\text{Percent change (\%)} = \frac{\text{Analysis period amount} - \text{Base period amount}}{\text{Base period amount}} \times 100$$

Apple comparative balance sheet: The prior year is the base period and current year is the analysis period.

$ millions	Current Yr	Prior Yr	Dollar Change	Percent Change
Assets				
Cash and cash equivalents	$48,844	$25,913	$22,931	88.5%
Short-term marketable securities	51,713	40,388	11,325	28.0%
Accounts receivable, net	22,926	23,186	(260)	(1.1)%

Trend analysis: Computing trend percents that show patterns in data across periods.

$$\text{Trend percent (\%)} = \frac{\text{Analysis period amount}}{\text{Base period amount}} \times 100$$

Apple trend analysis: 4 years ago is the base period, and each subsequent year is the analysis period.

In trend percent	Current Yr	1 Yr Ago	2 Yrs Ago	3 Yrs Ago	4 Yrs Ago
Net sales	111.3%	113.6%	98.1%	92.3%	100.0%
Cost of sales	115.5%	116.9%	100.7%	93.8%	100.0%
Operating expenses	153.9%	138.2%	119.9%	108.2%	100.0%

VERTICAL ANALYSIS

Common-size financial statements: Show changes in the relative importance of each financial statement item. All individual amounts in common-size statements are shown in common-size percents.

Common-size percent formula :

$$\text{Common-size percent (\%)} = \frac{\text{Analysis amount}}{\text{Base amount}} \times 100$$

Base amount: Comparative balance sheets use total assets, and comparative income statements use net sales.

Apple common-size balance sheet:

$ millions	Current Yr	Prior Yr	Common-Size Percents Current Yr	Common-Size Percents Prior Yr
Long-term marketable securities	105,341	170,799	31.1%	46.7%
Property, plant and equipment, net	37,378	41,304	11.0%	11.3%
Other noncurrent assets	32,978	22,283	9.7%	6.1%
Total assets	$338,516	$365,725	100.0%	100.0%

Apple common-size income statement:

$ millions	Current Yr	Prior Yr	Common-Size Percents Current Yr	Common-Size Percents Prior Yr
Net sales	$260,174	$265,595	100.0%	100.0%
Cost of sales	161,782	163,756	62.2%	61.7%
Gross margin	$ 98,392	$101,839	37.8%	38.3%

RATIO ANALYSIS AND REPORTING

Ratio	Formula
Liquidity and Efficiency	
Current ratio	$= \frac{\text{Current assets}}{\text{Current liabilities}}$
Acid-test ratio	$= \frac{\text{Cash + Short-term investments + Current receivables}}{\text{Current liabilities}}$
Accounts receivable turnover	$= \frac{\text{Net sales}}{\text{Average accounts receivable, net}}$
Inventory turnover	$= \frac{\text{Cost of goods sold}}{\text{Average inventory}}$
Days' sales uncollected	$= \frac{\text{Accounts receivable, net}}{\text{Net sales}} \times 365$
Days' sales in inventory	$= \frac{\text{Ending inventory}}{\text{Cost of goods sold}} \times 365$
Total asset turnover	$= \frac{\text{Net sales}}{\text{Average total assets}}$
Solvency	
Debt ratio	$= \frac{\text{Total liabilities}}{\text{Total assets}}$
Equity ratio	$= \frac{\text{Total equity}}{\text{Total assets}}$
Debt-to-equity ratio	$= \frac{\text{Total liabilities}}{\text{Total equity}}$
Times interest earned	$= \frac{\text{Income before interest expense and income tax expense}}{\text{Interest expense}}$
Profitability	
Profit margin ratio	$= \frac{\text{Net income}}{\text{Net sales}}$
Gross margin ratio	$= \frac{\text{Net sales} - \text{Cost of goods sold}}{\text{Net sales}}$
Return on total assets	$= \frac{\text{Net income}}{\text{Average total assets}}$
Return on equity	$= \frac{\text{Net income}}{\text{Average total equity}}$
Basic earnings per share	$= \frac{\text{Net income} - \text{Preferred dividends}}{\text{Weighted-average common shares outstanding}}$
Market Prospects	
Price-earnings ratio	$= \frac{\text{Market price per common share}}{\text{Earnings per share}}$
Dividend yield	$= \frac{\text{Annual cash dividends per share}}{\text{Market price per share}}$

Key Terms

Business segment (521)

Common-size financial statement (508)

Comparative financial statement (504)

Efficiency (503)

Equity ratio (514)

Financial reporting (504)

Financial statement analysis (503)

General-purpose financial statements (504)

Horizontal analysis (504)

Liquidity (503)

Market prospects (503)

Profitability (503)

Ratio analysis (504)

Solvency (503)

Vertical analysis (504)

Working capital (512)

Multiple Choice Quiz

1. A company's sales in the prior year were $300,000 and in the current year were $351,000. Using the prior year as the base year, the sales trend percent for the current year is

a. 17%.

b. 85%.

c. 100%.

d. 117%.

e. 48%.

Use the following information for questions 2 through 5.

ELLA COMPANY
Balance Sheet
December 31

Assets		Liabilities	
Cash	$ 86,000	Current liabilities	$124,000
Accounts receivable	76,000	Long-term liabilities	90,000
Merchandise inventory	122,000	**Equity**	
Prepaid insurance	12,000	Common stock	300,000
Long-term investments	98,000	Retained earnings	316,000
Plant assets, net	436,000		
Total assets	$830,000	Total liabilities and equity	$830,000

2. What is Ella Company's current ratio?

a. 0.69

b. 1.31

c. 3.88

d. 6.69

e. 2.39

3. What is Ella Company's acid-test ratio?

a. 2.39

b. 0.69

c. 1.31

d. 6.69

e. 3.88

4. What is Ella Company's debt ratio?

a. 25.78%

b. 100.00%

c. 74.22%

d. 137.78%

e. 34.74%

5. What is Ella Company's equity ratio?

a. 25.78%

b. 100.00%

c. 34.74%

d. 74.22%

e. 137.78%

ANSWERS TO MULTIPLE CHOICE QUIZ

1. d; ($351,000/$300,000) × 100 = 117%

2. e; ($86,000 + $76,000 + $122,000 + $12,000)/$124,000 = 2.39

3. c; ($86,000 + $76,000)/$124,000 = 1.31

4. a; ($124,000 + $90,000)/$830,000 = 25.78%

5. d; ($300,000 + $316,000)/$830,000 = 74.22%

Superscript letter A denotes assignments based on Appendix 13A.

QUICK STUDY

QS 13-1

Financial reporting

C1

Identify whether each of the following items is included as part of general-purpose financial statements.

a. Income statement

b. Balance sheet

c. Shareholders' meetings

d. Financial statement notes

e. Company news releases

f. Statement of cash flows

g. Stock price information and investor analysis

h. Statement of shareholders' equity

QS 13-2

Standard of comparison

C1

Identify which standard of comparison, (*a*) intracompany, (*b*) competitor, (*c*) industry, or (*d*) guidelines, best describes each of the following examples.

1. Compare **Ford** 's return on assets to **GM** 's return on assets.

2. Compare a company's acid-test ratio to the 1:1 rule of thumb.

3. Compare **Netflix** 's current year sales to its prior year sales.

4. Compare **McDonald 's** profit margin to the fast-food industry profit margin.

QS 13-3

Percent change **P1**

In the current year, Aveeno reported net income of $50,400, which was a 12% increase over prior year net income. Compute prior year net income.

QS 13-4

Horizontal analysis

P1

Compute the annual dollar changes and percent changes for each of the following accounts.

	Current Yr	Prior Yr
Short-term investments	$374,634	$234,000
Accounts receivable	97,364	101,000
Notes payable	0	88,000

QS 13-5

Horizontal analysis

P1

Compute the annual dollar changes and percent changes for each of the following items.

	Current Yr	Prior Yr
Cash	$ 7,440	$ 8,000
Accounts receivable	54,000	18,000
Equipment, net	44,000	40,000
Land	91,680	66,000
Total assets	$197,120	$132,000

QS 13-6

Vertical analysis **P2**

Express the items from QS 13-5 in common-size percents.

QS 13-7

Trend percents

P1

Use the following information to determine the prior year and current year trend percents for net sales using the prior year as the base year.

$ thousands	Current Yr	Prior Yr
Net sales	$801,810	$453,000
Cost of goods sold	392,887	134,088

QS 13-8

Common-size analysis **P2**

Refer to the information in QS 13-7. Determine the prior year and current year common-size percents for cost of goods sold using net sales as the base.

QS 13-9

Computing current ratio and acid-test ratio **P3**

Pritchett Co. reported the following year-end data: cash of $15,000; short-term investments of $5,000; accounts receivable (current) of $8,000; inventory of $20,000; prepaid (current) assets of $6,000; and total current liabilities of $20,000. Compute the (*a*) current ratio and (*b*) acid-test ratio. Round to one decimal.

QS 13-10

Analyzing effect of transactions on current ratio **P3**

At its prior year-end, VPN Co. reported current assets of $60,000 and current liabilities of $55,000. Determine how each of the following transactions would increase, decrease, or have no effect on total current assets, total current liabilities, and the current ratio.

1. Acquired inventory for $200 cash.
2. Sold a long-term asset (equipment) for $4,000 cash.
3. Accrued wages payable of $1,500.

QS 13-11

Computing accounts receivable turnover and days' sales uncollected **P3**

Mifflin Co. reported the following for the current year: net sales of $60,000; cost of goods sold of $38,000; beginning balance in accounts receivable of $14,000; and ending balance in accounts receivable of $6,000. Compute (*a*) accounts receivable turnover and (*b*) days' sales uncollected. Round to one decimal. *Hint:* Accounts receivable turnover uses average accounts receivable and days' sales uncollected uses the ending balance in accounts receivable.

QS 13-12

Computing inventory turnover and days' sales in inventory **P3**

SCC Co. reported the following for the current year: net sales of $48,000; cost of goods sold of $40,000; beginning balance in inventory of $2,000; and ending balance in inventory of $8,000. Compute (*a*) inventory turnover and (*b*) days' sales in inventory. *Hint:* Inventory turnover uses average inventory and days' sales in inventory uses the ending balance in inventory.

QS 13-13

Computing total asset turnover **P3**

Dundee Co. reported the following for the current year: net sales of $80,000; cost of goods sold of $60,000; beginning balance of total assets of $115,000; and ending balance of total assets of $85,000. Compute total asset turnover. Round to one decimal.

QS 13-14

Computing debt-to-equity ratio and times interest earned **P3**

Paddy's Pub reported the following year-end data: income before interest expense and income tax expense of $30,000; cost of goods sold of $17,000; interest expense of $1,500; total assets of $70,000; total liabilities of $20,000; and total equity of $50,000. Compute the (*a*) debt-to-equity ratio and (*b*) times interest earned. Round to one decimal.

QS 13-15

Computing profit margin and return on total assets **P3**

Edison Co. reported the following for the current year: net sales of $80,000; cost of goods sold of $56,000; net income of $16,000; beginning balance of total assets of $60,000; and ending balance of total assets of $68,000. Compute (*a*) profit margin and (*b*) return on total assets.

QS 13-16

Computing price-earnings ratio and dividend yield **P3**

Franklin Co. reported the following year-end data: net income of $220,000; annual cash dividends per share of $3; market price per (common) share of $150; and earnings per share of $10. Compute the (*a*) price-earnings ratio and (*b*) dividend yield.

QS 13-17

Ratio interpretation

P3

For each ratio listed, identify whether the change in ratio value from the prior year to the current year is usually regarded as favorable or unfavorable.

Ratio	Current Yr	Prior Yr	Ratio	Current Yr	Prior Yr
1. Profit margin	9%	8%	5. Accounts receivable turnover	5.5	6.7
2. Debt ratio	47%	42%	6. Basic earnings per share	$1.25	$1.10
3. Gross margin	34%	46%	7. Inventory turnover	3.6	3.4
4. Acid-test ratio	1.00	1.15	8. Dividend yield	2.0%	1.2%

QS 13-18

Ratio analysis for lending decisions

P3

We are evaluating whether or not to make a loan to a company. Indicate whether each of the following separate trends would make us more or less likely to make the loan.

a. Current ratio is increasing, from 0.8 to 1.3.

b. Acid-test ratio is increasing, from 0.6 to 1.0.

c. Times interest earned is decreasing, from 9.0 to 6.2.

d. Total asset turnover is decreasing, from 0.5 to 0.3.

QS 13-19

Ratio analysis for investing decisions

P3

We are evaluating whether or not to invest in a company. Indicate whether each of the following separate trends would make us more or less likely to invest.

a. Return on equity is increasing, from 19% to 24%.

b. Days' sales in inventory is increasing, from 22 days to 38 days.

c. Profit margin is decreasing, from 25% to 19%.

d. Return on total assets is increasing, from 12% to 16%.

QS 13-20

Analyzing short-term financial condition

A1

Following is information for Morgan Company and Parker Company, which are similar firms operating in the same industry.

	Morgan	Parker
Current ratio	1.7	3.2
Acid-test ratio	1.0	2.8
Accounts receivable turnover	30.5	16.4
Inventory turnover	24.2	14.5

1. Based on current ratio and acid-test ratio, which company appears better positioned to pay current liabilities?
2. Based on accounts receivable turnover, which company converts its receivables into cash more frequently?
3. Based on inventory turnover, which company appears to hold inventory for the least amount of time?

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QS 13-21[A]

Identifying unusual and/or infrequent gains or losses

A2

Which of the following gains or losses would Organic Foods account for as unusual and/or infrequent?

a. A hurricane destroys rainwater tanks that result in a loss for Organic Foods.

b. The used vehicle market is weak and Organic Foods is forced to sell its used delivery truck at a loss.

c. Organic Foods owns an organic farm in Venezuela that is seized by the government. The company records a loss.

QS 13-22[A]

Reporting a discontinued segment

A2

Wipfli Co. provides auditing services and consulting services. Wipfli sells the consulting services segment for a gain of $75,000 (net of tax). Income from consulting services during the year is $20,000 (net of tax). Wipfli reports income from continuing operations of $180,000. Prepare the discontinued segment portion of its income statement.

EXERCISES

Exercise 13-1

Building blocks of analysis

C1

Match the ratio to the building block of financial statement analysis to which it best relates.

A. Liquidity and efficiency

B. Solvency

C. Profitability

D. Market prospects

1. Equity ratio

2. Return on total assets

3. Dividend yield

4. Days' sales in inventory

5. Accounts receivable turnover

6. Debt-to-equity ratio

7. Times interest earned

8. Gross margin ratio

9. Acid-test ratio

Exercise 13-2

Identifying financial ratios

C1

Identify which of the following six metrics *a* through *f* best completes questions 1 through 3.

a. Days' sales uncollected

b. Accounts receivable turnover

c. Working capital

d. Return on total assets

e. Total asset turnover

f. Profit margin

1. Which two ratios are key components in measuring a company's operating efficiency? Which ratio summarizes these two components? _____
2. What measure reflects the difference between current assets and current liabilities? _____
3. Which two short-term liquidity ratios measure how frequently a company collects its accounts? _____ _____

Exercise 13-3

Computing and analyzing trend percents

P1

Compute trend percents for the following accounts using 2017 as the base year. For each of the three accounts, state whether the situation as revealed by the trend percents appears to be favorable or unfavorable.

	2021	2020	2019	2018	2017
Sales	$282,880	$270,800	$252,600	$234,560	$150,000
Cost of goods sold	128,200	122,080	115,280	106,440	67,000
Accounts receivable	18,100	17,300	16,400	15,200	9,000

Exercise 13-4

Computing and interpreting common-size percents

P2

Compute common-size percents for the following comparative income statements (round percents to one decimal). Using the common-size percents, which item is most responsible for the decline in net income?

GOMEZ CORPORATION Comparative Income Statements For Years Ended December 31	Current Yr	Prior Yr
Sales	$740,000	$625,000
Cost of goods sold	560,300	290,800
Gross profit	179,700	334,200
Operating expenses	128,200	218,500
Net income	$ 51,500	$115,700

Exercise 13-5

Determining income effects from common-size and trend percents **P1 P2**

Common-size and trend percents for Roxi Company's sales, cost of goods sold, and expenses follow. Determine whether net income increased, decreased, or remained unchanged in this three-year period.

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	Common-Size Percents			Trend Percents		
	Current Yr	1 Yr Ago	2 Yrs Ago	Current Yr	1 Yr Ago	2 Yrs Ago
Sales	100.0%	100.0%	100.0%	105.4%	104.2%	100.0%
Cost of goods sold	63.4	61.9	59.1	113.1	109.1	100.0
Operating expenses	15.3	14.8	15.1	106.8	102.1	100.0

Exercise 13-6

Common-size percents

P2

Simon Company's year-end balance sheets follow. (1) Express the balance sheets in common-size percents. Round percents to one decimal. (2) Assuming annual sales have not changed in the last three years, is the change in accounts receivable as a percentage of total assets favorable or unfavorable? (3) Is the change in merchandise inventory as a percentage of total assets favorable or unfavorable?

At December 31	Current Yr	1 Yr Ago	2 Yrs Ago
Assets			
Cash	$ 31,800	$ 35,625	$ 37,800
Accounts receivable, net	89,500	62,500	50,200
Merchandise inventory	112,500	82,500	54,000
Prepaid expenses	10,700	9,375	5,000
Plant assets, net	278,500	255,000	230,500
Total assets	$523,000	$445,000	$377,500
Liabilities and Equity			
Accounts payable	$129,900	$ 75,250	$ 51,250
Long-term notes payable	98,500	101,500	83,500
Common stock, $10 par value	163,500	163,500	163,500
Retained earnings	131,100	104,750	79,250
Total liabilities and equity	$523,000	$445,000	$377,500

Exercise 13-7

Analyzing liquidity

P3

Refer to Simon Company's balance sheets in Exercise 13-6. (1) Compute the current ratio for each of the three years. Did the current ratio improve or worsen over the three-year period? (2) Compute the acid-test ratio for each of the three years. Did the acid-test ratio improve or worsen over the three-year period? Round ratios to two decimals.

Exercise 13-8

Analyzing and interpreting liquidity

P3

Refer to the Simon Company information in Exercise 13-6. The company's income statements for the current year and one year ago follow. Assume that all sales are on credit and then compute (1) days' sales uncollected, (2) accounts receivable turnover, (3) inventory turnover, and (4) days' sales in inventory. For each ratio, determine if it improved or worsened in the current year. Round to one decimal.

For Year Ended December 31	Current Yr		1 Yr Ago	
Sales		$673,500		$532,000
Cost of goods sold	$411,225		$345,500	
Other operating expenses	209,550		134,980	
Interest expense	12,100		13,300	
Income tax expense	9,525		8,845	
Total costs and expenses		642,400		502,625
Net income		$ 31,100		$ 29,375
Earnings per share		$ 1.90		$ 1.80

Exercise 13-9

Analyzing risk and capital structure

P3

Refer to the Simon Company information in Exercises 13-6 and 13-8. For both the current year and one year ago, compute the following ratios: (1) debt ratio and equity ratio—percent rounded to one decimal, (2) debt-to-equity ratio—rounded to two decimals; based on debt-to-equity ratio, does the company have more or less debt in the current year versus one year ago? and (3) times interest earned—rounded to one decimal. Based on times interest earned, is the company more or less risky for creditors in the current year versus one year ago?

Exercise 13-10

Analyzing efficiency and profitability

P3

Refer to Simon Company's financial information in Exercises 13-6 and 13-8. For both the current year and one year ago, compute the following ratios: (1) profit margin ratio—percent rounded to one decimal; did profit margin improve or worsen in the current year versus one year ago? (2) total asset turnover—rounded to one decimal, and (3) return on total assets—percent rounded to one decimal. Based on return on total assets, did Simon's operating

efficiency improve or worsen in the current year versus one year ago?

Exercise 13-11

Analyzing profitability

P3

Refer to Simon Company's financial information in Exercises 13-6 and 13-8. Additional information about the company follows. For both the current year and one year ago, compute the following ratios: (1) return on equity—percent rounded to one decimal, (2) dividend yield —percent rounded to one decimal, and (3) price-earnings ratio on December 31—rounded to one decimal. Assuming Simon's competitor has a price-earnings ratio of 10, which company has higher market expectations for future growth?

Common stock market price, December 31, current year	$30.00	Annual cash dividends per share in current year	$0.29
Common stock market price, December 31, 1 year ago	28.00	Annual cash dividends per share 1 year ago.	0.24

Exercise 13-12

Analyzing effect of transactions on current ratio

P3

On January 1, 5G Co. reported current assets of $72,000 and current liabilities of $60,000. Compute total current assets, total current liabilities, and the current ratio at January 1 and after each of the following transactions.

Jan. 5 Purchased equipment to be used in operations for $18,000 cash.

Jan. 12 Paid $5,000 cash for accounts payable.

Jan. 18 Acquired a building in exchange for a $99,000 long-term note payable, first payment to occur in 3 years.

Jan. 22 Purchased $12,000 of merchandise on credit, terms n/45.

Jan. 31 Sold outdated machinery for $12,700 cash.

Exercise 13-13

Computing current ratio and profit margin

P3

Niantic reported the following financial information (amounts in millions). Compute the current ratio and profit margin.

Current assets	$ 9,000	Net sales	$4,400
Total assets	11,477	Net income	176
Current liabilities	900		

Exercise 13-14

Analyzing efficiency and profitability

P3

Following are data for BioBeans and GreenKale, which sell organic produce and are of similar size.

1. Compute the profit margin and the return on total assets for both companies.
2. Based on analysis of these two measures, which company is the preferred investment?

	BioBeans	GreenKale
Average total assets	$187,500	$150,000
Net sales	75,000	60,000
Net income	15,000	9,000

Exercise 13-15

Reconstructing an income statement with ratios

P3

Following is an incomplete current year income statement.

Income Statement	
Net sales	$ (*a*)
Cost of goods sold	(*b*)
Selling, general, and administrative expenses	7,000
Income tax expense	2,000
Net income	(*c*)

Determine amounts *a, b,* and *c.* Additional information follows:

- Return on total assets is 16% (average total assets is $68,750).
- Inventory turnover is 5 (average inventory is $6,000).
- Accounts receivable turnover is 8 (average accounts receivable is $6,250).

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Exercise 13-16

Interpreting financial ratios

A1 P3

Roak Company and Clay Company are similar firms that operate in the same industry. Clay began operations two years ago and Roak started five years ago. In the current year, both companies pay 6% interest on their debt to creditors. The following additional information is available.

	Roak Company			Clay Company		
	Current Yr	1 Yr Ago	2 Yrs Ago	Current Yr	1 Yr Ago	2 Yrs Ago
Total asset turnover	3.1	2.8	3.0	1.7	1.5	1.1
Return on total assets	7.4%	7.0%	6.9%	4.8%	4.5%	3.2%
Profit margin ratio	2.4%	2.5%	2.3%	2.8%	3.0%	2.9%
Sales	$410,000	$380,000	$396,000	$210,000	$170,000	$110,000

1. Which company has the better (*a*) profit margin, (*b*) asset turnover, and (*c*) return on assets?
2. Which company has the better rate of growth in sales?

3. Did the company successfully use financial leverage in the current year, as judged by return on assets exceeding its interest rate on debt, in the case of (*a*) Roak and (*b*) Clay?

Exercise 13-17[A]

Income statement categories

A2

In the current year, Randa Merchandising Inc. sold its interest in a chain of wholesale outlets, taking the company completely out of the wholesaling business. The company still operates its retail outlets. A listing of the major sections of an income statement follows.

A. Net sales less operating expense section

B. Other unusual and/or infrequent gains (losses)

C. Taxes reported on income (loss) from continuing operations

D. Income (loss) from operating a discontinued segment, or gain (loss) from its disposal

Indicate where each of the following income-related items for this company appears on its current year income statement by writing the letter of the appropriate section in the blank beside each item.

Section	Item	Debit	Credit
_____	1. Net sales		$2,900,000
_____	2. Gain on state's condemnation of company property		230,000
_____	3. Cost of goods sold	$1,480,000	
_____	4. Income tax expense	217,000	
_____	5. Depreciation expense	232,000	
_____	6. Gain on sale of wholesale business segment, net of tax		775,000
_____	7. Loss from operating wholesale business segment, net of tax	444,000	
_____	8. Loss of assets from meteor strike	640,000	

Exercise 13-18[A]

Income statement presentation **A2**

Use the financial data for Randa Merchandising Inc. in Exercise 13-17A to prepare its December 31 year-end income statement. Ignore the earnings per share section.

connect

PROBLEM SET A

Problem 13-1A

Calculating and analyzing trend percents

P1

Selected comparative financial statements of Haroun Company follow.

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HAROUN COMPANY
Comparative Income Statements
For Years Ended December 31

$ thousands	2021	2020	2019	2018	2017	2016	2015
Sales	$1,694	$1,496	$1,370	$1,264	$1,186	$1,110	$928
Cost of goods sold	1,246	1,032	902	802	752	710	586
Gross profit	448	464	468	462	434	400	342
Operating expenses	330	256	234	170	146	144	118
Net income	$ 118	$ 208	$ 234	$ 292	$ 288	$ 256	$224

HAROUN COMPANY
Comparative Year-End Balance Sheets

At December 31, $ thousands	2021	2020	2019	2018	2017	2016	2015
Assets							
Cash	$ 58	$ 78	$ 82	$ 84	$ 88	$ 86	$ 89
Accounts receivable, net	490	514	466	360	318	302	216
Merchandise inventory	1,838	1,364	1,204	1,032	936	810	615
Other current assets	36	32	14	34	28	28	9
Long-term investments	0	0	0	146	146	146	146
Plant assets, net	2,020	2,014	1,752	944	978	860	725
Total assets	$4,442	$4,002	$3,518	$2,600	$2,494	$2,232	$1,800
Liabilities and Equity							
Current liabilities	$1,220	$1,042	$ 718	$ 614	$ 546	$ 522	$ 282
Long-term liabilities	1,294	1,140	1,112	570	580	620	400
Common stock	1,000	1,000	1,000	850	850	650	650
Other paid-in capital	250	250	250	170	170	150	150
Retained earnings	678	570	438	396	348	290	318
Total liabilities and equity	$4,442	$4,002	$3,518	$2,600	$2,494	$2,232	$1,800

Required

1. Compute trend percents for all components of both statements using 2015 as the base year. Round percents to one decimal.

Check (1) 2021, Total assets trend, 246.8%

Analysis Component

2. Refer to the results from part 1. (*a*) Did sales grow steadily over this period? (*b*) Did net income as a percent of sales grow over the past four years? (*c*) Did inventory increase over this period?

Problem 13-2A

Ratios, common-size statements, and trend percents

P1 P2 P3

Selected comparative financial statements of Korbin Company follow.

KORBIN COMPANY
Comparative Income Statements

For Years Ended December 31	2021	2020	2019
Sales	$555,000	$340,000	$278,000
Cost of goods sold	283,500	212,500	153,900
Gross profit	271,500	127,500	124,100
Selling expenses	102,900	46,920	50,800
Administrative expenses	50,668	29,920	22,800
Total expenses	153,568	76,840	73,600
Income before taxes	117,932	50,660	50,500
Income tax expense	40,800	10,370	15,670
Net income	$ 77,132	$ 40,290	$ 34,830

KORBIN COMPANY
Comparative Balance Sheets

At December 31	2021	2020	2019
Assets			
Current assets	$ 52,390	$ 37,924	$ 51,748
Long-term investments	0	500	3,950
Plant assets, net	100,000	96,000	60,000
Total assets	$152,390	$134,424	$115,698
Liabilities and Equity			
Current liabilities	$ 22,800	$ 19,960	$ 20,300
Common stock	72,000	72,000	60,000
Other paid-in capital	9,000	9,000	6,000
Retained earnings	48,590	33,464	29,398
Total liabilities and equity	$152,390	$134,424	$115,698

Required

1. Compute each year's current ratio. Round ratios to one decimal.
2. Express the income statement data in common-size percents. Round percents to two decimals.
3. Express the balance sheet data in trend percents with 2019 as base year. Round percents to two decimals.

Check (3) 2021, Total assets trend, 131.71%

Analysis Component

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4. Refer to the results from parts 1, 2, and 3. (*a*) Did cost of goods sold make up a greater portion of sales for the most recent year compared to the prior year? (*b*) Did income as a percent of sales improve in the most recent year compared to the prior year? (*c*) Did plant assets grow over this period?

Problem 13-3A

Transactions, working capital, and liquidity ratios

P3

Plum Corporation began the month of May with $700,000 of current assets, a current ratio of 2.50:1, and an acid-test ratio of 1.10:1.

During the month, it completed the following transactions. The company uses a perpetual inventory system.

May 2 Purchased $50,000 of merchandise inventory on credit.

8 Sold merchandise inventory that cost $55,000 for $110,000 cash.

10 Collected $20,000 cash on an account receivable.

15 Paid $22,000 cash to settle an account payable.

17 Wrote off a $5,000 bad debt against the Allowance for Doubtful Accounts account.

22 Declared a $1 per share cash dividend on its 50,000 shares of outstanding common stock.

26 Paid the dividend declared on May 22.

27 Borrowed $100,000 cash by giving the bank a 30-day, 10% note.

28 Borrowed $80,000 cash by signing a long-term secured note.

29 Used the $180,000 cash proceeds from the notes to buy new machinery.

Check May 22: Current ratio, 2.19; Acid-test ratio, 1.11

May 29: Current ratio, 1.80; Working capital, $325,000

Required

Prepare a table, similar to the following, showing Plum's (1) current ratio, (2) acid-test ratio, and (3) working capital after each transaction. Round ratios to two decimals.

	A	B	C	D	E	F	G
1		Current Assets	Quick Assets	Current Liabilities	Current Ratio	Acid-Test Ratio	Working Capital
2	Transaction						
3	Beginning	$700,000	—	—	2.50	1.10	—

Problem 13-4A

Calculating financial statement ratios

P3

Selected current year-end financial statements of Cabot Corporation follow. All sales were on credit; selected balance sheet amounts at December 31 of the *prior year* were inventory, $48,900; total assets, $189,400; common stock, $90,000; and retained earnings, $33,748.

CABOT CORPORATION
Balance Sheet
December 31 of Current Year

Assets		Liabilities and Equity	
Cash	$ 10,000	Accounts payable	$ 17,500
Short-term investments	8,400	Accrued wages payable	3,200
Accounts receivable, net	33,700	Income taxes payable	3,300
Merchandise inventory	32,150	Long-term note payable, secured by mortgage on plant assets	63,400
Prepaid expenses	2,650	Common stock	90,000
Plant assets, net	153,300	Retained earnings	62,800
Total assets	$240,200	Total liabilities and equity	$240,200

CABOT CORPORATION
Income Statement
For Current Year Ended December 31

Sales	$448,600
Cost of goods sold	297,250
Gross profit	151,350
Operating expenses	98,600
Interest expense	4,100
Income before taxes	48,650
Income tax expense	19,598
Net income	$ 29,052

Required

Compute the following: (1) current ratio, (2) acid-test ratio, (3) days' sales uncollected, (4) inventory turnover, (5) days' sales in inventory, (6) debt-to-equity ratio, (7) times interest earned, (8) profit margin ratio, (9) total asset turnover, (10) return on total assets, and (11) return on equity. Round to one decimal place; for part 6, round to two decimals.

Check Acid-test ratio, 2.2 to 1; Inventory turnover, 7.3

Problem 13-5A

Comparative ratio analysis

P3

Summary information from the financial statements of two companies competing in the same industry follows.

	Barco Company	Kyan Company
Data from the current year-end balance sheets		
Assets		
Cash	$ 19,500	$ 34,000
Accounts receivable, net	46,500	64,600
Merchandise inventory	84,440	132,500
Prepaid expenses	5,000	6,950
Plant assets, net	290,000	304,400
Total assets	$445,440	$542,450
Liabilities and Equity		
Current liabilities	$ 61,340	$ 93,300
Long-term notes payable	80,800	101,000
Common stock, $5 par value	180,000	206,000
Retained earnings	123,300	142,150
Total liabilities and equity	$445,440	$542,450

	Barco Company	Kyan Company
Data from the current year's income statement		
Sales	$770,000	$880,200
Cost of goods sold	585,100	632,500
Interest expense	7,900	13,000
Income tax expense	14,800	24,300
Net income	162,200	210,400
Basic earnings per share	4.51	5.11
Cash dividends per share	3.81	3.93
Beginning-of-year balance sheet data		
Accounts receivable, net	$ 29,800	$ 54,200
Merchandise inventory	55,600	107,400
Total assets	398,000	382,500
Common stock, $5 par value	180,000	206,000
Retained earnings	98,300	93,600

Required

1. For both companies compute the (*a*) current ratio, (*b*) acid-test ratio, (*c*) accounts receivable turnover, (*d*) inventory turnover, (*e*) days' sales in inventory, and (*f*) days' sales uncollected. Round to one decimal place. Identify the company you consider to be the better short-term credit risk and explain why.
2. For both companies compute the (*a*) profit margin ratio, (*b*) total asset turnover, (*c*) return on total assets, and (*d*) return on equity. Assuming that each company's stock can be purchased at $75 per share, compute their (*e*) price-earnings ratios and (*f*) dividend yields. Round to one decimal place. Identify which company's stock you would recommend as the better investment and explain why.

Check (1) Kyan: Accounts receivable turnover, 14.8; Inventory turnover, 5.3

(2) Barco: Profit margin, 21.1%; PE, 16.6

Problem 13-6A[A]

Income statement computations and format

A2

Selected account balances from the adjusted trial balance for Olinda Corporation as of its calendar year-end December 31 follow.

	Debit	Credit
a. Interest revenue		$ 14,000
b. Depreciation expense—Equipment	$ 34,000	
c. Loss on sale of equipment	25,850	
d. Accounts payable		44,000
e. Other operating expenses	106,400	
f. Accumulated depreciation—Equipment		71,600
g. Gain from settlement of lawsuit		44,000
h. Accumulated depreciation—Buildings		174,500
i. Loss from operating a discontinued segment (pretax)	18,250	
j. Gain on insurance recovery of tornado damage		20,000
k. Net sales		998,000
l. Depreciation expense—Buildings	52,000	
m. Correction of overstatement of prior year's sales (pretax)	16,000	
n. Gain on sale of discontinued segment's assets (pretax)		34,000
o. Loss from settlement of lawsuit	23,250	
p. Income tax expense	?	
q. Cost of goods sold	482,500	

Required

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1. Assume that the company's income tax rate is 30% for all items. Identify the tax effects and after-tax amounts of the three items labeled pretax.
2. Compute the amount of income from continuing operations before income taxes. What is the amount of the income tax expense? What is the amount of income from continuing operations?
3. What is the total amount of after-tax income (loss) associated with the discontinued segment?
4. What is the amount of net income for the year?

Check (3) $11,025

(4) $257,425

PROBLEM SET B

Problem 13-1B

Calculating and analyzing trend percents

P1

Selected comparative financial statements of Tripoly Company follow.

TRIPOLY COMPANY
Comparative Income Statements
For Years Ended December 31

$ thousands	2021	2020	2019	2018	2017	2016	2015
Sales	$560	$610	$630	$680	$740	$770	$860
Cost of goods sold	276	290	294	314	340	350	380
Gross profit	284	320	336	366	400	420	480
Operating expenses	84	104	112	126	140	144	150
Net income	$200	$216	$224	$240	$260	$276	$330

TRIPOLY COMPANY
Comparative Year-End Balance Sheets

At December 31, $ thousands	2021	2020	2019	2018	2017	2016	2015
Assets							
Cash	$ 44	$ 46	$ 52	$ 54	$ 60	$ 62	$ 68
Accounts receivable, net	130	136	140	144	150	154	160
Merchandise inventory	166	172	178	180	186	190	208
Other current assets	34	34	36	38	38	40	40
Long-term investments	36	30	26	110	110	110	110
Plant assets, net	510	514	520	412	420	428	454
Total assets	$920	$932	$952	$938	$964	$984	$1,040
Liabilities and Equity							
Current liabilities	$148	$156	$186	$190	$210	$260	$ 280
Long-term liabilities	92	120	142	148	194	214	260
Common stock	160	160	160	160	160	160	160
Other paid-in capital	70	70	70	70	70	70	70
Retained earnings	450	426	394	370	330	280	270
Total liabilities and equity	$920	$932	$952	$938	$964	$984	$1,040

Required

1. Compute trend percents for all components of both statements using 2015 as the base year. Round percents to one decimal.

Check (1) 2021, Total assets trend, 88.5%

Analysis Component

2. Analyze and comment on the financial statements and trend percents from part 1.

Problem 13-2B

Ratios, common-size statements, and trend percents **P1 P2 P3**

Selected comparative financial statement information of Bluegrass Corporation follows.

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BLUEGRASS CORPORATION
Comparative Year-End Balance Sheets

At December 31	2021	2020	2019
Assets			
Current assets	$ 54,860	$ 32,660	$ 36,300
Long-term investments	0	1,700	10,600
Plant assets, net	112,810	113,660	79,000
Total assets	$167,670	$148,020	$125,900
Liabilities and Equity			
Current liabilities	$ 22,370	$ 19,180	$ 16,500
Common stock	46,500	46,500	37,000
Other paid-in capital	13,850	13,850	11,300
Retained earnings	84,950	68,490	61,100
Total liabilities and equity	$167,670	$148,020	$125,900

BLUEGRASS CORPORATION
Comparative Income Statements

For Years Ended December 31	2021	2020	2019
Sales	$198,800	$166,000	$143,800
Cost of goods sold	108,890	86,175	66,200
Gross profit	89,910	79,825	77,600
Selling expenses	22,680	19,790	18,000
Administrative expenses	16,760	14,610	15,700
Total expenses	39,440	34,400	33,700
Income before taxes	50,470	45,425	43,900
Income tax expense	6,050	5,910	5,300
Net income	$ 44,420	$ 39,515	$ 38,600

Required

1. Compute each year's current ratio. Round ratios to one decimal.

2. Express the income statement data in common-size percents. Round percents to two decimals.

3. Express the balance sheet data in trend percents with 2019 as the base year. Round percents to two decimals.

Analysis Component

4. Comment on any significant relations revealed by the ratios and percents computed.

Check (3) 2021, Total assets trend, 133.18%

Problem 13-3B

Transactions, working capital, and liquidity ratios **P3**

Koto Corporation began the month of June with $300,000 of current assets, a current ratio of 2.5:1, and an acid-test ratio of 1.4:1. During the month, it completed the following transactions. The company uses a perpetual inventory system.

June 1 Sold merchandise inventory that cost $75,000 for $120,000 cash.

3 Collected $88,000 cash on an account receivable.

5 Purchased $150,000 of merchandise inventory on credit.

7 Borrowed $100,000 cash by giving the bank a 60-day, 10% note.

10 Borrowed $120,000 cash by signing a long-term secured note.

12 Purchased machinery for $275,000 cash.

15 Declared a $1 per share cash dividend on its 80,000 shares of outstanding common stock.

19 Wrote off a $5,000 bad debt against the Allowance for Doubtful Accounts account.

22 Paid $12,000 cash to settle an account payable.

30 Paid the dividend declared on June 15.

Check June 3: Current ratio, 2.88; Acid-test ratio, 2.40

June 30: Working capital, $(10,000); Current ratio, 0.97

Required

Prepare a table, similar to the following, showing the company's (1) current ratio, (2) acid-test ratio, and (3) working capital after each transaction. Round ratios to two decimals.

	A	B	C	D	E	F	G
1							
2	Transaction	Current Assets	Quick Assets	Current Liabilities	Current Ratio	Acid-Test Ratio	Working Capital
3	Beginning	$300,000	—	—	2.50	1.40	—

Problem 13-4B

Calculating financial statement ratios

P3

Selected current year-end financial statements of Overton Corporation follow. (All sales were on credit; selected balance sheet amounts at December 31 of the *prior year* were inventory, $17,400; total assets, $94,900; common stock, $35,500; and retained earnings, $18,800.)

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OVERTON CORPORATION
Income Statement
For Current Year Ended December 31

Sales	$315,500
Cost of goods sold	236,100
Gross profit	79,400
Operating expenses	49,200
Interest expense	2,200
Income before taxes	28,000
Income tax expense	4,200
Net income	$ 23,800

OVERTON CORPORATION
Balance Sheet
December 31 of Current Year

Assets		Liabilities and Equity	
Cash	$ 6,100	Accounts payable	$ 11,500
Short-term investments	6,900	Accrued wages payable	3,300
Accounts receivable, net	15,100	Income taxes payable	2,600
Merchandise inventory	13,500	Long-term note payable, secured by mortgage on plant assets	30,000
Prepaid expenses	2,000	Common stock, $5 par value	35,000
Plant assets, net	73,900	Retained earnings	35,100
Total assets	$117,500	Total liabilities and equity	$117,500

Required

Compute the following: (1) current ratio, (2) acid-test ratio, (3) days' sales uncollected, (4) inventory turnover, (5) days' sales in inventory, (6) debt-to-equity ratio, (7) times interest earned, (8) profit margin ratio, (9) total asset turnover, (10) return on total assets, and (11) return on equity. Round to one decimal place; for part 6, round to two decimals.

Check Acid-test ratio, 1.6 to 1; Inventory turnover, 15.3

Problem 13-5B

Comparative ratio analysis **P3**

Summary information from the financial statements of two companies competing in the same industry follows.

	Fargo Company	Ball Company
Data from the current year-end balance sheets		
Assets		
Cash	$ 20,000	$ 36,500
Accounts receivable, net	88,700	79,500
Merchandise inventory	86,800	82,000
Prepaid expenses	9,700	10,100
Plant assets, net	176,900	252,300
Total assets	$382,100	$460,400
Liabilities and Equity		
Current liabilities	$ 90,500	$ 97,000
Long-term notes payable	93,000	93,300
Common stock, $5 par value	133,000	141,000
Retained earnings	65,600	129,100
Total liabilities and equity	$382,100	$460,400

	Fargo Company	Ball Company
Data from the current year's income statement		
Sales	$393,600	$667,500
Cost of goods sold	290,600	480,000
Interest expense	5,900	12,300
Income tax expense	5,700	12,300
Net income	33,850	61,700
Basic earnings per share	1.27	2.19
Beginning-of-year balance sheet data		
Accounts receivable, net	$ 72,200	$ 73,300
Merchandise inventory	105,100	80,500
Total assets	383,400	443,000
Common stock, $5 par value	133,000	141,000
Retained earnings	49,100	109,700

Required

1. For both companies compute the (*a*) current ratio, (*b*) acid-test ratio, (*c*) accounts receivable turnover, (*d*) inventory turnover, (*e*) days' sales in inventory, and (*f*) days' sales uncollected. Round to one decimal place. Identify the company you consider to be the better short-term credit risk and explain why.
2. For both companies compute the (*a*) profit margin ratio, (*b*) total asset turnover, (*c*) return on total assets, and (*d*) return on equity. Assuming that each company paid cash dividends of $1.50 per share and each company's stock can be purchased at $25 per share, compute their (*e*) price-earnings ratios and (*f*) dividend yields. Round to one decimal place; for part b , round to two decimals. Identify which company's stock you would recommend as the better investment and explain why.

Problem 13-6B[A]

Income statement computations and format

A2

Selected account balances from the adjusted trial balance for Harbor Corp. as of its calendar year-end December 31 follow.

	Debit	Credit
a. Accumulated depreciation—Buildings		$ 400,000
b. Interest revenue		20,000
c. Net sales		2,640,000
d. Income tax expense	$?	
e. Loss on hurricane damage	48,000	
f. Accumulated depreciation—Equipment		220,000
g. Other operating expenses	328,000	
h. Depreciation expense—Equipment	100,000	
i. Loss from settlement of lawsuit	36,000	
j. Gain from settlement of lawsuit		68,000
k. Loss on sale of equipment	24,000	
l. Loss from operating a discontinued segment (pretax)	120,000	
m. Depreciation expense—Buildings	156,000	
n. Correction of overstatement of prior year's expense (pretax)		48,000
o. Cost of goods sold	1,040,000	
p. Loss on sale of discontinued segment's assets (pretax)	180,000	
q. Accounts payable		132,000

Required

1. Assume that the company's income tax rate is 25% for all items. Identify the tax effects and after-tax amounts of the three items labeled pretax.
2. What is the amount of income from continuing operations before income taxes? What is the amount of income tax expense? What is the amount of income from continuing operations?
3. What is the total amount of after-tax income (loss) associated with the discontinued segment?
4. What is the amount of net income for the year?

Check (3) $(225,000) (4) $522,000

SERIAL PROBLEM

Business Solutions

P3

Serial problem began in Chapter 1. If previous chapter segments were not completed, the serial problem can begin at this point. It is available in Connect with an algorithmic option.

SP 13 Use the following selected data from **Business Solutions** 's income statement for the three months ended March 31, 2022, and from its March 31, 2022, balance sheet to complete the requirements.

Computer services revenue	$25,307	Net income	$ 18,833	Current liabilities	$ 875
Net sales (of goods)	18,693	Quick assets	90,924	Total liabilities	875
Total sales and revenue	44,000	Current assets	95,568	Total equity	119,393
Cost of goods sold	14,052	Total assets	120,268		

Required

1. Compute the gross margin ratio (both with and without services revenue) and net profit margin ratio (round the percent to one decimal).
2. Compute the current ratio and acid-test ratio (round to one decimal).
3. Compute the debt ratio and equity ratio (round the percent to one decimal).
4. What percent of its assets are current? What percent are long term? Round percents to one decimal.

Alexander Image/Shutterstock

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA 13-1 Quick Study , Computing profit margin, **P3** —similar to QS 13-15, part *a*

Tableau DA 13-2 Exercise , Computing profit margin and return on assets, **P3** —similar to QS 13-15

Tableau DA 13-3 Mini-Case , Computing ratios and making business decisions, **P3** —similar to Exercise 13-10

Accounting Analysis connect

COMPANY ANALYSIS

A1 P1 P2

AA 13-1 Use **Apple** 's financial statements in Appendix A to answer the following.

1. Using fiscal 2017 as the base year, compute trend percents for fiscal years 2017, 2018, and 2019 for total net sales, total cost

of sales, operating income, other income (expense) net, provision for income taxes, and net income. Round percents to one decimal.

2. Compute common-size percents for fiscal years 2018 and 2019 for the following categories of assets: (*a*) total current assets; (*b*) property, plant and equipment, net; and (*c*) accounts receivable, net. Round percents to one decimal.

3. Using current assets as a percent of total assets to measure liquidity, did Apple's asset makeup become more liquid or less liquid in 2019?

COMPARATIVE ANALYSIS

C1 P2

AA 13-2 Key figures for **Apple** and **Google** follow.

$ millions	Apple	Google	$ millions	Apple	Google
Cash and equivalents	$48,844	$ 18,498	Cost of sales	$161,782	$ 71,896
Accounts receivable, net	22,926	25,326	Revenues	260,174	161,857
Inventories	4,106	999	Total assets	338,516	275,909
Retained earnings	45,898	152,122			

Required

1. Compute common-size percents for each company using the data given. Round percents to one decimal.

2. If Google paid a dividend, would retained earnings as a percent of total assets increase or decrease?

3. Which company has the better gross margin ratio on sales?

EXTENDED ANALYSIS

A1

AA 13-3 Key figures for **Samsung** follow (in $ millions).

Cash and equivalents	$ 23,069	Cost of sales	$126,336
Accounts receivable, net	30,144	Revenues	197,691
Inventories	22,966	Total assets	302,511
Retained earnings	218,440		

Required

1. Compute common-size percents for Samsung using the data given. Round percents to one decimal.
2. What is Samsung's gross margin ratio on sales?
3. Does Samsung's gross margin ratio outperform or underperform the industry average of 25%?

Discussion Questions

1. Explain the difference between financial reporting and financial statements.
2. What is the difference between comparative financial statements and common-size comparative statements?
3. Which items are usually assigned a 100% value on (*a*) a common-size balance sheet and (*b*) a common-size income statement?
4. What three factors would influence your evaluation as to whether a company's current ratio is good or bad?
5. Suggest several reasons why a 2:1 current ratio might not be adequate for a particular company.
6. Why is working capital given special attention in the process of analyzing balance sheets?
7. What does the number of days' sales uncollected indicate?
8. What does a relatively high accounts receivable turnover indicate about a company's short-term liquidity?
9. Why is a company's capital structure, as measured by debt and equity ratios, important to financial statement analysts?

10. How does inventory turnover provide information about a company's short-term liquidity?
11. What ratios would you compute to evaluate management performance?
12. Why would a company's return on total assets be different from its return on equity?
13. Where on the income statement does a company report an unusual gain not expected to occur more often than once every two years or so?

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Beyond the Numbers

ETHICS CHALLENGE

A1

BTN 13-1 As Beacon Company controller, you are responsible for informing the board of directors about its financial activities. At the board meeting, you present the following information.

	2021	2020	2019
Sales trend percent	147.0%	135.0%	100.0%
Selling expenses to sales	10.1%	14.0%	15.6%
Sales to plant assets ratio	3.8 to 1	3.6 to 1	3.3 to 1
Current ratio	2.9 to 1	2.7 to 1	2.4 to 1
Acid-test ratio	1.1 to 1	1.4 to 1	1.5 to 1
Inventory turnover	7.8 times	9.0 times	10.2 times
Accounts receivable turnover	7.0 times	7.7 times	8.5 times
Total asset turnover	2.9 times	2.9 times	3.3 times
Return on total assets	10.4%	11.0%	13.2%
Return on equity	10.7%	11.5%	14.1%
Profit margin ratio	3.6%	3.8%	4.0%

After the meeting, the company's CEO holds a press conference with analysts in which she mentions the following ratios.

	2021	2020	2019
Sales trend percent	147.0%	135.0%	100.0%
Selling expenses to sales	10.1%	14.0%	15.6%
Sales to plant assets ratio	3.8 to 1	3.6 to 1	3.3 to 1
Current ratio	2.9 to 1	2.7 to 1	2.4 to 1

Required

1. Why do you think the CEO decided to report 4 ratios instead of the 11 prepared?
2. Comment on the possible consequences of the CEO's reporting of the ratios selected.

COMMUNICATING IN PRACTICE

A1 P3

BTN 13-2 Each team is to select a different industry, and each team member is to select a different company in that industry and acquire its financial statements. Use those statements to analyze the company, including at least one ratio from each of the four building blocks of analysis. When necessary, use the financial press to determine the market price of its stock. Communicate with teammates via a meeting, e-mail, or telephone to discuss how different companies compare to each other and to industry norms. The team is to prepare a single one-page memorandum reporting on its analysis and the conclusions reached.

TAKING IT TO THE NET

P3

BTN 13-3 Access the February 22, 2019, filing of the December 31, 2018, 10-K report of **The Hershey Company** (ticker: HSY) at **SEC.gov** and complete the following requirements.

Required

Compute or identify the following profitability ratios of Hershey for its years ending December 31, 2018, *and* December 31, 2017. Interpret its profitability using the results obtained for these two years.

1. Profit margin ratio (round the percent to one decimal).
2. Gross profit ratio (round the percent to one decimal).
3. Return on total assets (round the percent to one decimal). (Total assets at year-end 2016 were $5,524,333 in thousands.)
4. Return on equity (round the percent to one decimal). (Total shareholders' equity at year-end 2016 was $827,687 in thousands.)
5. Basic net income per common share (round to the nearest cent).

TEAMWORK IN ACTION

P1 P2 P3

BTN 13-4 A team approach to learning financial statement analysis is often useful.

Required

1. Each team should write a description of horizontal and vertical analysis that all team members agree with and understand. Illustrate each description with an example.
2. *Each* member of the team is to select *one* of the following categories of ratio analysis. Explain what the ratios in that category measure. Choose one ratio from the category selected, present its formula, and explain what it measures.

a. Liquidity and efficiency

b. Solvency

c. Profitability

d. Market prospects

3. Each team member is to present his or her notes from part 2 to teammates. Team members are to confirm or correct other teammates' presentations.

Hint: Pairing within teams may be necessary for part 2. Use as an in-class activity or as an assignment. Consider presentations to the entire class using team rotation with slides.

ENTREPRENEURIAL DECISION

A1 P1 P2 P3

BTN 13-5 Assume that Carla Harris of **Morgan Stanley** (**MorganStanley.com**) has impressed you with the company's success and its commitment to ethical behavior. You learn of a staff opening at Morgan Stanley and decide to apply for it. Your resume is successfully screened from those received and you advance to the interview process. You learn that the interview consists of analyzing the following financial facts and answering analysis questions below. (The data are taken from a small merchandiser in outdoor recreational equipment.)

	2021	2020	2019
Sales trend percents.	137.0%	125.0%	100.0%
Selling expenses to sales.	9.8%	13.7%	15.3%
Sales to plant assets ratio	3.5 to 1	3.3 to 1	3.0 to 1
Current ratio	2.6 to 1	2.4 to 1	2.1 to 1
Acid-test ratio	0.8 to 1	1.1 to 1	1.2 to 1
Merchandise inventory turnover	7.5 times	8.7 times	9.9 times
Accounts receivable turnover	6.7 times	7.4 times	8.2 times
Total asset turnover	2.6 times	2.6 times	3.0 times
Return on total assets.	8.8%	9.4%	11.1%
Return on equity	9.75%	11.50%	12.25%
Profit margin ratio.	3.3%	3.5%	3.7%

Required

1. Is it becoming easier for the company to meet its current liabilities on time and to take advantage of any available

cash discounts? Explain.

2. Is the company collecting its accounts receivable more rapidly? Explain.
3. Is the company's investment in accounts receivable decreasing? Explain.
4. Is the company's investment in plant assets increasing? Explain.
5. Is the owner's investment becoming more profitable? Explain.
6. Did the dollar amount of selling expenses decrease during the three-year period? Explain.

14 Managerial Accounting Concepts and Principles

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Chapter Preview

MANAGERIAL ACCOUNTING BASICS

C1 Introducing managerial accounting

Fraud and ethics

Career paths

NTK 14-1

COST CONCEPTS

C2 Direct vs. indirect

Manufacturing costs

Prime vs. conversion

Product vs. period

NTK 14-2

REPORTING

P1 Manufacturer vs. merchandiser vs. service company

Balance sheet

Income statement

NTK 14-3

COST FLOWS

C3 Flow of activities

P2 Schedule of cost of goods manufactured

C4 Trends

A1 Inventory analysis

NTK 14-4

Learning Objectives

CONCEPTUAL

C1 Explain the roles and ethics of managerial accounting.

C2 Describe accounting concepts useful in classifying costs.

C3 Explain manufacturing activities and the flow of manufacturing costs.

C4 Describe trends in managerial accounting.

ANALYTICAL

A1 Assess raw materials inventory management using raw materials inventory turnover and days' sales in raw materials inventory.

PROCEDURAL

P1 Prepare an income statement and balance sheet for a manufacturer.

P2 Prepare a schedule of cost of goods manufactured and explain its purpose and links to financial statements.

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Best Face Forward

"Use digital media to drive business"—**TEANNA BASS**

ST. LOUIS—Teanna Bass dreamed of her own cosmetics business. After some research, and a company name from her twin sister, Teanna launched **Sweet Tea Cosmetics** in her college's student union. Teanna's goal: "Give the customer the best experience."

Getting the right materials was Teanna's first step. She chose to buy her cosmetics rather than make them herself. "Sourcing is very important," explains Teanna. She chose her supplier in part for its sustainable business practices such as using glass containers instead of plastic.

Teanna next set up her accounting system, which required basic managerial principles and cost classifications. Though not an accounting major, Teanna drew on her introductory accounting courses, and guidance from her aunt (an accountant), to keep her records. "I do it all," admits Teanna.

Analytics and visualization through social media are key to Teanna's strategy. She uses analytics—likes per post, comments per post, profile visits, website clicks—to measure follower engagement. This

helped Teanna double her Instagram followers and increase revenues. “The right picture at the right time” is crucial, says Teanna.

Teanna continues to study business-to-business development and is considering a subscription model. She uses a *four-H model*—“be humble, have a heart, ask for help, and be hungry.” Adds Teanna, “Be passionate about what you do.”

Courtesy of Teanna Bass/photographer Chelsea Priebe

Sources: Sweet Tea Cosmetics *Facebook*, January 2021; *Columbia Missourian*, November 2018; *Vox magazine*, December 2018; Author interview, July 2019

MANAGERIAL ACCOUNTING BASICS

C1

Explain the roles and ethics of managerial accounting.

Managerial accounting provides financial and nonfinancial information to an organization’s managers. Managers control or direct

a company or one of its many parts. Examples are an employee in charge of a company division, the head of marketing, the information technology officer, the human resources head, and top-level managers such as the chief executive officer (CEO) and chief financial officer (CFO). This section explains the purpose of managerial accounting (also called *management accounting*) and compares it with financial accounting.

Purpose of Managerial Accounting

Managerial accounting provides useful information to aid in

- Determining the costs of an organization's products and services.
- Planning future activities.
- Comparing actual results to planned results.

For example, managerial accounting helps marketing managers decide whether to advertise on social media such as **Twitter**. Managerial accounting also helps **Google**'s information technology manager decide whether to buy new computers.

The managerial accounting system collects cost information and assigns it to an organization's products and services. Costs are important to managers because they impact the financial position and profitability of a business. Costs are also important for decisions such as product pricing, profitability analysis, and whether to make or buy a product.

Much of managerial accounting involves gathering information for planning and control. **Planning** is the process of setting goals and making plans to achieve them. Companies make long-term strategic plans that usually span 5 to 10 years. Strategic plans are then turned into short-term *action plans*, which are more concrete with better-defined goals. A short-term action plan that includes dollar amounts is known as a *budget*.

Control is the process of monitoring and evaluating an organization's activities and employees. Feedback from the control function helps managers compare actual results with planned results and take corrective actions. Exhibit 14.1 shows the relation

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between planning and control and the types of questions managerial accounting helps answer.

EXHIBIT 14.1

Planning and Control

Nature of Managerial Accounting

Exhibit 14.2 highlights key differences between managerial accounting and financial accounting.

EXHIBIT 14.2

Managerial Accounting vs. Financial Accounting

Attribute	Financial Accounting	Managerial Accounting
		
Users	External users: Investors, creditors, and others outside of the company's managers	Internal users: Managerial and executive employees inside the company
Purpose	Help external users make investment, credit, and other decisions	Help managers make planning and control decisions
Flexibility of reporting	Structured and controlled by GAAP	Relatively flexible (no GAAP rules)
Timeliness	Often available only after an audit	Available quickly without an audit
Time dimension	Past performance using historical information.	Current performance and future projections using mostly real-time information
Focus	The whole company	A company's projects, processes, and divisions
Nature	Monetary information	Mostly monetary; some nonmonetary

Users of Accounting Information Companies report to different groups of decision makers. Financial accounting information is provided primarily to external users including investors, creditors, and regulators. Managerial accounting information is provided primarily to

internal managerial and executive employees who are in charge of a company's business activities.

Purpose of Information External users of financial accounting information often decide whether to invest in or lend to a company. Internal decision makers use managerial accounting information to understand, analyze, plan, and control company activities.

Flexibility of Reporting Financial accounting follows concepts and rules known as generally accepted accounting principles (GAAP) to provide consistency and comparability of financial statements across companies. Managerial accounting provides internal information and is more flexible (not rules-based), reflecting the needs of managers to analyze, plan, and control products and processes.

Timeliness of Information Financial accounting provides information to external users following required time periods (such as annual and quarterly). Many financial statements are delayed until an audit is done. Managerial accounting provides information to internal users as they request it. This can be as immediate and frequent as demanded.

Time Dimension External users of financial accounting information get historical reports using information that is often months old. Internal users of managerial accounting information often get real-time reports that are used to evaluate current performance, plan future activities, and make projections.

Focus of Information External users of financial accounting information often focus on the performance of a company as a whole for investing and lending decisions. Internal users of managerial accounting information often focus on a specific activity, product, department, or division for which they are responsible. For example, an investor of **Apple** might focus on income growth. An Apple production manager might focus on cost control at its Mac production facility.

Nature of Information Both financial and managerial accounting reports have monetary information. Managerial accounting reports also have *nonmonetary* information, which includes customer and

employee satisfaction data, percentage of on-time deliveries, product defect rates, energy from renewable sources, and employee diversity.

Fraud and Ethics in Managerial Accounting

Fraud affects all business and it is costly: The Association of Certified Fraud Examiners (ACFE) estimates the average U.S. business loses 5% of its revenues to fraud.

The fraud triangle in Exhibit 14.3 shows *three* factors that push a person to commit fraud.

- **Opportunity**. A person must be able to commit fraud with a low risk of getting caught.
- **Pressure**, or incentive. A person must feel pressure or have incentive to commit fraud.
- **Rationalization**, or attitude. A person justifies fraud or does not see its criminal nature.

EXHIBIT 14.3

Fraud Triangle

Implications of Fraud for Managerial Accounting The key to stopping fraud is prevention. It is less expensive and more effective to prevent fraud than to detect it. To help prevent fraud, managers set up internal controls. An **internal control system** is procedures managers use to

- Ensure reliable accounting.
- Protect assets.
- Uphold company policies.
- Promote efficiency.

Combating fraud requires ethics in accounting. **Ethics** are beliefs that distinguish right from wrong. They are accepted standards of good and bad behavior. The **Institute of Management Accountants (IMA)** requires that management accountants be competent, maintain confidentiality, act with integrity, and communicate information in a fair and credible manner.

Joe Prachatree/Shutterstock

Career Paths

Managerial accountants are highly regarded, and their professional standing is sometimes denoted by a certificate. Certified management accountants (CMAs) must meet education and experience requirements, pass an exam, and be ethical. Many accounting specialists hold certificates in addition to or instead of the CMA. One of the most common is certified public accountant (CPA). Employers also want specialists with designations such as certified financial manager (CFM), certified internal auditor (CIA), certified bookkeeper (CB), certified payroll professional (CPP), certified fraud examiner (CFE), and certified forensic accountant (CrFA).

Managerial accountants are in demand. Exhibit 14.4 reports average annual salaries for several accounting positions. Salaries vary based on location, company size, and other factors.

EXHIBIT 14.4

Accounting Salaries

Top-Level Managers	Annual Salary
Chief financial officer (CFO)	$290,000
Controller/Treasurer	180,000

Senior-Level Managers	Annual Salary
Division controller	$130,000
General manager	105,000

Mid- and Entry-Level Jobs	Annual Salary
Financial analyst	$85,000
Senior accountant	85,000
Junior accountant	60,000

Managerial accounting skills are highly valued and are useful in many careers. page 544

- **Marketing** uses sales and cost data to decide which products to promote.
- **Management** uses sales staff performance data for bonuses.
- **Entrepreneurs** use costs, budgets, and financial reports for financing.
- **Decision makers** in both for-profit and non profit organizations use accounting data to make informed decisions and secure financing from donors.

Analytics Insight

Jump Start Kickstarter's crowdfunding site allows budding entrepreneurs to seek financing. Analytics can be used to tailor one's pitch—most successfully funded projects seek less than $10,000. About 37% of all projects are fully funded, with over 60% of theater and dance projects funded, but less than 30% of fashion and food projects funded. ■

Caia Image/Image Source

NEED-TO-KNOW 14-1

Managerial Accounting Basics

C1

Following are aspects of accounting information. Classify each as relating more to financial accounting or to managerial accounting.

1. Primary users are external
2. Includes more nonmonetary information
3. Focuses more on the future
4. Uses many estimates and projections
5. Controlled by GAAP

6. Used in managers' planning decisions
7. Focuses on the whole organization
8. Not constrained by GAAP

Solution

	Financial	Managerial
1. Primary users are external	X	
2. Includes more nonmonetary information		X
3. Focuses more on the future		X
4. Uses many estimates and projections		X

	Financial	Managerial
5. Controlled by GAAP	X	
6. Used in managers' planning decisions		X
7. Focuses on the whole organization	X	
8. Not constrained by GAAP		X

Do More: QS 14-1, E 14-1

COST CONCEPTS

C2

Describe accounting concepts useful in classifying costs.

This section explains how to classify costs. We demonstrate these cost classifications with Rocky Mountain Bikes, a manufacturer of bicycles.

Direct versus Indirect

Costs can be classified as direct or indirect, depending on their link to a cost object. A **cost object** is a product, process, department, or customer to which costs are assigned. Rocky Mountain Bikes' cost object is a bicycle.

- **Direct costs** are costs that *can* be cost-effectively traced to a cost object and consist of direct materials and direct labor. *Direct materials* for a bicycle include tires, frame, seat, chain, and so on. *Direct labor* for a bicycle includes wages and benefits of the workers making the bikes. See Exhibit 14.5.
- **Indirect costs** are costs that *cannot* be cost-effectively traced to a cost object. Indirect costs include the salary of a manufacturing

supervisor, who monitors production but does not actually make bikes. That supervisor's salary cannot be directly traced to bikes. Another example of indirect costs is the wages of maintenance department employees who clean the factory. These wages cannot be directly traced to bikes.

Exhibit 14.5 lists examples of direct and indirect costs for a bicycle manufacturer. page 545

EXHIBIT 14.5

Direct and Indirect Costs

Direct Costs (for bicycle)	
• Tires	• Frames
• Seats	• Chains
• Handlebars	• Brakes
• Cables	• Pedals
• Bike maker wages	• Bike maker benefits

Indirect Costs (for bicycle)
• Factory accounting
• Factory administration
• Factory rent
• Factory manager's salary
• Factory light and heat
• Factory insurance
• Factory equipment depreciation*

*Except units-of-production.

Manufacturing Costs

Direct Materials **Direct materials** are materials that are crucial parts of a finished product. **Direct materials costs** are costs for direct materials that *can* be cost-effectively traced through the manufacturing process to finished goods. Examples of direct materials in manufacturing a bike include its tires, seat, frame, pedals, brakes, cables, gears, and handlebars.

Direct Labor **Direct labor** refers to employees who directly convert materials to finished goods. **Direct labor costs** are the wages and benefits for direct labor that *can* be cost-effectively traced through the

manufacturing process to finished goods. Examples of direct labor in manufacturing a bike include operators directly converting raw materials into finished goods (welding, painting, forming) and assembly workers who attach materials such as tires, seats, pedals, and brakes.

Factory Overhead **Factory overhead**, also called *manufacturing overhead* or *overhead*, includes all manufacturing costs that are not direct materials or direct labor. **Factory overhead costs** are manufacturing costs that *cannot* be cost-effectively traced to finished goods. Factory overhead costs include indirect materials, indirect labor, and other indirect costs.

- **Indirect materials** are materials used in manufacturing that *cannot* be cost-effectively traced to finished goods. Materials are often classified as indirect materials when their costs are low. Examples include screws and nuts used in assembling bikes, and staples and glue used in manufacturing shoes.
- **Indirect labor** is labor needed in manufacturing that *cannot* be cost-effectively traced to finished goods. Indirect labor costs are the costs of workers who assist in or supervise manufacturing. Examples include costs for employees who maintain and repair manufacturing equipment and salaries of production supervisors. Those workers do not assemble products but are indirectly involved in production.
- ***Other indirect costs*** include factory utilities (water, gas, electricity), factory rent, depreciation on factory buildings and equipment, factory insurance, and property taxes on factory buildings.

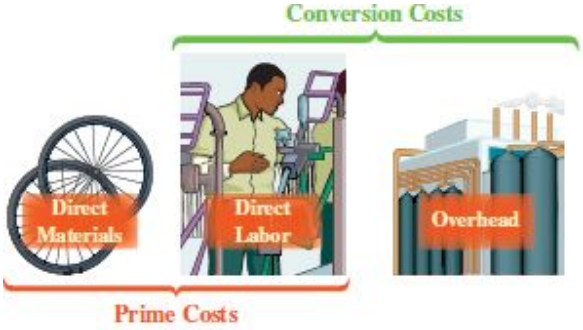
Direct materials
+ Direct labor
+ Factory overhead
= Total manufacturing costs

Prime and Conversion Costs

We can classify product costs into prime costs or conversion costs as in Exhibit 14.6.

EXHIBIT 14.6

Prime Costs and Conversion Costs



- **Prime costs** consist of direct materials costs and direct labor costs.
- **Conversion costs** are costs incurred in converting raw materials to finished goods. Conversion costs consist of direct labor and factory overhead.

Conversion costs =
Direct labor + Factory overhead

Prime costs =
Direct materials + Direct labor

Product versus Period Costs

Costs can be classified as product costs or period costs. Exhibit 14.7 lists product and period costs for a bicycle manufacturer.

- **Product costs** are production costs necessary to create a product and consist of direct materials, direct labor, and factory overhead. Product costs are added to inventory, or *capitalized*, during manufacturing of products. When products are sold, these costs are expensed as cost of goods sold.
- **Period costs** are nonproduction costs linked to a time period (not to specific products). Period costs are expensed in the period when incurred and reported on the income statement as either selling expenses or general and administrative expenses. Common examples of selling expenses are advertising, delivery, and salesperson salaries, commissions, and travel expenses. Common examples of general and administrative expenses are office accounting expenses, office employee wages, office rent, depreciation on office equipment, and office manager salaries. For

a manufacturer, period costs are also called *nonmanufacturing costs*.

EXHIBIT 14.7

Product and Period Costs

Product Costs (for bicycle)			
Direct Costs		**Indirect Costs**	
• Tires	• Frames	• Factory accounting	
• Seats	• Chains	• Factory rent	
• Handlebars	• Brakes	• Factory manager's salary	
• Cables	• Pedals	• Factory light and heat	
• Bike maker wages	• Bike maker benefits	• Factory Insurance	
		• Factory equipment depreciation*	
		*Except units-of-production.	

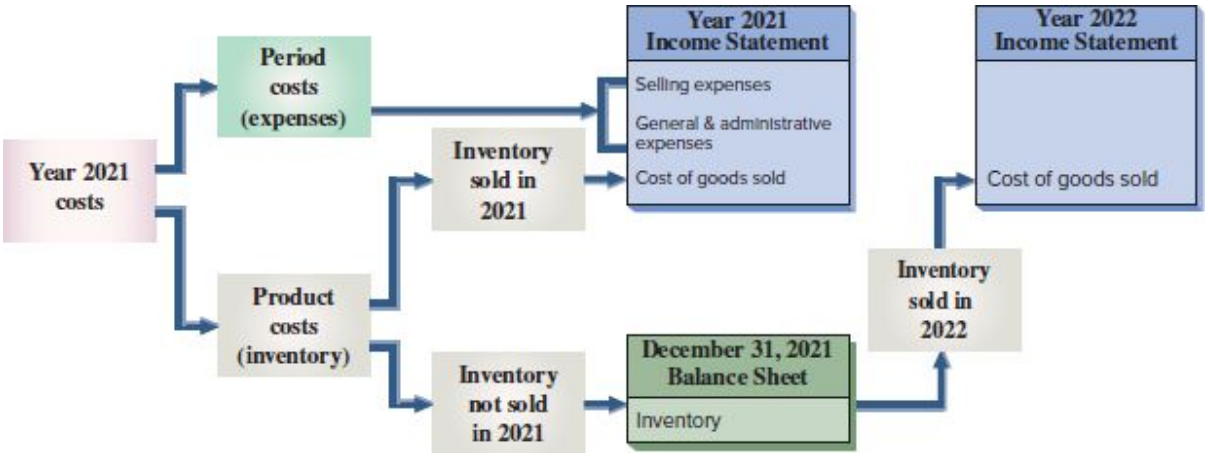
Period Costs (for bicycle)	
Selling Expenses	**General & Administrative Expenses**
• Advertising	• Office accounting
• Promotional materials	• Office employee wages
• Salesperson salaries	• Office rent
• Salesperson commissions	• Office equipment depreciation
• Salesperson travel	• Office insurance
• Salesperson smartphone	• Office manager's salary

Reporting Product and Period Costs Exhibit 14.8 shows the financial statement effects of product and period costs.

- Period costs go directly to the current income statement as expenses.
- Product costs are first assigned to inventory. They move to cost of goods sold when inventory is sold.

EXHIBIT 14.8

Product and Period Costs in Financial Statements



Product costs assigned to inventory that is sold in 2021 are reported on the 2021 income statement as cost of goods sold. Product costs assigned to inventory not sold in 2021 are reported on the 2021 balance sheet. If this inventory is sold in 2022, product costs assigned to it are reported as cost of goods sold in the 2022 income statement.

Point: Product costs are either in the income statement as part of cost of goods sold or in the balance sheet as inventory. Period costs appear only on the income statement.

Cost Concepts for Service Companies

Managers in service companies apply cost concepts. A **Southwest Airlines** manager traces flight crew salaries, food, fuel, and oil costs to specific flights. These are *direct costs* of a flight. Southwest does not trace *indirect costs* such as ground crew wages to page 547 specific flights. (Classification as product versus period costs is not relevant to service companies as costs of services are not reported in inventory.) Travel agent fees and office manager salaries are neither directly nor indirectly related to flights.

Digital Vision/PunchStock

Service companies can also classify costs into direct materials, direct labor, overhead, selling, or general and administrative costs. Selling expenses and General and administrative expenses for a service company are period costs unrelated to performing its services.

Exhibit 14.9 lists cost classifications for an airline when the cost object is a flight. No matter how each cost is classified, all service company costs are expensed when incurred.

EXHIBIT 14.9

Service Company Cost Classification

Costs for Airline Company	Direct or Indirect	Cost Classification
Beverages and snacks	Direct	Direct materials
Pilot salaries	Direct	Direct labor
Flight attendant salaries	Direct	Direct labor
Fuel and oil costs	Direct	Direct materials
Travel agent fees	Neither	Selling
Ground crew wages	Indirect	Overhead
Maintenance crew wages	Indirect	Overhead
Office manager salary	Neither	General and administrative

Decision Maker

Entrepreneur You wish to trace as many of your assembly department's direct costs as possible. You can trace 90% of them in a cost-effective manner. To trace the other 10%, you need sophisticated and costly accounting software. Do you buy this software? ■ *Answer:* Tracing costs directly to cost objects is desirable if it is cost-effective. If the cost of purchasing and maintaining the software is greater than the benefit of tracing the other 10%, do not buy the software.

NEED-TO-KNOW 14-2

Cost Classification

C2

Following are selected costs of a computer chip manufacturer. Classify each as either a product cost or a period cost. Then classify each of the product costs as direct material, direct labor, or overhead.

1. Plastic boards used to mount chips
2. Advertising

3. Factory maintenance salaries
4. Sales office rent
5. Factory rent
6. Factory supervisor salary
7. Depreciation on factory equipment
8. Assembly worker hourly pay to make chips

Solution

	Product Cost			Period Cost
	Direct Material	Direct Labor	Overhead	
1. Plastic boards used to mount chips	X			
2. Advertising				X
3. Factory maintenance salaries			X	
4. Sales office rent				X
5. Factory rent			X	
6. Factory supervisor salary			X	
7. Depreciation on factory equipment			X	
8. Assembly worker hourly pay to make chips		X		

Do More: QS 14-2, QS 14-3, QS 14-4, E 14-5, E 14-6

REPORTING

P1

Prepare an income statement and balance sheet for a manufacturer.

Companies with manufacturing activities differ from both merchandising and service companies.

- **Target** is a merchandiser. It buys and sells goods without physically changing them.
- **Adidas** is a manufacturer of shoes and apparel. It purchases materials such as cloth, dye, plastic, glue, and laces and converts them to products.

- **Southwest Airlines** is a service company that transports people. page 548
- **Best Buy** is a merchandiser that also provides services via Geek Squad, showing that some companies pursue multiple activities.

Because manufacturing activities are different than those for merchandising and service companies, their reporting is different.

Point: Materials that *cannot* be cost-effectively traced to a product (such as staples or glue) are called indirect materials and included in overhead.

Reporting Inventory on the Balance Sheet

Manufacturers report three types of inventories: raw materials, work in process, and finished goods.

Raw Materials Inventory

Raw materials inventory is the cost of materials a company acquires to use in making products. Raw materials that *can* be cost-effectively traced to a product are called *direct materials* and are included in raw materials inventory.

Work in Process Inventory

Work in process inventory, also called *goods in process inventory*, consists of the costs of direct materials, direct labor, and overhead for partially completed products.

Finished Goods Inventory

Finished goods inventory consists of the costs of direct materials, direct labor, and overhead of completed products ready for sale.

Manufacturer Balance Sheet The current assets section of the balance sheet for a manufacturer is different than that for merchandising and service companies. A manufacturer reports three types of inventory, a merchandiser reports only merchandise inventory, and a service company usually reports no inventory. Exhibit 14.10 shows the current assets section of the balance sheet for a service company, a merchandiser, and a manufacturer.

EXHIBIT 14.10

Balance Sheets

Service Company

NORTHEAST AIR
Current assets section of Balance Sheet
December 31

Assets	
Current assets	
Cash	$11,000
Accounts receivable, net	30,150
Supplies	350
Prepaid insurance	300
Total current assets	$41,800

Merchandising Company

TELE-MART
Current assets section of Balance Sheet
December 31

Assets	
Current assets	
Cash	$11,000
Accounts receivable, net	30,150
Merchandise inventory	21,000
Supplies	350
Prepaid insurance	300
Total current assets	$62,800

Manufacturing Company

ROCKY MOUNTAIN BIKES
Current assets section of Balance Sheet
December 31

Assets	
Current assets	
Cash	$11,000
Accounts receivable, net	30,150
Raw materials inventory	9,000
Work in process inventory	7,500
Finished goods inventory	10,300
Supplies	350
Prepaid insurance	300
Total current assets	$68,600

Reporting Cost of Goods Sold on the Income Statement

The main difference between the income statement of a manufacturer and that of a merchandiser is the content of cost of goods sold.

Computing Cost of Goods Sold Exhibit 14.11 compares the calculation of cost of goods sold for a merchandiser with that for a manufacturer.

- *Merchandisers* add cost of merchandise purchased to beginning merchandise inventory and then subtract ending merchandise inventory to compute cost of goods sold.
- *Manufacturers* add cost of goods manufactured to beginning finished goods inventory and then subtract ending finished goods inventory to compute cost of goods sold.

EXHIBIT 14.11

Cost of Goods Sold Computation

Merchandiser	Beginning merchandise inventory	+	Cost of merchandise purchased	−	Ending merchandise inventory	=	Cost of goods sold
Manufacturer	Beginning finished goods inventory	+	Cost of goods manufactured	−	Ending finished goods inventory	=	Cost of goods sold

Key differences in computing cost of goods sold between merchandisers and manufacturers follow.

- Merchandisers have *merchandise inventory*. Manufacturers have *finished goods inventory*.
- Merchandisers have cost of merchandise *purchased*. This is the cost of buying products to sell.
- Manufacturers have cost of goods *manufactured*. This is the cost of direct materials, direct labor, and factory overhead in making finished goods.

Reporting Cost of Goods Sold Exhibit 14.12 highlights differences in the reporting of cost of goods sold on the income statement for a service, a merchandising, and a manufacturing company. Because a service company does not make or buy inventory to sell, it does not report cost of goods sold.

EXHIBIT 14.12

Income Statements

Service Company

NORTHEAST AIR Income Statement For Year Ended December 31	
Revenues	$310,000
Selling expenses	209,600
Gen. & admin. exp.	54,400
Net income	$ 46,000

Merchandising Company

TELE-MART Income Statement For Year Ended December 31	
Sales	$310,000
Cost of goods sold	
Merchandise inventory, beginning	14,200
Cost of merchandise purchased	169,300
Goods available for sale	183,500
Less merchandise inventory, ending	12,100
Cost of goods sold	171,400
Gross profit	138,600
Selling expenses	38,200
General and admin. expenses	54,400
Net income	$ 46,000

Manufacturing Company

ROCKY MOUNTAIN BIKES Income Statement For Year Ended December 31	
Sales	$310,000
Cost of goods sold	
Finished goods inventory, beginning	11,200
Cost of goods manufactured	170,500
Goods available for sale	181,700
Less finished goods inventory, ending	10,300
Cost of goods sold	171,400
Gross profit	138,600
Selling expenses	38,200
General and admin. expenses	54,400
Net income	$ 46,000

NEED-TO-KNOW 14-3

Preparing an Income Statement

P1

Use the following information for the month ended April 30 from a manufacturing company and from a merchandising company to prepare an income statement for each company.

Built-Rite Manufacturer	
Sales	$360
Cash	750
Selling expenses	65
General and admin. expenses	55
Finished goods inventory, ending	20
Cost of goods manufactured	120
Finished goods inventory, beginning	105

SaveMart Merchandiser	
Merchandise inventory, ending	$100
Selling expenses	50
Sales	325
General and admin. expenses	28
Cost of merchandise purchased	180
Accounts receivable	125
Merchandise inventory, beginning	110

Solution

page 550

Built-Rite Manufacturer Income Statement For Month Ended April 30		
Sales		$360
Cost of goods sold		
Finished goods inventory, beginning	$105	
Cost of goods manufactured	120	
Goods available for sale	225	
Less finished goods inventory, ending	20	
Cost of goods sold		205
Gross profit		155
Selling expenses		65
General and admin. expenses		55
Net income		$ 35

SaveMart Merchandiser Income Statement For Month Ended April 30		
Sales		$325
Cost of goods sold		
Merchandise inventory, beginning	$110	
Cost of merchandise purchased	180	
Goods available for sale	290	
Less merchandise inventory, ending	100	
Cost of goods sold		190
Gross profit		135
Selling expenses		50
General and admin. expenses		28
Net income		$ 57

Do More: QS 14-7 through QS 14-11, E 14-10, E 14-11

COST FLOWS AND COST OF GOODS MANUFACTURED

C3

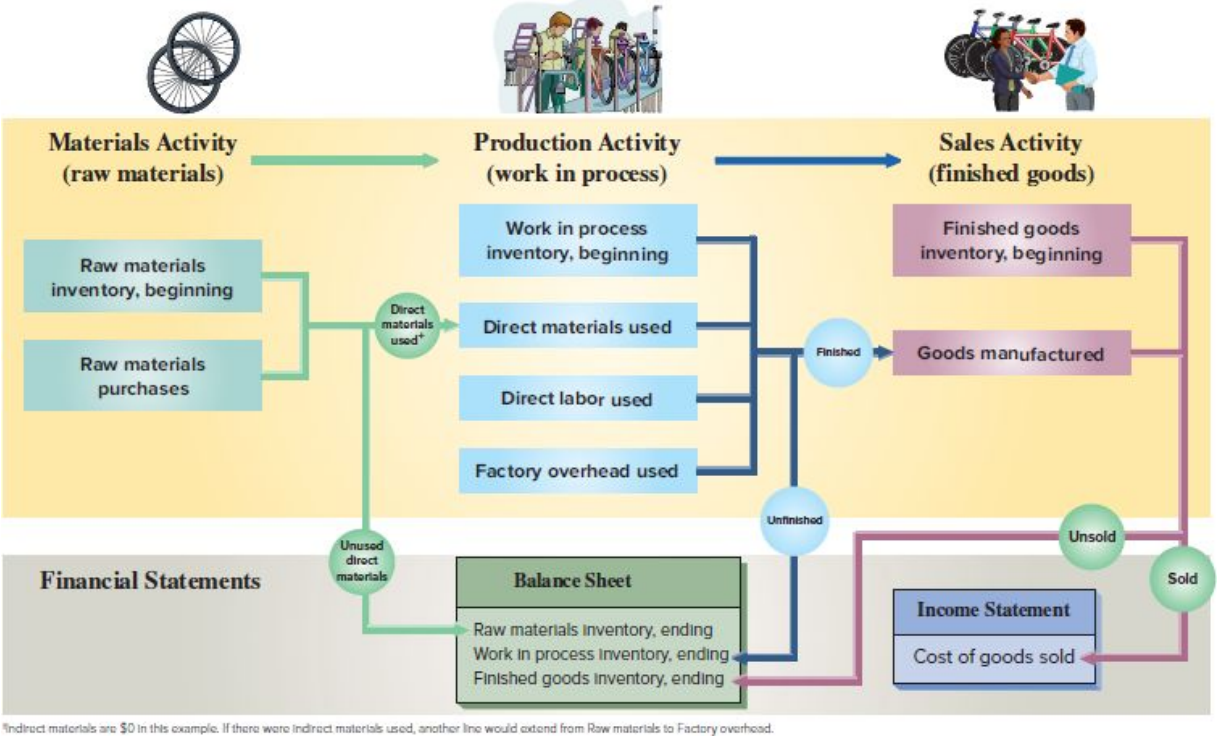
Explain manufacturing activities and the flow of manufacturing costs.

Flow of Manufacturing Activities

Exhibit 14.13 shows the flow of manufacturing activities and their cost flows. Looking across the top row, the activities flow consists of *materials activity* followed by *production activity* followed by *sales activity*.

EXHIBIT 14.13

Activities and Cost Flows in Manufacturing



*Indirect materials are $0 in this example. If there were indirect materials used, another line would extend from Raw materials to Factory overhead.

Materials Activity The left side of Exhibit 14.13 shows the page 551 flow of raw materials. Manufacturers usually start a period with beginning raw materials inventory left over from the prior period. The

company then buys more raw materials in the current period. Adding these purchases to beginning inventory gives *total raw materials available for use* in production. These raw materials are then either used in production in the current period or remain in raw materials inventory at the end of the period for use in future periods.

RM Inventory, beginning
+ RM Purchases
= Total RM available for use

Production Activity The middle section of Exhibit 14.13 describes production activity. Manufacturers usually start a period with beginning work in process inventory, which equals the costs of partially complete products from prior periods. Production then adds the costs of direct materials, direct labor, and factory overhead for the current period. Production activity results in products that are either finished or unfinished at the end of the period.

- Total cost of direct materials, direct labor, and factory overhead for *finished* products makes up the **cost of goods manufactured**. That amount is carried over to the current period income statement in the computation of cost of goods sold.
- Total cost of direct materials, direct labor, and factory overhead for *unfinished* products makes up ending work in process inventory. That amount is carried over to the current period balance sheet.

Sales Activity The right side of Exhibit 14.13 shows the flow of finished goods. Manufacturers usually start a period with beginning finished goods inventory, which is the cost of unsold finished goods from prior periods. Adding this to the cost of newly completed units (goods manufactured) equals *total finished goods available for sale* in the current period. The cost of finished goods sold is reported on the income statement. The cost of any finished goods not sold is reported as a current asset, *finished goods inventory*, on the balance sheet.

FG Inventory, beginning
+ Cost of goods manufactured
= Total FG available for sale

Schedule of Cost of Goods Manufactured

P2

Prepare a schedule of cost of goods manufactured and explain its purpose and links to financial statements.

Point: Indirect materials are $0 in this example. If there were indirect materials, we would subtract that from materials used to get direct materials used *and* indirect materials would be listed under factory overhead.

Manufacturing activities are described in a report called a **schedule of cost of goods manufactured** (also called a *manufacturing statement* or a *statement of cost of goods manufactured*). This schedule lists the types and amounts of costs incurred in manufacturing. Exhibit 14.14 shows the schedule of cost of goods manufactured for Rocky Mountain Bikes.

EXHIBIT 14.14

Schedule of Cost of Goods Manufactured

ROCKY MOUNTAIN BIKES
Schedule of Cost of Goods Manufactured
For Year Ended December 31

①	**Direct materials**		
	Raw materials inventory, beginning	$ 8,000	
	Raw materials purchases	86,500	
	Raw materials available for use	94,500	
	Less raw materials inventory, ending	9,000	
	Direct materials used		$ 85,500
②	**Direct labor**		60,000
③	**Factory overhead**		
	Indirect labor	15,000	
	Factory utilities	2,600	
	Repairs—Factory equipment	2,500	
	Property taxes—Factory	4,400	
	Depreciation expense—Factory	5,500	
	Total factory overhead		30,000
④	Total manufacturing costs		175,500
	Add work in process inventory, beginning		2,500
	Total cost of work in process		178,000
	Less work in process inventory, ending		7,500
	Cost of goods manufactured		$170,500

The schedule has four parts: *direct materials, direct labor,* page 552 *overhead*, and *cost of goods manufactured*.

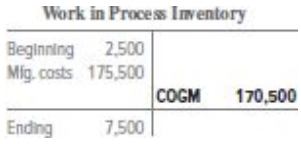
① **Compute direct materials used.** Add beginning raw materials inventory of $8,000 to the purchases of $86,500 to get $94,500 of raw materials available for use. A year-end count of inventory shows $9,000 of ending raw materials inventory. If $94,500 of materials were available for use and $9,000 of materials remain in inventory, then $85,500 of direct materials were used in the period.

② **Compute direct labor used.** Total direct labor costs are $60,000 for the period. This includes wages, payroll taxes, and benefits for workers who make bikes.

③ **Compute factory overhead used.** The schedule lists each factory overhead cost. All of these costs are *indirectly* related to manufacturing activities. (Period expenses, such as selling expenses and general and administrative expenses, are *not* reported on this schedule.) Total factory overhead is $30,000.

④ **Compute cost of goods manufactured.** Total manufacturing costs are $175,500 ($85,500 + $60,000 + $30,000), the sum of direct materials, direct labor, and overhead. We take the $175,500 total manufacturing costs and add the $2,500 beginning work in process inventory to get total work in process of $178,000. We then subtract the $7,500 ending work in process inventory to get cost of goods manufactured of $170,500. Cost of goods manufactured (COGM) is also called *net cost of goods manufactured* or *cost of goods completed*.

Point: This chapter's raw materials inventory excludes indirect materials. This aids students by simplifying the flow of costs in the first managerial chapter. The next chapter includes indirect materials.



Key calculations in the schedule of costs of goods manufactured follow.

Total manufacturing costs	=	Direct materials used	+	Direct labor used	+	Factory overhead used

Cost of goods manufactured	=	Total manufacturing costs	+	Beginning work in process inventory	−	Ending work in process inventory

Management uses the schedule of cost of goods manufactured to plan and control manufacturing activities. To provide timely information for business decisions, the schedule is often prepared monthly, weekly, or even daily.

Estimating Cost per Unit Managers can use the schedule of cost of goods manufactured to estimate per unit costs. For example, if Rocky Mountain Bikes makes 1,000 bikes during the year, the average manufacturing cost per unit is $170.50 (computed as $170,500/1,000).

Manufacturing Cost Flows across Accounting Reports

Cost information is used in financial statements. Exhibit 14.15 shows how product costs affect financial statements. Direct materials, direct labor, and overhead costs are in the schedule of cost of goods manufactured. The cost of goods manufactured from that schedule is used to compute cost of goods sold on the income statement. page 553 The ending work in process inventory is carried from that schedule to the balance sheet, and the ending finished goods inventory is used in computing cost of goods sold on the income statement and is also part of current assets on the balance sheet.

EXHIBIT 14.15

Manufacturing Cost Flows across Reports

ROCKY MOUNTAIN BIKES
Schedule of Cost of Goods Manufactured
For Year Ended December 31

Direct materials used	$ 85,500
Direct labor	60,000
Factory overhead	30,000
Total manufacturing costs	175,500
Work in process, beginning	2,500
Total cost of work in process	178,000
Work in process, ending	(7,500)
Cost of goods manufactured	$170,500

ROCKY MOUNTAIN BIKES
Income Statement
For Year Ended December 31

Sales	$310,000
Cost of goods sold	
Finished goods, beginning	11,200
Cost of goods manufactured	170,500
Finished goods, ending	(10,300)
Cost of goods sold	171,400
Gross profit	138,600
Selling expenses	38,200
General and admin. expense	54,400
Net income	$ 46,000

ROCKY MOUNTAIN BIKES
Current Assets section of Balance Sheet
December 31

Cash	$11,000
Accounts receivable, net	30,150
Raw materials inventory	9,000
Work in process inventory	7,500
Finished goods inventory	10,300
Supplies	350
Prepaid insurance	300
Total current assets	$68,600

NEED-TO-KNOW 14-4

Cost of Goods Manufactured

P2 C3

Part A: Compute the following three cost amounts using the information below.

1. Direct materials used **2**. Cost of goods manufactured **3**. Cost of goods sold

Raw materials inventory, beginning	$15,500	Raw materials inventory, ending	$10,600
Work in process inventory, beginning	29,000	Work in process inventory, ending	44,000
Finished goods inventory, beginning	24,000	Finished goods inventory, ending	37,400
Raw materials purchased	66,000	Direct labor used	38,000
Total factory overhead used	60,000		

Solution

1. $70,900 **2**. $153,900 **3**. $140,500

Part B: Prepare a schedule of cost of goods manufactured using information in Part A. Total factory overhead used of $60,000 consists of Indirect labor of $25,000, Depreciation expense—Factory of $32,000, and Factory utilities of $3,000.

Solution

Schedule of Cost of Goods Manufactured		
Direct materials		
Raw materials inventory, beginning	$15,500	
Raw materials purchases	66,000	
Raw materials available for use	81,500	
Less raw materials inventory, ending	10,600	
Direct materials used		$ 70,900
Direct labor		38,000
Factory overhead		
Indirect labor	25,000	
Depreciation expense—Factory	32,000	
Factory utilities	3,000	
Total factory overhead		60,000
Total manufacturing costs		168,900
Add work in process inventory, beginning		29,000
Total cost of work in process		197,900
Less work in process inventory, ending		44,000
Cost of goods manufactured		$153,900

Do More: QS 14-15, QS 14-16, E 14-7, E 14-13, E 14-15

Trends in Managerial Accounting

C4

Describe trends in managerial accounting.

Tools and techniques of managerial accounting evolve due to changes in business. This section describes some of these changes.

Digital Manufacturing **Digital manufacturing** combines machines, computers, and human control to manufacture products. On the factory floor, machines replace much of direct labor. Computers collect information on these automated processes, including product quality, equipment performance, and maintenance demands. Humans then use data analytics and data visualization to plan and control operations. Growth of digital manufacturing means employers seek employees with data analytics and visualization skills.

page 554

- ***Data analytics*** is a process of analyzing data to identify meaningful relations and trends.
- ***Data visualization*** is a graphical depiction of data to help people interpret their meaning.

Customer Orientation There is increased emphasis on *customers*. Customers expect value for the money spent to buy products and services. They want the right service (or product) at the right time and the right price. This **customer orientation** means that managers and employees understand the changing needs of customers and align operations accordingly.

Global Economy Our *global economy* expands competitive boundaries and provides customers more choices. One notable case that reflects changes in customer demand and global competition is auto manufacturing. The top three Japanese auto manufacturers (**Honda**, **Nissan**, and **Toyota**) once controlled more than 40% of the U.S. auto market. Customers perceived that Japanese manufacturers provided value not available from others. Many European and North American manufacturers responded and regained much of the lost market share.

E-Commerce People are increasingly interconnected via smartphones, text messaging, and other electronic applications. Consumers expect and demand to buy items electronically, whenever and wherever they want. Many businesses focus on online transactions. Online sales make up a growing share of retail sales. Some companies such as **BucketFeet**, a footwear retailer, only sell online to reduce costs.

Service Economy Businesses that provide services, such as telecommunications and health care, constitute an ever-growing part of our economy. Service businesses typically account for over 60% of total economic activity. Many service companies, such as **Uber**, employ part-time workers. The "gig economy" changes cost structures.

Lean Principles Many companies have adopted a **lean business model**, whose goal is to *eliminate waste* while "satisfying the customer" and "providing a positive return" to the company. This is often paired with continuous improvement. **Continuous improvement** rejects the notion of "good enough" and challenges employees and managers to continuously improve operations. This has led companies to adopt practices such as total quality management (TQM) and just-in-time (JIT) manufacturing.

- **Total quality management** focuses on quality improvement to business activities. Managers and employees seek to uncover waste in business activities, including accounting activities such as payroll and disbursements. **Ritz Carlton Hotel** applies a set of values, called *The Gold Standards*, to improve customer service.
- **Just-in-time manufacturing** is a system that acquires inventory and produces products only after it receives an order (a *demand-pull* system) and then delivers orders on time. Processes are aligned to eliminate delays and inefficiencies. Companies must establish good communications with suppliers. On the downside, JIT is more susceptible to disruption. Several **General Motors** plants were temporarily shut down due to a strike at a supplier that provided components *just in time* to the assembly division.

Point: Goals of a TQM process include reduced waste, better inventory control, fewer defects, and continuous improvement. JIT concepts have similar aims.

Point: Quality control standards include the International Organization for Standardization (ISO). To be certified under **ISO 9000 standards**, a company must use a quality control system and provide documentation

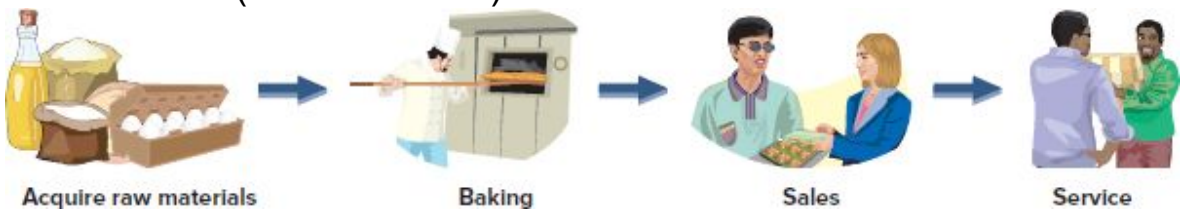
.

Point: The time between buying raw materials and selling finished goods is called *throughput time*.

Value Chain The **value chain** is the series of activities that add value to a company's products or services. Exhibit 14.16 illustrates a possible value chain for a retail cookie company.

EXHIBIT 14.16

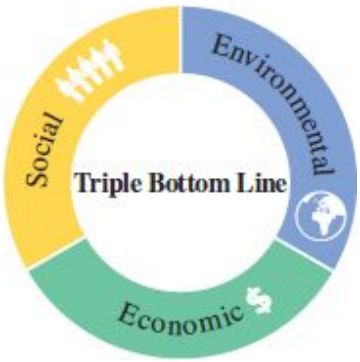
Value Chain (cookie retailer)



How Lean Principles Impact the Value Chain Companies page 555 can use lean practices across the value chain to increase efficiency and profits. Managerial accounting is important in providing accurate cost and performance information to measure the "value" to customers. The price that customers pay for goods and services reflects on that value.

Corporate Social Responsibility **Corporate social responsibility (CSR)** is a concept that goes beyond shareholder value and the law. Corporations must consider the demands of other stakeholders, including employees, suppliers, and society. To reduce its impact on the environment, **Three Twins Ice Cream** uses only cups and spoons made from organic ingredients. **United By Blue**, an apparel and jewelry company, removes one pound of trash from waterways for every product sold. Many companies extend CSR to include sustainability, which considers future generations when making business decisions.

Point: Companies like **Microsoft, Google**, and **Walt Disney** disclose CSR results on their websites.



Triple Bottom Line **Triple bottom line** focuses on three measures: financial ("profits"), social ("people"), and environmental ("planet"). Adopting a triple bottom line impacts how businesses report. The **Sustainability Accounting Standards Board (SASB)** sets reporting standards for businesses' sustainability activities. The SASB has developed reporting standards for several sectors including health care, nonrenewable resources, and renewable resources and alternative energy.

Decision Insight

Balanced Scorecard The *balanced scorecard* aids continuous improvement by augmenting financial measures with information on the "drivers" (indicators) of future financial performance along four dimensions: **(1)** ***financial***—profitability and risk, **(2)** ***customer***—value creation and product and service differentiation, **(3)** ***internal processes***—business activities that create customer and owner satisfaction, and **(4)** ***innovation and learning***—organizational change, innovation, and growth. ■

CORPORATE SOCIAL RESPONSIBILITY

Courtesy of Teanna Bass/photographer Chelsea Priebe

The Sustainability Accounting Standards Board (SASB) considers sustainability information as *material* if its disclosure would affect the views of equity investors on a company's financial condition or operating performance. Material information can vary across industries. While environmental "planet" issues such as air quality, wastewater management, and biodiversity impacts are important for investments in the nonrenewable resources sectors, such issues are likely not as important for investments in banks. "People" issues such as diversity and inclusion, fair labor practices, and employee health are considered material for most sectors, and especially for sectors having high direct labor use.

Sweet Tea Cosmetics, this chapter's feature company, focuses on inclusivity and sustainability. "My makeup is for everybody," explains Teanna. Her makeup supplier uses safe, nontoxic ingredients; does not do animal testing; and aims to reduce its carbon footprint. Although this increases costs, Teanna believes her company's focus on "consciously sustaining the earth" appeals to her target market and helps drive sales.

Decision Insight

Sustainability Returns A recent study shows the value of investing in sustainability. Companies with good ratings on sustainability perform better than companies with poor ratings. The chart here shows that high sustainability firms have 4.05% higher stock returns and 6.89% higher return on sales than low sustainability firms. Source: HBS. ■

Decision Analysis Raw Materials Inventory Turnover and Days' Sales in Raw Materials Inventory

A1

Assess raw materials inventory management using raw materials inventory turnover and days' sales in raw materials inventory.

Managerial accounting information helps managers perform analyses to improve operations and profitability. Inventory management is one example.

Raw Materials Inventory Turnover

A manager can assess how effectively a company manages its *raw materials* inventory by computing the **raw materials inventory turnover** ratio as defined in Exhibit 14.17. Average raw materials

inventory is (Beginning raw materials inventory + Ending raw materials inventory) ÷ 2.

EXHIBIT 14.17

Raw Materials Inventory Turnover

$$\text{Raw materials inventory turnover} = \frac{\text{Raw materials used}}{\text{Average raw materials inventory}}$$

This ratio reveals how many times a company turns over (uses in production) its raw materials inventory during a period. A high ratio of raw materials inventory turnover is preferred, as long as raw materials inventory levels are adequate to meet demand. To demonstrate, Rocky Mountain Bikes reports direct (raw) materials used of $85,500 for the year, with a beginning raw materials inventory of $8,000 and an ending raw materials inventory of $9,000 (from Exhibit 14.14). Raw materials inventory turnover for Rocky Mountain Bikes is computed below.

$$\text{Raw materials inventory turnover} = \frac{\$85{,}500}{(\$8{,}000 + \$9{,}000)/2} = 10.1 \text{ (rounded)}$$

Days' Sales in Raw Materials Inventory

A manager can measure the adequacy of raw materials inventory to meet production demand. **Days' sales in raw materials inventory** reveals how much raw materials inventory is available in terms of the number of days' sales. It is a measure of how long it takes raw materials to be used in production. It is defined and computed for Rocky Mountain Bikes in Exhibit 14.18.

EXHIBIT 14.18

Days' Sales in Raw Materials Inventory Turnover

$$\text{Days' sales in raw materials inventory} = \frac{\text{Ending raw materials inventory}}{\text{Raw materials used}} \times 365$$

$$= \frac{\$9{,}000}{\$85{,}500} \times 365 = 38.4 \text{ days (rounded)}$$

This shows that it will take about 38 days for raw materials inventory to be used in production. Assuming production needs can be met, companies prefer a *low* number of days' sales in raw materials inventory. Just-in-time manufacturing can help lower days' sales in raw materials inventory. For example, **Dell** keeps less than seven days of production needs in raw materials inventory for most of its computer components.

Decision Maker

Chief Financial Officer Your company regularly reports days' sales in raw materials of 20 days, which is similar to that of competitors. A manager argues that profit can be increased if the company applies just-in-time principles and cuts it down to 2 days. Do you drop it to 2 days? ■ *Answer:* Cutting days' sales in raw materials to 2 days *might* increase profits. Having less money tied up in inventory is a positive. However, if the company loses customers over out-of-stock inventory or if production is delayed (with costs), then the increase in profit might be outweighed by the increase in costs.

NEED-TO-KNOW 14-5

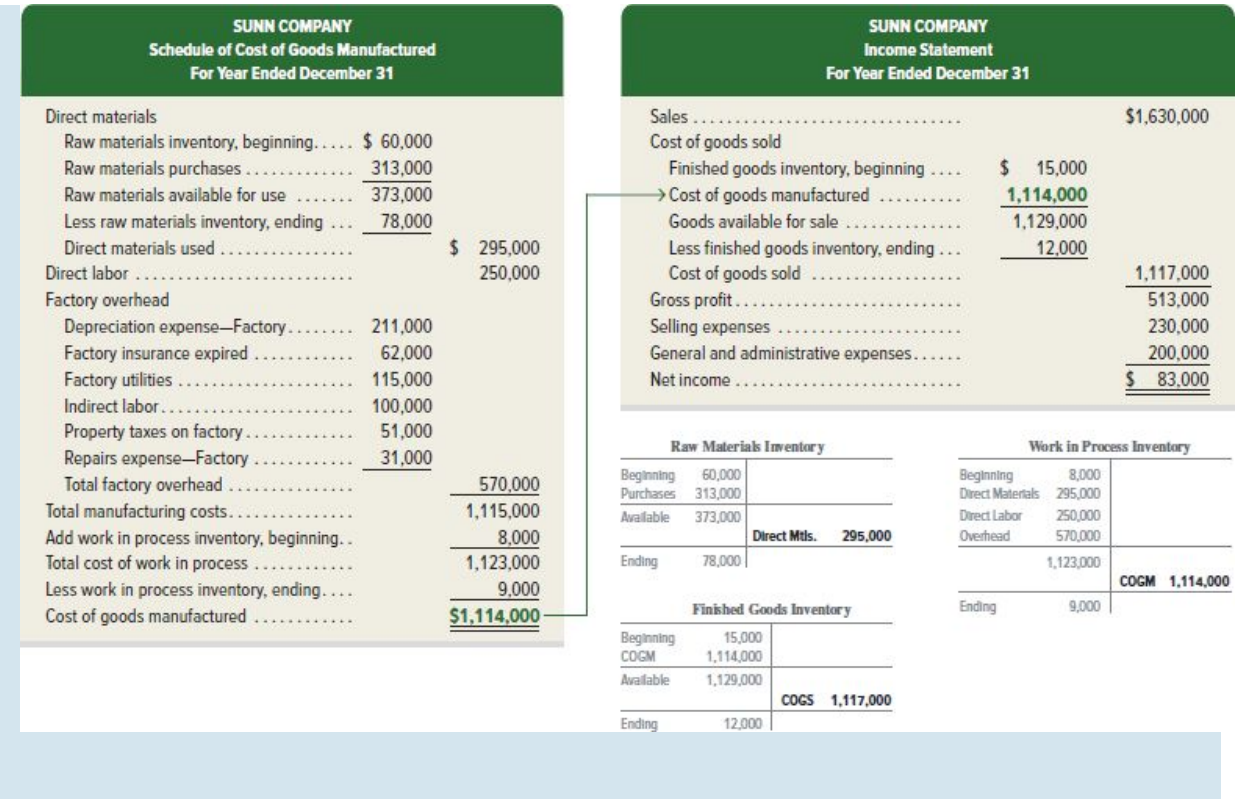
COMPREHENSIVE

Schedule of Cost of Goods Manufactured, and Income Statement

The following information is from SUNN Company's records for the current year-end December 31. Prepare (1) a schedule of cost of goods manufactured and (2) an income statement.

Depreciation expense—Factory	$211,000	Indirect labor	$ 100,000
Direct labor	250,000	Property taxes on factory	51,000
Factory insurance expired	62,000	Raw materials inventory, beginning	60,000
Factory utilities	115,000	Raw materials inventory, ending	78,000
Finished goods inventory, beginning	15,000	Raw materials purchases	313,000
Finished goods inventory, ending	12,000	Repairs expense—Factory	31,000
General and administrative expenses	200,000	Sales	1,630,000
Work in process inventory, beginning	8,000	Selling expenses	230,000
Work in process inventory, ending	9,000		

SOLUTION



SUNN COMPANY
Schedule of Cost of Goods Manufactured
For Year Ended December 31

Direct materials		
Raw materials inventory, beginning	$ 60,000	
Raw materials purchases	313,000	
Raw materials available for use	373,000	
Less raw materials inventory, ending	78,000	
Direct materials used		$ 295,000
Direct labor		250,000
Factory overhead		
Depreciation expense—Factory	211,000	
Factory insurance expired	62,000	
Factory utilities	115,000	
Indirect labor	100,000	
Property taxes on factory	51,000	
Repairs expense—Factory	31,000	
Total factory overhead		570,000
Total manufacturing costs		1,115,000
Add work in process inventory, beginning		8,000
Total cost of work in process		1,123,000
Less work in process inventory, ending		9,000
Cost of goods manufactured		$1,114,000

SUNN COMPANY
Income Statement
For Year Ended December 31

Sales		$1,630,000
Cost of goods sold		
Finished goods inventory, beginning	$ 15,000	
Cost of goods manufactured	1,114,000	
Goods available for sale	1,129,000	
Less finished goods inventory, ending	12,000	
Cost of goods sold		1,117,000
Gross profit		513,000
Selling expenses		230,000
General and administrative expenses		200,000
Net income		$ 83,000

Raw Materials Inventory

Beginning	60,000		
Purchases	313,000		
Available	373,000		
		Direct Mtls.	295,000
Ending	78,000		

Work in Process Inventory

Beginning	8,000		
Direct Materials	295,000		
Direct Labor	250,000		
Overhead	570,000		
	1,123,000		
		COGM	1,114,000
Ending	9,000		

Finished Goods Inventory

Beginning	15,000		
COGM	1,114,000		
Available	1,129,000		
		COGS	1,117,000
Ending	12,000		

Summary: Cheat Sheet

MANAGERIAL ACCOUNTING BASICS

Planning: Process of setting goals and making plans to achieve them.

Control: Process of monitoring and evaluating an organization's activities and employees.

Managerial Accounting: Focused on the needs of internal managerial and executive employees.

Financial Accounting: Focused on the needs of external users including investors and creditors.

COST CONCEPTS

Direct costs: Costs that *can* be cost-effectively traced to a cost object. Examples for a bicycle include wages of bike maker, tires, seats, handlebars, cables, frames, pedals, and brakes.

Indirect costs: Costs that *cannot* be cost-effectively traced to a cost object. Examples for a bicycle include factory accounting, factory rent, factory supervisor salary, and factory insurance.

Direct materials: Materials that are crucial parts of a finished product and that *can* be cost-effectively traced to finished goods. Examples for a bicycle include tires, seats, handlebars, cables, frames, pedals, and brakes.

page 558

Direct labor: Employees who directly convert materials to finished product and whose costs *can* be cost-effectively traced to finished goods. Examples for a bicycle include workers who convert raw materials into finished products (welding, painting, forming) and assembly workers who attach materials such as tires, seats, pedals, and brakes.

Factory overhead: All manufacturing costs that are not direct materials or direct labor. Costs include manufacturing costs that *cannot* be cost-effectively traced to finished goods. Factory overhead includes indirect materials, indirect labor, and other indirect costs such as staples, glue, supervisor salaries, and factory insurance.

- **Indirect materials:** Materials used in manufacturing that *cannot* be cost-effectively traced to finished goods. Their costs are often low. Examples include staples, glue, nuts, and screws.
- **Indirect labor:** Labor needed in manufacturing that *cannot* be cost-effectively traced to finished goods. Examples include costs for employees who maintain and repair manufacturing equipment and salaries of production supervisors.
- ***Other indirect costs*** include factory utilities (water, gas, electricity), factory rent, depreciation on factory buildings and equipment, and factory insurance.

Prime costs: Direct materials costs + Direct labor costs.

Conversion costs: Overhead costs + Direct labor costs.

Product costs: Consist of direct materials, direct labor, and factory overhead. Product costs are added to inventory during production. After products are sold, these costs become cost of goods sold.

Period costs: *Nonproduction* costs linked to a time period rather than to completed products. Examples include sales staff salaries, office worker wages, advertising expenses, and depreciation on office furniture. Period costs are expensed in the period when incurred and reported on the income statement as either selling expenses or general and administrative expenses.

REPORTING

Raw materials inventory: Materials a company acquires to use in making products.

Work in process inventory: Products in the process of being manufactured but not yet complete.

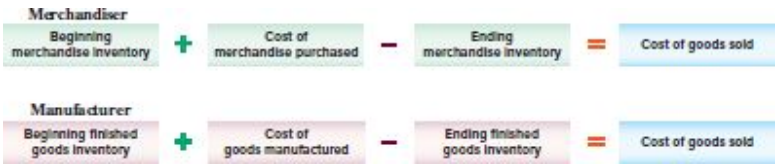
Finished goods inventory: Completed products ready for sale.

Manufacturer Balance Sheet (current assets section):

ROCKY MOUNTAIN BIKES
Income Statement
For Year Ended December 31

Sales		$310,000
Cost of goods sold		
Finished goods inventory, beginning	$ 11,200	
Cost of goods manufactured	170,500	
Goods available for sale	181,700	
Less finished goods inventory, ending	10,300	
Cost of goods sold		171,400
Gross profit		138,600
Selling expenses		38,200
General and administrative expenses		54,400
Net income		$ 46,000

Cost of Goods Sold:



Manufacturer Income Statement:

ROCKY MOUNTAIN BIKES Income Statement For Year Ended December 31		
Sales		$310,000
Cost of goods sold		
Finished goods inventory, beginning	$ 11,200	
Cost of goods manufactured	170,500	
Goods available for sale	181,700	
Less finished goods inventory, ending	10,300	
Cost of goods sold		171,400
Gross profit		138,600
Selling expenses		38,200
General and administrative expenses		54,400
Net income		$ 46,000

COST FLOWS

Cost of goods manufactured: Total of direct materials used, direct labor, and factory overhead costs for finished goods manufactured.

Cost of Goods Manufactured Computation:

Total manufacturing cost = **Direct materials used** + **Direct labor used** + **Factory overhead used**

Cost of goods manufactured = **Total manufacturing costs** + **Beginning work in process inventory** − **Ending work in process inventory**

Schedule of Cost of Goods Manufactured:

ROCKY MOUNTAIN BIKES
Schedule of Cost of Goods Manufactured
For Year Ended December 31

Direct materials		
Raw materials inventory, beginning	$ 8,000	
Raw materials purchases	86,500	
Raw materials available for use	94,500	
Less raw materials inventory, ending	9,000	
Direct materials used		$ 85,500
Direct labor		60,000
Factory overhead		
Indirect labor	15,000	
Factory utilities	2,600	
Repairs—Factory equipment	2,500	
Property taxes—Factory	4,400	
Depreciation expense—Factory	5,500	
Total factory overhead		30,000
Total manufacturing costs		$175,500
Add work in process inventory, beginning		2,500
Total cost of work in process		178,000
Less work in process inventory, ending		7,500
Cost of goods manufactured		$170,500

Key Terms

Continuous improvement (554)

Control (542)

Conversion costs (545)

Corporate social responsibility (CSR) (555)

Cost object (544)

Cost of goods manufactured (551)

Customer orientation (554)

Days' sales in raw materials inventory (556)

Digital manufacturing (553)

Direct costs (544)

Direct labor (545)

Work in process inventory (548)

Multiple Choice Quiz

1. Period costs
   - **a.** Include direct materials and direct labor.
   - **b.** Are capitalized as inventory.
   - **c.** Are expensed in the period incurred.
   - **d.** Include factory overhead.
   - **e.** Are included in total manufacturing costs.
2. Factory overhead
   - **a.** Includes selling expenses.
   - **b.** Includes indirect labor.
   - **c.** Is a period cost.
   - **d.** Includes general and administrative expenses.
   - **e.** Is included in nonmanufacturing costs.
3. A manufacturer reports the following.

Raw materials purchases	$81,200
Raw materials inventory, ending	12,000
Raw materials inventory, beginning	8,000

   Its cost of materials used is
   - **a.** $81,200
   - **b.** $77,200
   - **c.** $85,200
   - **e.** $101,200
   - **e.** $89,200
4. A manufacturer reports the following.

Direct materials used	$22,650	Factory utilities	800
Selling expenses	800	Direct labor	8,720
Finished goods inventory, ending	4,000	Indirect labor	4,000

Its total manufacturing costs equal

a. $36,170

b. $36,970

c. $32,970

d. $40,970

e. $32,170

5. A manufacturer reports the following.

Finished goods inventory, beginning	$6,000
Finished goods inventory, ending	3,200
Cost of goods sold	7,500

Its cost of goods manufactured is

a. $1,500.

b. $1,700.

c. $7,500.

d. $2,800.

e. $4,700.

ANSWERS TO MULTIPLE CHOICE QUIZ

1. c

2. b

3. b; Beginning raw materials inventory + Raw materials purchases − Ending raw materials inventory = $8,000 + $81,200 − $12,000 = $77,200

4. a; Direct materials + Direct labor + Factory overhead = $22,650 + $8,720 + $800 + $4,000 = $36,170

5. Beginning finished goods + Cost of goods manufactured (COGM) − Ending finished goods = Cost of goods sold

$6,000 + COGM − $3,200 = $7,500

COGM = $4,700

Select Quick Study and Exercise assignments page 560 ***feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.***

QUICK STUDY

QS 14-1

Managerial vs. financial accounting

C1

Identify whether each description most likely applies to managerial or financial accounting.

1. Its primary users are company managers.
2. Its information is often available only after an audit is complete.
3. Its primary focus is on the organization as a whole.
4. Its principles and practices are relatively flexible.
5. It focuses mainly on past results.

QS 14-2

Classifying direct and indirect costs

C2

Diez Company produces sporting equipment, including leather footballs. Assume that the cost object is a football. Classify each of the following costs as direct or indirect.

1. Electricity used in the production plant.
2. Labor used on the football production line.

3. Salary of manager who supervises the entire plant.
4. Depreciation on maintenance equipment used in the plant.
5. Leather used to produce footballs.

QS 14-3

Classifying direct materials, direct labor, and overhead

C2

A company manufactures tennis balls. Classify each of the following costs as either direct materials, direct labor, or factory overhead.

1. Rubber used to form the cores.
2. Factory maintenance.
3. Wages paid to assembly workers.
4. Glue used in binding rubber cores to felt covers.
5. Depreciation on factory equipment.
6. Cans to package the balls.

QS 14-4

Classifying product and period costs

C2

Classify each of the following costs as either a product cost or a period cost for a manufacturer.

1. Factory insurance.
2. Sales commissions.
3. Depreciation on factory equipment.
4. Depreciation on office equipment.
5. Rent on factory building.
6. Tax accountant salary.

7. Office manager salary.
8. Indirect labor in making goods.

QS 14-5

Identifying prime and conversion costs

C2

A company manufactures guitars. Identify each of the following costs as either a prime cost, a conversion cost, or both.

1. Wood used to build the guitar body.
2. Glue used to bind the guitar wood.
3. Wages paid to assembly workers.
4. Depreciation on factory equipment.
5. Rent on factory building.
6. Wood to build the guitar bridge.

QS 14-6

Computing ending work in process inventory

P1

Compute ending work in process inventory for a manufacturer using the following information.

Raw materials purchased	$124,000	Factory overhead	$ 95,000
Direct materials used	74,000	Work in process inventory, beginning	26,000
Direct labor used	55,000	Cost of goods manufactured	220,000

QS 14-7

Computing cost of goods sold for a manufacturer

P1

Compute cost of goods sold using the following information.

Finished goods inventory, beginning	$ 500	Finished goods inventory, ending	$700
Cost of goods manufactured	4,000		

QS 14-8

Computing cost of goods sold for a manufacturer

P1

Compute cost of goods sold using the following information.

Finished goods inventory, beginning	$345,000	Cost of goods manufactured	$918,000
Work in process inventory, beginning	83,000	Finished goods inventory, ending	283,000
Work in process inventory, ending	72,000		

QS 14-9

Computing cost of goods sold for a merchandiser

P1

Compute cost of goods sold using the following information.

Merchandise inventory, beginning	$12,000	Merchandise inventory, ending	$18,000
Cost of merchandise purchased	85,000		

QS 14-10

Determining merchandiser cost flows

P1

Determine the missing amount for each separate situation involving inventory cost flows.

	(1)	(2)	(3)
Cost of merchandise purchased	$?	$140,000	$289,000
Merchandise inventory, beginning	106,000	?	28,000
Merchandise inventory, ending	82,000	33,000	?
Cost of goods sold	205,000	128,000	267,000

QS 14-11

Preparing an income statement

P1

Prepare an income statement for Rex Manufacturing for the year ended December 31 using the following information. *Hint:* Not all information given is needed for the solution.

Finished goods inventory, ending	$16,000	Selling expenses	$12,000
General and administrative expenses	14,000	Cash	55,000
Accounts receivable	18,000	Land	28,000
Finished goods inventory, beginning	19,000	Sales	92,000
Cost of goods manufactured	40,000	Equipment	1,000

QS 14-12

Preparing a balance sheet

P1

Prepare the current assets section of the balance sheet at December 31 for Bin Manufacturing using the following information. *Hint:* Not all information given is needed for the solution.

Cash	$22,000	Selling expenses	$12,000
Accounts payable	2,000	Finished goods inventory	22,000
Raw materials inventory	8,000	Work in process inventory	18,000
General and administrative expenses	42,000	Prepaid insurance	4,000
Accounts receivable, net	12,000	Cost of goods sold	33,000

QS 14-13

Computing direct materials used **P2**

Garcia Company reports beginning raw materials inventory of $855 and ending raw materials inventory of $717. If the company purchased $3,646 of raw materials during the month, what is the amount of materials used during the month? *Note*: Assume all raw materials were used as direct materials.

QS 14-14

Computing total manufacturing costs

P2

Determine the missing amount for each separate situation involving manufacturing costs.

	(1)	(2)	(3)
Direct materials used	$8,000	$14,000	$?
Direct labor used	4,000	?	18,000
Factory overhead	5,000	23,000	22,000
Total manufacturing costs	?	50,000	72,000

QS 14-15

Preparing a schedule of cost of goods manufactured

P2

Prepare the schedule of cost of goods manufactured for Barton Company using the following information for the year ended December 31.

Direct materials used . . .	$190,000	Work in process inventory, beginning	$157,000
Direct labor	63,000	Work in process inventory, ending	142,000
Factory overhead	24,000		

QS 14-16

Computing direct materials used

P2

Use the following information to compute the cost of direct materials used for the current year. *Note*: Assume all raw materials were used as direct materials.

Inventories	Beginning of Year	End of Year
Raw materials inventory	$ 6,000	$7,000
Work in process inventory	12,000	9,000
Finished goods inventory	8,000	5,000

Activity during current year	
Raw materials purchased	$123,000
Direct labor	94,000
Factory overhead	39,000

QS 14-17

Schedule of cost of goods manufactured

P2

Refer to the data in Quick Study 14-16. Factory overhead of $39,000 consists of Indirect labor of $20,000, Depreciation expense—Factory of $15,000, and Factory utilities of $4,000.

a. Compute total manufacturing costs.

b. Prepare a schedule of cost of goods manufactured.

QS 14-18

Determining components of cost of goods manufactured

P2

Determine the missing amount for each separate situation involving work in process cost flows.

	(1)	(2)	(3)
Total manufacturing costs	$?	$150,000	$217,000
Work in process inventory, beginning	105,000	?	32,000
Work in process inventory, ending	84,000	22,000	?
Cost of goods manufactured	200,000	138,000	237,000

QS 14-19

Computing average manufacturing cost per unit

P2

A company reports cost of goods manufactured of $918,700 and cost of goods sold of $955,448. Compute the average manufacturing cost per unit assuming 18,374 units were produced.

QS 14-20

Trends in managerial accounting

C4

Match each concept with its best description.

1. Just-in-time manufacturing

2. Continuous improvement

3. Customer orientation

4. Total quality management

5. Triple bottom line

A. Focuses on quality throughout the production process.

B. Flexible product designs can be modified to accommodate customer choices.

C. Managers and employees constantly look to improve operations.

D. Reports on financial, social, and environmental performance.

E. Inventory is acquired or produced only as needed.

QS 14-21

Computing inventory ratios

A1

Sims Company reports beginning raw materials inventory of $900 and ending raw materials inventory of $1,100. Assume the company purchased $5,200 of raw materials and used $5,000 of raw materials during the year. Compute raw materials inventory turnover (round to one decimal) and the number of days' sales in raw materials inventory (round to the nearest day).

EXERCISES

Exercise 14-1

Managerial vs. financial accounting

C1

Indicate whether each decision is most likely to be made using managerial accounting information or financial accounting information.

Business Decision	Primary Information Source
1. Determine whether to lend to a company	_____
2. Evaluate a purchasing department's performance	_____
3. Report financial performance to shareholders	_____
4. Estimate product cost for a new line of shoes	_____
5. Plan the manufacturing budget for next quarter	_____
6. Measure profitability of an individual store	_____
7. Prepare financial reports according to GAAP	_____
8. Determine location and size for a new plant	_____

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Exercise 14-2

Classifying direct and indirect costs

C2

Listed here are product costs for production of soccer balls. Classify each cost as either direct or indirect.

Product Cost	Direct or Indirect	Product Cost	Direct or Indirect
1. Leather covers for soccer balls	_____	6. Taxes on factory	_____
2. Annual flat fee paid for factory security	_____	7. Machinery depreciation (straight-line)	_____
3. Coolants for machinery	_____	8. Rubber bladder interior for balls	_____
4. Wages of product assembly workers	_____	9. Ink for labeling soccer balls	_____
5. Factory supervisor salary	_____	10. Factory building rent	_____

Exercise 14-3

Classifying direct and indirect costs for a service company

C2

TechPro offers instructional courses in website design. The company holds classes in a building that it owns. The cost object is an individual class. Classify each of TechPro's costs below as direct or indirect.

1. Depreciation on classroom building
2. Monthly Internet connection cost
3. Instructional manuals for students
4. Classroom building utilities cost
5. Depreciation on computers used for classes
6. Instructor wage (per class)
7. Classroom cleaning fees
8. Snacks for the class

Exercise 14-4

Classifying costs for a service company

C2

Listed below are costs of services provided by an airline company. Consider the cost object to be a flight. Flight attendants and pilots are paid based on hours of flight time. Classify each cost as direct, indirect, selling, or general and administrative.

Cost	Classification	Cost	Classification
1. Advertising	_____	5. Fuel used for plane flight	_____
2. Beverages served on plane	_____	6. Flight attendant wages for flight	_____
3. Accounting manager salary	_____	7. Pilot wages for flight	_____
4. Depreciation (straight-line) on plane	_____	8. Aircraft maintenance manager salary	_____

Exercise 14-5

Classifying costs

C2

Selected costs related to **Apple**'s iPhone are listed below. Classify each cost as either direct materials, direct labor, factory overhead, selling expenses, or general and administrative expenses.

1. Display screen

2. Assembly-line supervisor salary
3. Wages for assembly workers
4. Salary of chief executive officer
5. Glue to hold iPhone cases together
6. Uniforms provided for each factory worker
7. Wages for retail store salesperson
8. Depreciation (straight-line) on robotic equipment used in assembly

---

Exercise 14-6

Classifying product and period costs

C2

A car manufacturer incurs the following costs. Classify each cost as either a product or period cost. If a product cost, classify it as direct materials, direct labor, or factory overhead. If a period cost, classify it as a selling expense or a general and administrative expense. Place an "X" in the correct column for each cost.

	Product Costs			Period Costs	
Cost	Direct Materials	Direct Labor	Factory Overhead	Selling Expense	General and Administrative Expense
1. Factory electricity					
2. Advertising					
3. Depreciation on factory machine					
4. Batteries for electric cars					
5. Office supplies used					
6. Wages to assembly workers					
7. Salesperson commissions					
8. Steel for cars					
9. Depreciation on office equipment					
10. Leather for car seats					

Exercise 14-7

Computing cost of goods manufactured and cost of goods sold

P1 P2

Using the following data from both Garcon Company and Pepper Company for the year ended December 31 to compute (1) the cost of goods manufactured and (2) the cost of goods sold for each company. *Hint:* Not all information is needed for the solution.

	Garcon Co.	Pepper Co.
Finished goods inventory, beginning	$ 12,000	$ 16,450
Work in process inventory, beginning	14,500	19,950
Raw materials inventory, beginning	7,250	9,000
Rental cost on factory equipment	27,000	22,750
Direct labor	19,000	35,000
Finished goods inventory, ending	17,650	13,300
Work in process inventory, ending	22,000	16,000
Raw materials inventory, ending	5,300	7,200
Factory utilities	9,000	12,000
General and administrative expenses	21,000	43,000
Indirect labor	9,450	10,860
Repairs—Factory equipment	4,780	1,500
Raw materials purchases	33,000	52,000
Selling expenses	50,000	46,000
Sales	195,030	290,010
Cash	20,000	15,700
Accounts receivable, net	13,200	19,450

Exercise 14-8

Preparing financial statements for a manufacturer

P1

Refer to the data in Exercise 14-7. For each company, prepare (1) an income statement and (2) the current assets section of the balance sheet.

Exercise 14-9

Computing prime and conversion costs

C2

Refer to the data in Exercise 14-7. For each company, compute the total (1) prime costs and (2) conversion costs.

Exercise 14-10

Cost of goods sold computation for a merchandiser and manufacturer

P1

Compute cost of goods sold for each of these two companies.

	A	B	C
1		Unimart	Bare Manufacturing
2	Beginning inventory		
3	Merchandise	$275,000	
4	Finished goods		$450,000
5	Cost of merchandise purchased	500,000	
6	Cost of goods manufactured		900,000
7	Ending inventory		
8	Merchandise	115,000	
9	Finished goods		375,000

Check Unimart COGS, $660,000

Exercise 14-11

Balance sheet identification and preparation

P1

End-of-year current assets for two different companies follow. One is a manufacturer, Rayzer Skis Mfg., and the other, Sunrise Foods, is a merchandiser.

1. Identify which set of numbers relates to the manufacturer and which to the merchandiser.
2. Prepare the current asset section of the balance sheet at December 31 for each company.

Account	Company 1	Company 2
Cash	$ 7,000	$ 5,000
Merchandise inventory	45,000	—
Raw materials inventory	—	42,000
Work in process inventory	—	30,000
Finished goods inventory	—	50,000
Accounts receivable, net	62,000	75,000
Prepaid expenses	1,500	900

Exercise 14-12

Components of accounting reports

P2

For each of the following accounts for a manufacturing company, place a ✓ in the column indicating that it is included in selling expenses, general and administrative expenses, or the calculation of cost of goods manufactured. An account can only be included in one column.

	A	B	C	D
1	**Account**	**Selling Expenses**	**General & Admin. Expenses**	**Cost of Goods Manufactured**
2	Advertising			
3	Work in process inventory, beginning			
4	Computer supplies used in office			
5	Depreciation expense—Factory			
6	Depreciation expense—Office			
7	Wages for assembly workers			
8	Office employee wages			
9	Factory maintenance wages			
10	Property taxes on factory			
11	Raw materials purchases			
12	Sales commissions			

Exercise 14-13

Preparing schedule of cost of goods manufactured

P2

Use the following selected account balances of Delray Mfg. to prepare its schedule of cost of goods manufactured for the year ended December 31.

Sales	$1,250,000	Repairs—Factory equipment	$ 23,000
Raw materials inventory, beginning	37,000	Rent cost of factory building	57,000
Work in process inventory, beginning	53,900	Selling expenses	94,000
Finished goods inventory, beginning	62,700	General and administrative expenses	129,300
Raw materials purchases	175,600	Raw materials inventory, ending	42,700
Direct labor	225,000	Work in process inventory, ending	41,500
Indirect labor	47,000	Finished goods inventory, ending	67,300

Check Direct materials used, $169,900

Exercise 14-14

Income statement preparation

P1

Refer to the information in Exercise 14-13 to prepare an income statement for Delray Mfg. (a manufacturer). Assume that its cost of goods manufactured is $534,300.

Exercise 14-15

Schedule of cost of goods manufactured and cost of goods sold

P2

Beck Manufacturing reports the following information in T-accounts for the current year.

1. Prepare the schedule of cost of goods manufactured for the year.
2. Compute cost of goods sold for the year.

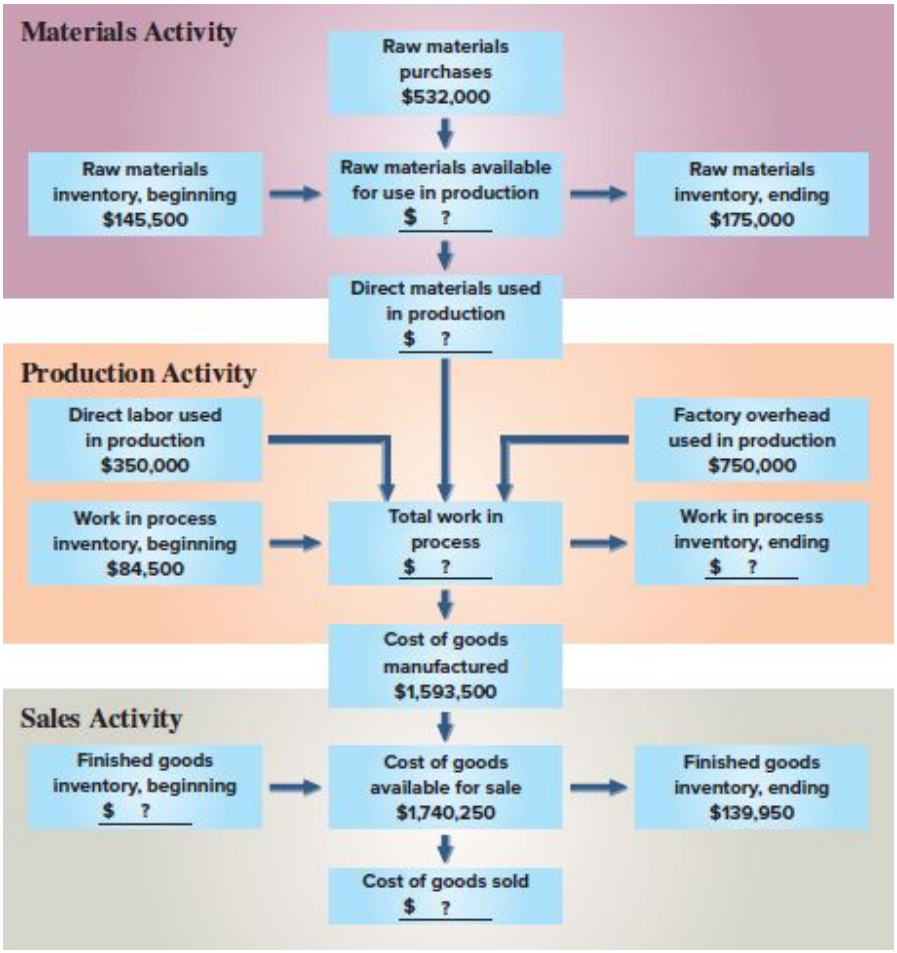
*DM = Direct materials

Exercise 14-16

Cost flows in manufacturing–visualization

C3

The following chart shows how costs flow through a business as a product is manufactured. All boxes in the chart show cost amounts. Compute the cost amounts for the boxes that contain question marks.



Exercise 14-17

Determining cost flows for manufacturers

P2

Determine the missing amount for each separate situation involving manufacturing cost flows.

	(1)	(2)	(3)
Direct materials used	$ (a)	$150,480	$33,890
Direct labor used	75,000	(d)	45,720
Factory overhead	122,000	32,840	60,275
Total manufacturing costs	243,500	238,700	(g)
Work in process inventory, beginning	(b)	56,920	8,245
Total cost of work in process	289,325	(e)	(h)
Work in process inventory, ending	(c)	22,545	11,250
Cost of goods manufactured	265,420	(f)	(i)

Exercise 14-18

Lean business practices

C4

Many fast-food restaurants compete on lean business practices. Identify which lean business practice *a, b*, or *c*, is being implemented with each of the following activities.

1. Courteous employees

2. Food produced to order

3. Clean tables and floors

4. Orders filled within three minutes

5. Standardized food-making processes

6. New product development

a. Just-in-time (JIT)

b. Continuous improvement (CI)

c. Total quality management (TQM)

Exercise 14-19

Triple bottom line

C4

In a recent annual report and related *Global Responsibility Report*, **Starbucks** provides information on company performance on several dimensions. Indicate whether the following items best fit into the financial (label your answer "Profit"), social (label your answer "People"), or environmental (label your answer "Planet") aspects of triple bottom line reporting.

1. Sales revenue totaled $22.4 billion.

2. 99% of coffee was purchased from suppliers certified for paying fair wages.

3. Company reported r>educed water consumption.

4. Net income totaled $2.9 billion.
5. Increased purchases of energy from renewable sources.
6. Stopped working with factories that had poor working conditions.

connect

PROBLEM SET A

Problem 14-1A

Classifying costs and computing cost per unit

C2 P2

Listed here are the costs associated with the production of 1,000 drum sets manufactured by TrueBeat.

Costs	Product	Period
1. Plastic for casing—$17,000	$17,000	____
2. Wages of assembly workers—$82,000	____	____
3. Property taxes on factory—$5,000	____	____
4. Office accounting salaries—$35,000	____	____
5. Drum stands—$26,000	____	____
6. Rent cost of office for accountants—$10,000	____	____
7. Office management salaries—$125,000	____	____
8. Annual fee for factory maintenance—$10,000	____	____
9. Sales commissions—$15,000	____	____
10. Factory machinery depreciation, straight-line—$40,000	____	____

Required

1. Classify each cost and its amount as either product or period. The first cost is completed as an example.
2. Compute the average manufacturing cost per drum set.

Problem 14-2A

Classifying costs

C2

The following year-end information is taken from the December 31 adjusted trial balance and other records of Leone Company.

Advertising expense	$ 28,750	Direct labor	$675,480
Depreciation expense—Office equipment	7,250	Indirect labor	159,475
Depreciation expense—Selling equipment	8,600	Office salaries expense	63,000
Depreciation expense—Factory equipment	49,325	Rent expense—Office space	22,000
Raw materials purchases (all direct materials)	925,000	Rent expense—Selling space	26,100
Maintenance expense—Factory equipment	35,400	Rent expense—Factory building	76,800
Factory utilities	33,000	Sales salaries expense	392,560

Required

Identify each cost as either a product cost or a period cost. If a product cost, classify it as direct materials, direct labor, or factory overhead. If a period cost, classify it as a selling expense or a general and administrative expense.

Problem 14-3A

Schedule of cost of goods manufactured and income statement

P1 P2

Using the data from Problem 14-2A and the following additional information for Leone Company, complete the requirements below.

Raw materials inventory, beginning	$ 166,850	Work in process inventory, ending	$ 19,380
Raw materials inventory, ending	182,000	Finished goods inventory, beginning	167,350
Work in process inventory, beginning	15,700	Finished goods inventory, ending	136,490
Sales	4,462,500		

Required

1. Prepare the schedule of cost of goods manufactured for the current year.
2. Prepare the current year income statement.

Check (1) Cost of goods manufactured, $1,935,650

Problem 14-4A

Reporting cost of goods sold

P1

Shown here are annual financial data for a merchandising company and a manufacturing company.

	Music World Retail	Wave-Board Manufacturing
Beginning inventory		
Merchandise	$200,000	
Finished goods		$500,000
Cost of merchandise purchased	300,000	
Cost of goods manufactured		875,000
Ending inventory		
Merchandise	175,000	
Finished goods		225,000

Required

Prepare the cost of goods sold section of the income statement for each company.

Problem 14-5A

Raw materials inventory turnover

A1

A manufacturing company reports the following information.

	Current Year	1 Year Ago	2 Years Ago
Raw materials inventory, ending	$ 169,500	$ 190,500	$ 197,500
Raw materials used	2,160,000	2,522,000	2,765,000

Required

1. Compute raw materials inventory turnover for the most recent two years.
2. Is the current year change in raw materials inventory turnover ratio favorable or unfavorable?
3. Compute days' sales in raw materials inventory for the current year.

PROBLEM SET B

Problem 14-1B

Classifying costs and computing cost per unit

C2 P2

Listed here are the costs associated with the production of 18,000 Blu-ray discs (BDs) manufactured by Maxwell.

Costs	Product	Period
1. Plastic for BDs—$1,500	$1,500	____
2. Wages of assembly workers—$30,000	____	____
3. Factory rent—$6,750	____	____
4. Human resources staff salaries—$15,000	____	____
5. BD labeling—$3,750	____	____
6. Office equipment rent—$1,050	____	____
7. Office management salaries—$120,000	____	____
8. Annual fee for factory maintenance—$21,000	____	____
9. Advertising—$7,200	____	____
10. Factory machinery depreciation, straight-line—$18,000	____	____

Required

1. Classify each cost and its amount as either product or period. The first cost is completed as an example.
2. Compute the average manufacturing cost per BD.

Problem 14-2B

Classifying costs

C2

The following year-end information is taken from the December 31 adjusted trial balance and other records of Best Bikes.

Advertising expense	$ 20,250	Direct labor	$562,500
Depreciation expense—Office equipment	8,440	Indirect labor	180,500
Depreciation expense—Selling equipment	10,125	Office salaries expense	70,875
Depreciation expense—Factory equipment	49,900	Rent expense—Office space	23,625
Raw materials purchases (all direct materials)	894,375	Rent expense—Selling space	27,000
Maintenance expense—Factory equipment	30,375	Rent expense—Factory building	93,500
Factory utilities	37,500	Sales salaries expense	295,300

Required

Identify each cost as either a product cost or a period cost. If a product cost, classify it as direct materials, direct labor, or factory overhead. If a period cost, classify it as a selling expense or a general and administrative expense.

Problem 14-3B

Schedule of cost of goods manufactured and income statement

P1 P2

Using the information from Problem 14-2B and the following additional information for Best Bikes, complete the requirements below.

Raw materials inventory, beginning	$ 40,375	Work in process inventory, ending	$ 14,100
Raw materials inventory, ending	70,430	Finished goods inventory, beginning	177,200
Work in process inventory, beginning	12,500	Finished goods inventory, ending	141,750
Sales	4,942,625		

Required

1. Prepare the schedule of cost of goods manufactured for the year.
2. Prepare the current year income statement.

Check (1) Cost of goods manufactured, $1,816,995

Problem 14-4B

Reporting cost of goods sold

P1

Shown here are annual financial data for a merchandising company and a manufacturing company.

	TeeMart Retailing	Aim Labs Manufacturing
Beginning inventory		
Merchandise	$100,000	
Finished goods		$300,000
Cost of merchandise purchased	250,000	
Cost of goods manufactured		586,000
Ending inventory		
Merchandise	150,000	
Finished goods		200,000

Required

1. Prepare the cost of goods sold section of the income statement for each company.
2. Write a half-page memorandum to your instructor (*a*) identifying the inventory accounts and (*b*) identifying where each is reported on the income statement and/or balance sheet for both companies.

Problem 14-5B

Raw materials inventory turnover

A1

A manufacturing company reports the following information.

	Current Year	1 Year Ago	2 Years Ago
Raw materials inventory, ending	$ 270,225	$ 259,775	$ 230,225
Raw materials used	2,385,000	2,695,000	2,700,000

Required

1. Compute raw materials inventory turnover for the most recent two years.
2. Is the current year change in raw materials inventory turnover ratio favorable or unfavorable?
3. Compute days' sales in raw materials inventory for the current year.

SERIAL PROBLEM

Business Solutions

C4 P1 P2

Alexander Image/Shutterstock

This serial problem began in Chapter 1 and continues through most of the book. If previous chapter segments were not completed, the serial problem can begin at this point.

SP 14 Santana Rey, owner of **Business Solutions**, diversifies her business by also manufacturing computer workstation furniture.

Required

1. Classify the following manufacturing costs of Business Solutions as either direct (D) or indirect (I).

Manufacturing Costs	Direct or Indirect
1. Monthly fee to clean workshop	_____
2. Laminate coverings for desktops	_____
3. Taxes on assembly workshop	_____
4. Glue to assemble workstation components	_____
5. Wages of desk assembler	_____
6. Electricity for workshop	_____
7. Depreciation on manufacturing tools	_____

2. Prepare a schedule of cost of goods manufactured for Business Solutions for the month ended January 31, 2022. Assume the

following manufacturing costs.

Work in process inventory, beginning	$ 0	Direct materials used	$2,200
Work in process inventory, ending	540	Direct labor	900
Finished goods inventory, beginning	0	Factory overhead	490
Finished goods inventory, ending	350		

3. Refer to the data in part 2 and prepare the cost of goods sold section of a partial income statement for Business Solutions for the month ended January 31, 2022.

Check (3) COGS, $2,700

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA 14-1 Quick Study, Computing direct materials used, **C2**—similar to QS 14-13.

Tableau DA 14-2 Exercise, Cost classification and current assets section of balance sheet, **P1**,**C2**—similar to Exercises 14-8 & 14-9.

Tableau DA 14-3 Mini-case, Schedule of cost of goods manufactured and income statement preparation, **C2**—similar to Exercise 14-7.

Accounting Analysis connect

COMPANY ANALYSIS

A1

AA 14-1 For **Apple**'s current annual report, assume it reports the following for raw materials.

$ millions	Current Year	1 Year Ago	2 Years Ago
Raw materials inventory, ending . . .	$ 2,100	$ 1,900	$ 2,500
Raw materials used.	72,000	74,800	79,200

Required

1. Compute Apple's raw materials inventory turnover ratio for the most recent two years.
2. Is the current year change in Apple's raw materials inventory turnover ratio favorable or unfavorable?

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COMPARATIVE ANALYSIS

A1

AA 14-2 For the current annual reports of **Apple** and **Google**, assume they report the following.

	Apple			Google		
$ millions	Current Year	1 Year Ago	2 Years Ago	Current Year	1 Year Ago	2 Years Ago
Raw materials inventory, ending . . .	$ 2,100	$ 1,900	$ 2,500	$ 500	$ 700	$ 300
Raw materials used.	72,000	74,800	79,200	42,000	30,000	27,000

Required

1. Compute the recent two years' raw materials inventory turnover ratio for (*a*) Apple and (*b*) Google.
2. Is the current year change in Apple's raw materials inventory turnover ratio favorable or unfavorable? Is the current year change in Google's raw materials inventory turnover ratio favorable or unfavorable?
3. For the current year, does raw materials inventory turnover outperform or underperform the industry (assumed) average of 40 for (*a*) Apple and (*b*) Google?

EXTENDED ANALYSIS

A1

AA 14-3 For the current annual reports of **Samsung** and **Apple**, assume they report the following.

$ millions	Samsung		Apple	
	Current Year	Prior Year	Current Year	Prior Year
Raw materials inventory, ending . . .	$11,500	$12,400	$ 2,100	$ 1,900
Raw materials used.	63,598	56,575	72,000	74,800

Required

1. Compute the recent two years' days' sales in raw materials inventory for (*a*) Samsung and (*b*) Apple.
2. Is the current year change in Samsung's days' sales in raw materials inventory favorable or unfavorable? Is the current year change in Apple's days' sales in raw materials inventory favorable or unfavorable?
3. For the current year, is Samsung's days' sales in raw materials inventory better or worse than Apple's? (Assume all production needs can be met for both companies.)

Discussion Questions

1. Describe the managerial accountant's role in business planning, control, and decision making.
2. Distinguish between managerial and financial accounting on the following information attributes.
   - **a.** Users.
   - **b.** Purpose.
   - **c.** Flexibility of reporting.
   - **d.** Time dimension.
   - **e.** Focus.
   - **f.** Nature.

3. Identify the usual changes that a company must make when it adopts a customer orientation.
4. Distinguish between direct labor and indirect labor.
5. Distinguish between (*a*) factory overhead and (*b*) selling, general, and administrative expenses.
6. Distinguish between direct materials and indirect materials.
7. What product cost is both a prime cost and a conversion cost?
8. Assume that we tour **Apple**'s factory where it makes iPhones. List three direct costs and three indirect costs that we are likely to see.
9. List several examples of nonmanufacturing costs.
10. Should we evaluate a production manager's performance on the basis of general and administrative expenses? Why?
11. Explain why product costs are capitalized but period costs are expensed in the current accounting period.
12. Explain how business activities and inventories for a manufacturing company, a merchandising company, and a service company differ.
13. Why does managerial accounting often involve working with numerous predictions and estimates?
14. How do an income statement and a balance sheet for a manufacturing company and a merchandising company differ?
15. Besides inventories, what other assets often appear on manufacturers' balance sheets but not on merchandisers' balance sheets?
16. Why does a manufacturing company require three different inventory categories?
17. What are the goals of the lean business model?

18. What are the three categories of manufacturing costs?
19. List several examples of factory overhead.

20. List the four components of a schedule of cost of goods manufactured and provide specific examples of each for **Apple**.

21. Prepare a proper title for the annual schedule of cost of goods manufactured of **Google**. Does the date match the balance sheet or income statement? Why?

22. How does the cost of goods manufactured schedule relate to the income statement?

23. Define and describe two measures to assess raw materials inventory management.

24. The triple bottom line includes what three main dimensions?

25. Read the *Statement of Ethical Professional Practice* posted at **IMAnet.org**. (Under "Career Resources," select "Ethics Center," and then select "IMA Statement of Ethical Professional Practice.") What four overarching ethical principles underlie the IMA's statement? Describe the courses of action the IMA recommends in resolving ethical conflicts.

Beyond the Numbers

ETHICS CHALLENGE

C3

BTN 14-1 You are the managerial accountant at Infostore, a manufacturer of hard drives. Its reporting year-end is December 31. The chief financial officer is concerned about having enough cash to pay the expected income tax bill because of poor cash flow management. On November 15, the purchasing department purchased excess inventory of raw materials in anticipation of rapid sales growth beginning in January. The chief financial officer tells you to record the purchase of raw materials as an expense in the current year; this would decrease the company's tax liability by increasing expenses and reducing income.

Required

1. In which account should the purchase of raw materials be recorded?

2. How should you respond to this request by the chief financial officer?

COMMUNICATING IN PRACTICE

C1

BTN 14-2 Write a one-page memorandum to a prospective college student about salary expectations for graduates in business. Compare and contrast the expected salaries for accounting (including different subfields such as public, corporate, tax, audit, and so forth), marketing, management, and finance majors. Prepare a graph showing average starting salaries (and those for experienced professionals in those fields if available). To get this information, stop by your school's career services office; libraries also have this information. The website **JobStar.org** (click on "Salary Info") also can get you started.

TEAMWORK IN ACTION

P1 P2

BTN 14-3 The following calendar-year information is taken from the adjusted trial balance and other records of Dahlia Company.

Advertising expense	$ 19,125	Direct labor	$ 650,750
Depreciation expense—Office equipment	8,750	Indirect labor	182,500
Depreciation expense—Selling equipment	10,000	Office salaries expense	100,875
Depreciation expense—Factory equipment	32,500	Raw materials purchases	872,500
Inventories		Rent expense—Office space	21,125
Raw materials, beginning	177,500	Rent expense—Selling space	25,750
Raw materials, ending	168,125	Rent expense—Factory building	79,750
Work in process, beginning	15,875	Maintenance expense—Factory equipment	27,875
Work in process, ending	14,000	Sales	3,217,500
Finished goods, beginning	164,375	Sales salaries expense	286,250
Finished goods, ending	129,000	Factory utilities	60,500

Required

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1. *Each* team member is to be responsible for computing **one** of the following amounts. Do not duplicate your teammates' work.

Get any necessary amounts from teammates. Each member is to explain the computation to the team in preparation for reporting to class.

a. Direct materials used

b. Factory overhead

c. Total manufacturing costs

d. Total cost of work in process

e. Cost of goods manufactured

2. Check your cost of goods manufactured amount with the instructor. If it is correct, proceed to part 3.

3. *Each* team member is to be responsible for computing **one** of the following amounts. Do not duplicate your teammates' work. Get any necessary amounts from teammates. Each member is to explain the computation to the team in preparation for reporting to class.

a. Cost of goods sold

b. Gross profit

c. Total selling expenses

d. Total general and administrative expenses

e. Net income

ENTREPRENEURIAL DECISION

P1 C4

BTN 14-4 Teanna Bass of **Sweet Tea Cosmetics** understands and controls merchandising costs.

Required

1. How does a merchandiser such as Sweet Tea Cosmetics compute cost of goods sold? Provide examples of costs Teanna must monitor and control.

2. What are four goals of a total quality management process? *Hint:* The goals are listed in a “Point.” Assume Sweet Tea Cosmetics decides to manufacture its own makeup. How could the company use TQM to improve its business activities?

15 Job Order Costing

Chapter Preview

JOB ORDER COSTING

C1 Job order production

Job order vs. process operations

Production activities

Cost flows

Job cost sheet

NTK 15-1

MATERIALS AND LABOR COSTS

P1 Materials cost flows and documents

P2 Labor cost flows and documents

Linking job cost sheets with accounts

NTK 15-2, 15-3

OVERHEAD COSTS

P3 Predetermined overhead rate

Applied overhead

Actual overhead

Summary of cost flows

Reporting costs

NTK 15-4, 15-5

CLOSING OVERHEAD AND SERVICE USES

P4 Overhead account

Underapplied or overapplied overhead

Job order costing for services

A1 Pricing services

NTK 15-6

Learning Objectives

CONCEPTUAL

C1 Explain job order costing and job cost sheets.

ANALYTICAL

A1 Apply job order costing in pricing services.

PROCEDURAL

P1 Describe and record the flow of materials costs in job order costing.

P2 Describe and record the flow of labor costs in job order costing.

P3 Describe and record the flow of overhead costs in job order costing.

P4 Close overapplied and underapplied factory overhead.

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Chip Off the Old Block

"Preserve history with craftsmanship"—**MARK WALLACE**

DETROIT—Touring a warehouse of salvaged materials, Mark Wallace said that it "would be cool to build a guitar from old wood." After learning how to use a router, Mark built a prototype and founded his company, **Wallace Detroit Guitars** (**WallaceDetroitGuitars.com**).

Most of the reclaimed wood Mark uses is over 100 years old and bears unique scars and stains. "We take something that was once great but cast aside and turn it into something new and vital," says Mark. Each guitar takes about three months to build. "Every guitar we make is truly unique," explains Mark. "All are hand-made to precise customer specifications."

Businesses like Mark's that produce goods to customer order use job order costing to determine the cost of each order. Understanding what customers want, and the costs required, enables Mark to properly price orders. "Prices depend on the rarity of wood and the components our customers want," admits Mark. Job order costing enables Mark to control costs that are often the downfall of startups.

Social media has spurred momentum for Mark's venture. "The **Instagram** photo of my first guitar went viral." Through analytics, Mark saw that followers enjoy "photos of artisans crafting old wood into new guitars." His posts help drive sales, currently topping $100,000 and 50 guitars per year. Mark lives by the motto: "Go for it!"

ClarenceTabb Jr./Detroit News/AP Images

Sources: *Wallace Detroit Guitars website*, January 2021; *CNN Business*, August 2018; *Entrepreneur*, November 2017

JOB ORDER COSTING

C1

Explain job order costing and job cost sheets.

A **cost accounting system** accumulates production costs and assigns them to products and services. Managers use this information to control costs and set selling prices. Two basic types of cost accounting systems are *job order costing* and *process costing*. We describe job order costing in this chapter and process costing in the next chapter.

Job Order Production

Many companies produce customized products for specific customers. Each customized product is manufactured separately, and its production is called **job order production**, or *job order manufacturing*. Examples of job order production include a custom home, a factory building, custom jewelry, wedding invitations, tattoos, and audits by an accounting firm.

Production activities for a customized product represent a **job**. A key feature of job order production is the diversity of the products produced.

Each customer order is unique. For example, **Disney** produces movies according to unique scripts, actors, and set locations.

When a job involves producing more than one unit of a custom product, it is called a **job lot**. Examples of products produced as job lots include T-shirts for a 10K race and advertising signs for a chain of stores. The volume of production is typically low such as 200 T-shirts or 100 signs.

Job Order vs. Process Operations

Process operations, also called *process manufacturing* or *process production*, is the mass production of large quantities of similar products in a continuous flow of steps. For example, **Penn** uses process operations to make millions of tennis balls and **The Hershey Company** uses it to produce over a billion pounds of chocolate. Exhibit 15.1 lists key features of job order and process operations.

EXHIBIT 15.1

Comparing Job Order and Process Operations

Production Activities in Job Order Costing

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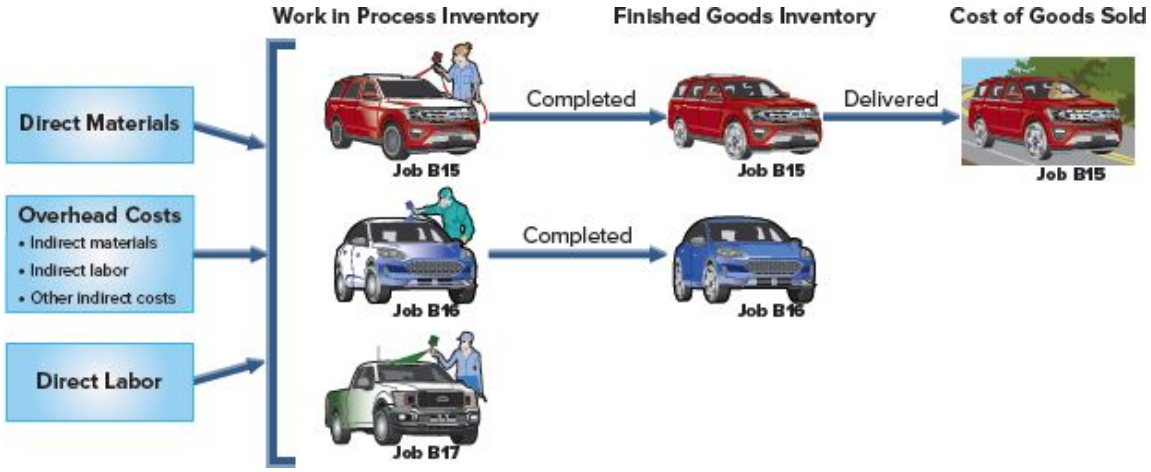
An overview of job order production activity and cost flows is shown in Exhibit 15.2. This exhibit shows the March production activity of Road Warriors, which customizes vehicles with paint, speakers, amplifiers, video systems, alarms, and reinforced exteriors.

EXHIBIT 15.2

Job Order Production Activities and Cost Flows



Job order production requires materials, labor, and overhead costs.

- *Direct materials* are key parts of a finished product and are clearly identified with one job.
- *Direct labor* is employee effort to directly convert materials to finished product on one job.
- *Overhead*, or *factory overhead*, includes manufacturing costs that indirectly support production of more than one job.

Common overhead items are depreciation on factory buildings and equipment, indirect materials, supervision and maintenance (indirect labor), factory insurance and property taxes, factory cleaning, and factory utilities.

Exhibit 15.2 shows that direct materials, direct labor, and overhead are added to three jobs started during March. Alarm systems and paint jobs are added to Jobs B15, B16, and B17. Job B16 also receives a high-end audio system. The company completed Job B15 in March and delivered it to the customer. At the end of March, Job B16 is in finished goods inventory and Job B17 is in work in process inventory.

Cost Flows

Manufacturing costs flow through Raw Materials Inventory, Work in Process Inventory, and Finished Goods Inventory until the related goods are sold. While a job is being produced, its costs are recorded in **Work in Process Inventory**. When a job is finished, its total costs are transferred from Work in Process Inventory to **Finished Goods Inventory**. When a finished job is delivered to a customer, its total costs are transferred from Finished Goods Inventory to **Cost of Goods Sold**.

These **general ledger** inventory accounts do not provide enough cost detail for managers to plan and control production activities. Managers need to know the costs of each individual job or job lot. **Subsidiary records** are created to store job-specific cost data and are described next.

Job Cost Sheet

A **job order costing system** is used to determine the cost of producing each job or job lot. A **job cost sheet** is a cost record maintained for each job. Exhibit 15.3 shows a job cost sheet for Road Warriors. This job cost sheet identifies the customer, the job number, the costs, and key dates. Only product costs are on job cost sheets. Direct materials and direct labor costs incurred on the job are on this sheet. For Job B15, the direct materials and direct labor costs total $700 and $1,000. *Estimated* overhead costs are included on job cost sheets using a process we explain later in the chapter. For Job B15, estimated overhead costs are $1,600. When each job is complete, the supervisor enters the completion date and signs the sheet. Managers use job cost sheets to monitor costs incurred and to predict costs for each job.

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EXHIBIT 15.3

Job Cost Sheet

Road Warriors — **JOB COST SHEET**

Customer's Name: Carroll Connor — Job No.: B15
Address: 1542 High Point Dr., Malibu, CA
Job Description: Alarm System and Paint on Ford Expedition
Date promised: March 15 — Date started: March 8 — Date completed: March 12

Direct Materials			Direct Labor			Overhead		
Date	Requisition	Cost	Date	Time Ticket	Cost	Date	Rate	Cost
Mar. 8	R-46	$700	Mar. 12	T-33	$1,000	Mar. 12	160% of Direct Labor Cost	$1,600
	Total	$700		Total	$1,000		Total	$1,600

REMARKS: Completed job on March 12, and delivered to customer on March 15. Met all specifications and requirements.

SUMMARY:

Materials	$ 700
Labor	1,000
Overhead	1,600
Total cost	$3,300

Signed: *C. Luther, Supervisor*

Direct Materials
+ Direct Labor
+ Overhead (estimated)
= Total job cost

Linking Job Cost Sheets with Accounts Balances in the accounts equal the sums of costs on job cost sheets as defined in the table below.

Account	Balance equals costs on job cost sheets for
Work in Process Inventory	All jobs not yet done
Finished Goods Inventory	All jobs complete but not yet sold
Cost of Goods Sold	All jobs sold in that period

Decision Insight

Target Costing Many producers determine a **target cost** for their jobs. Target cost is determined as follows: Expected selling price − Desired profit = Target cost. If the projected target cost of the job as determined by job costing is too high, the producer can apply *value engineering*, which is a method of determining ways to reduce job cost until the target cost is met. ■

NEED-TO-KNOW 15-1

Job Cost Sheet

C1

A manufacturer has the following costs for Job No. 501 that requires printing 200 custom T-shirts for a bikers' reunion.

Direct materials, from requisition R-22	$1,150
Direct labor, from time ticket T-31	$ 250
Estimated overhead	$ 400

1. Complete a (partial) job cost sheet and compute the total cost of this job lot.
2. Compute the cost per unit (T-shirt) for this job lot.

Solution

1.

Job No. 501	
Materials	$1,150
Labor	250
Overhead	400
Total cost	$1,800

2. Cost per unit = Total cost/ Total number of units in job lot
= $1,800/200 units
= $9 per T-shirt

Do More: QS 15-3, QS 15-4, QS 15-5, E 15-2, E 15-4

MATERIALS AND LABOR COSTS

P1

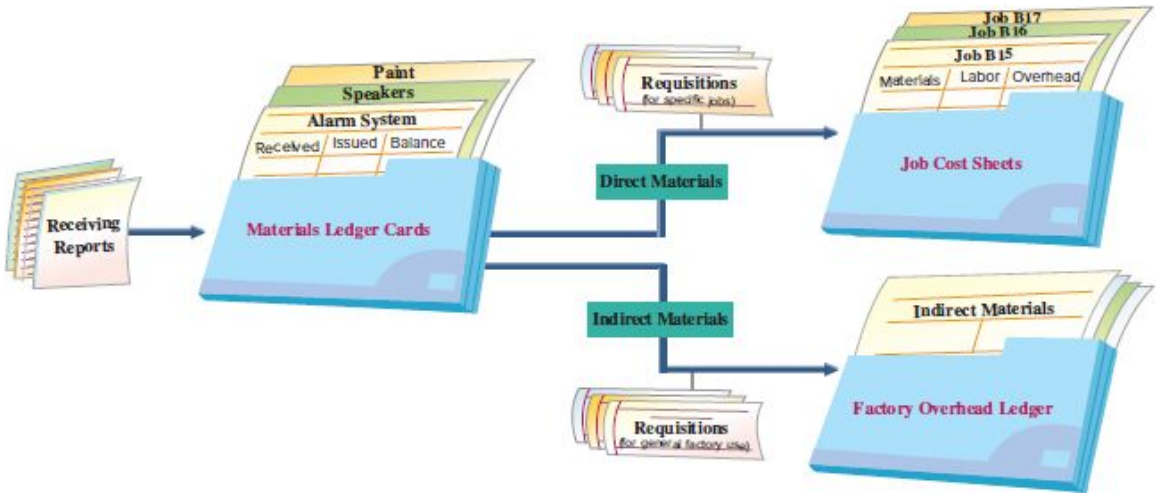
Describe and record the flow of materials costs in job order costing.

Materials Cost Flows and Documents

Let's continue with our Road Warriors example. It began March with $1,000 in Raw Materials Inventory and $0 balances in the Work in Process Inventory and Finished Goods Inventory accounts. The flow of materials costs is in Exhibit 15.4. When materials are received, employees count and inspect them and record the items' quantity and cost on a receiving report. The **receiving report** is used to record materials received in a materials ledger card. **Materials ledger cards** are perpetual records that are updated each time materials are purchased and each time materials are issued for use in production.

EXHIBIT 15.4

Materials Cost Flows



Materials Purchases Road Warriors purchases $2,750 of materials on credit on March 4. These raw materials include both direct and indirect

materials. This purchase is recorded below. Each materials ledger card is updated for the purchased materials.

Mar. 4	Raw Materials Inventory	2,750	
	Accounts Payable		2,750
	Purchase materials for production.		

Materials Use (Requisitions) Exhibit 15.4 shows that materials are commonly requisitioned, or requested, to be used on a specific job (direct materials) or as overhead (indirect materials). Direct materials are costs that *can* be cost-effectively traced to individual jobs, such as alarm systems. Indirect materials are costs that *cannot* be cost-effectively traced to individual jobs, such as the cost of electrical tape and glue.

Direct materials costs flow to job cost sheets. Indirect materials costs flow to the Factory Overhead general ledger account. The Factory Overhead account is a clearing (temporary) account consisting of indirect costs.

Exhibit 15.5 shows a materials ledger card for an alarm system. The card shows the stock number, location in the storeroom, maximum and minimum quantities available, and the reorder quantity. For example, two alarm systems were purchased on March 4 as recorded in receiving report C-71. After this purchase, the company has three alarm systems in inventory.

EXHIBIT 15.5

Materials Ledger Card

MATERIALS LEDGER CARD

Road Warriors
Los Angeles, California

Item	Alarm system	Stock No.	M–3	Location in Storeroom	Bin 7
Maximum quantity	5 units	Minimum quantity	1 unit	Quantity to reorder	2 units

	Received				Issued				Balance		
Date	Receiving Report Number	Units	Unit Price	Total Price	Requisition Number	Units	Unit Price	Total Price	Units	Unit Price	Total Price
									1	$600	$ 600
Mar. 4	C-71	2	$600	$1,200					3	600	1,800
Mar. 8					R–46	1	$600	$600	2	600	1,200

When materials are needed in production, a production manager prepares a **materials requisition** and sends it to the materials manager. For direct materials, the requisition shows the job number, the types of materials, and the quantities needed. On March 8, one alarm system was issued and recorded in requisition R-46.

Exhibit 15.6 shows the materials requisitions for Job B15, Job B16, and Job B17. For requisitions of indirect materials, the "Job No." line might read "For General Factory Use."

EXHIBIT 15.6

Materials Requisition

Requisitions often are accumulated by job and recorded in one journal entry. Road Warriors records its materials requisitions as follows.

Direct materials—requisitioned for specific jobs	
Job B15	$ 700
Job B16	800
Job B17	300
Total direct materials	$1,800

Mar. 8	Work in Process Inventory	1,800	
	Raw Materials Inventory		1,800
	Use of direct materials.		

Exhibit 15.7 shows the postings to Work in Process Inventory and Raw Materials Inventory general ledger accounts. The exhibit shows summary job cost sheets for all three jobs, and it shows a detailed partial job cost sheet for Job B15.

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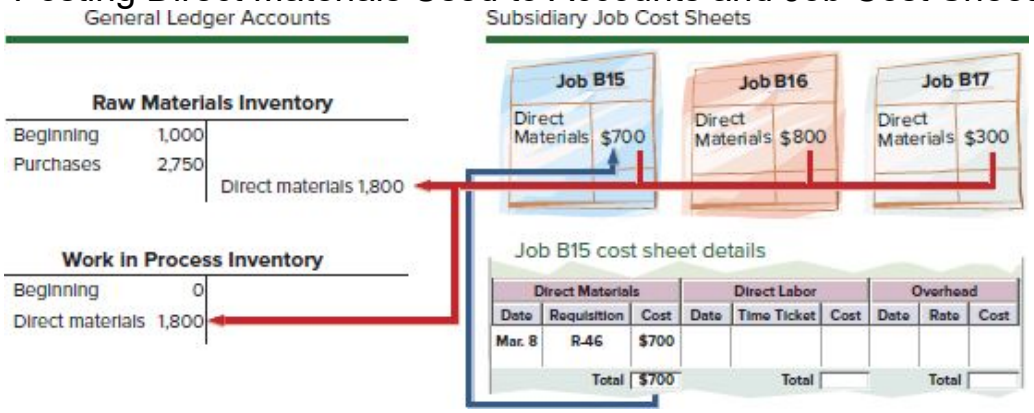
EXHIBIT 15.7

Posting Direct Materials Used to Accounts and Job Cost Sheet



The Raw Materials Inventory account began the month with $1,000 of beginning inventory; it was increased for purchases of $2,750. The $1,800 cost of direct materials used reduces Raw Materials Inventory and increases Work in Process Inventory. The total amount of direct materials used so far ($1,800) is reflected in the job cost sheets. Later we show the accounting for indirect materials. At this point, know that requisitions of indirect materials are not separately recorded on job cost sheets.

NEED-TO-KNOW 15-2

Recording Direct Materials

P1

Prepare journal entries to record the following transactions of a manufacturing company.

1. Purchased $1,200 of materials on credit for use in production.

2. Used $200 of direct materials on Job 1 and $300 of direct materials on Job 2.
3. Compute the ending balance of Raw Materials Inventory. Its beginning balance was $200.

Solution

1.

Raw Materials Inventory	1,200	
Accounts Payable		1,200
Purchase of materials on credit.		

2.

Work in Process Inventory	500	
Raw Materials Inventory		500
Use of direct materials.		

3. Ending raw materials inventory = Beginning raw materials inventory + Raw materials purchases – Direct materials used
= $200 + $1,200 – $500 = $900

Do More: QS 15-6, E 15-13

Labor Cost Flows and Documents

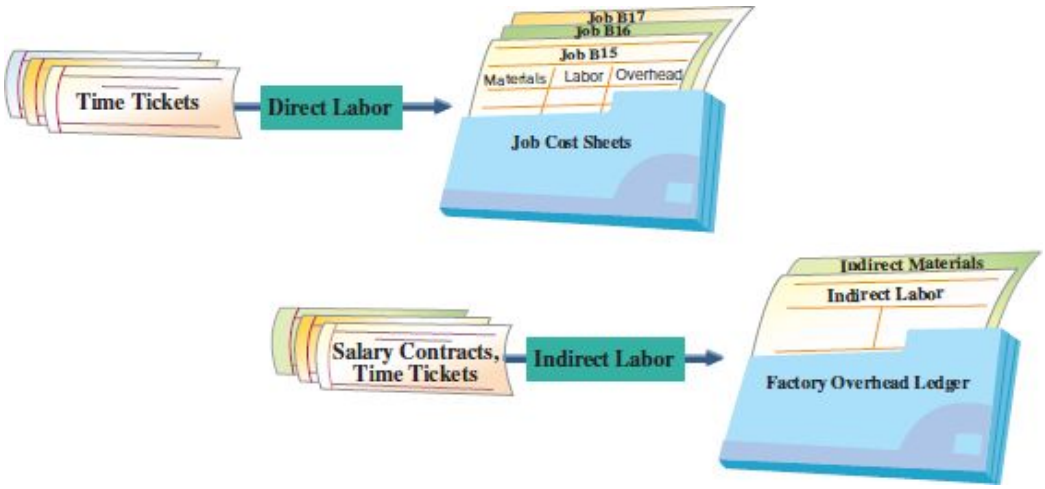
P2

Describe and record the flow of labor costs in job order costing.

Exhibit 15.8 shows that labor costs are classified as either direct or indirect. Direct labor costs flow to job cost sheets. To assign direct labor costs to individual jobs, companies use **time tickets** to track how much time employees spend on each job. This process is often automated. Employees swipe identification badges and a computer system assigns employees' hours worked to individual jobs.

EXHIBIT 15.8

Labor Cost Flows



Indirect labor includes factory costs like supervisor salaries and maintenance worker wages. These costs are not assigned directly to individual jobs. Instead, indirect labor costs flow to the Factory Overhead ledger account. page 581

Exhibit 15.9 shows time tickets for Jobs B15, B16, and B17.

EXHIBIT 15.9

Time Ticket

TIME TICKET No. T–35 Date March 30

Employee Name	Employee Number	Job No.
		B17

TIME TICKET No. T–34 Date March 21

Road Warriors

Employee Name	Employee Number	Job No.
		B16

TIME TICKET No. T–33 Date March 12

Road Warriors
Los Angeles, California

Employee Name	Employee Number	Job No.
T. Zeller	69	B15

Date	Start Time	End Time	Start Time	End Time	Total Hours	Hourly Rate	Amount
Mar. 10	8:00	12:00	1:00	5:00	8	$50	$400
Mar. 11	8:00	12:00	1:00	5:00	8	50	400
Mar. 12	8:00	12:00			4	50	200
Approved By C. Luther						Total	$1,000

Amount
$400
400
400
$1,200
$400
400
400
400
$2,000

Time tickets are often accumulated and recorded in one journal entry. For March, Road Warriors's direct labor costs total $4,200.

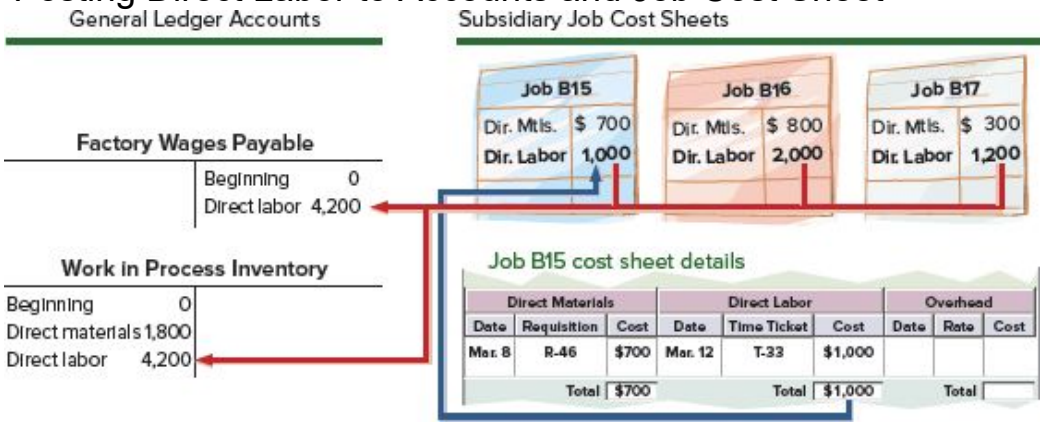
Direct labor—traceable to specific jobs	
Job B15	$1,000
Job B16	2,000
Job B17	1,200
Total direct labor	$4,200

Mar. 31	Work in Process Inventory	4,200	
	Factory Wages Payable		4,200
	Direct labor used.		

The entry for direct labor is posted to the Work in Process Inventory and Factory Wages Payable (or Cash) accounts. Exhibit 15.10 shows these postings. The exhibit also shows summary job cost sheets for all three jobs, and it shows a partial job cost sheet for Job B15.

EXHIBIT 15.10

Posting Direct Labor to Accounts and Job Cost Sheet



Time tickets are used to determine direct labor cost ($4,200) to assign to specific jobs. This total is the amount of direct labor posted to the Work in Process Inventory account. After this entry is posted, the balance in Work in Process Inventory is $6,000, consisting of $1,800 of direct materials and $4,200 of direct labor. Later we show the accounting for indirect labor, which is not separately recorded on job cost sheets.

NEED-TO-KNOW 15-3

Recording Direct Labor

P2

A company started two jobs in June, Job A1 and Job A2. Time tickets for June report 270 direct labor hours worked at a rate of $20 per direct labor hour. Job A1 used 150 direct labor hours and Job A2 used 120 direct labor hours.

1. What is cost of direct labor on Job A1's cost sheet and on Job A2's cost sheet?
2. Prepare the journal entry to record direct labor used.

Solution

1. Job A1's cost of direct labor is $3,000 (150 DLH × $20).

   Job A2's cost of direct labor is $2,400 (120 DLH × $20).

2.

Work in Process Inventory	5,400	
Factory Wages Payable		5,400
Direct labor used.		

Do More: QS 15-7, E 15-14

OVERHEAD COSTS

P3

Describe and record the flow of overhead costs in job order costing.

Unlike direct materials and direct labor, actual overhead costs *cannot* be cost-effectively traced to individual jobs. Still, each job's total cost must include *estimated* overhead costs.

Overhead Process Accounting for overhead costs follows the four-step process shown in Exhibit 15.11. Overhead accounting requires managers to first estimate what total overhead costs will be for the coming period and how to apply those costs to jobs. Managers cannot wait until the end of a period to allocate actual overhead to jobs because they need it in setting prices and monitoring job profitability. At the end of each period, the company closes its overhead account.

EXHIBIT 15.11

Four-Step Process for Overhead

$$\text{Predetermined overhead rate} = \frac{\text{Estimated overhead costs}}{\text{Estimated activity base}}$$

$$\text{Applied overhead} = \text{Overhead rate} \times \text{Actual amount of activity base used}$$

Close to Cost of Goods Sold for Actual Overhead – Estimated Overhead

① Set Predetermined Overhead Rate

Estimating overhead for a job requires a **predetermined overhead rate**, also called *predetermined overhead allocation* (or *application*) *rate*. This in turn requires an estimate of total overhead cost and an estimated activity base *before* the start of the period. Exhibit 15.12 shows how to compute a predetermined overhead rate. This rate is used during the period to apply estimated overhead to jobs, based on each job's *actual* usage of the activity.

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EXHIBIT 15.12

Predetermined Overhead Rate

$$\text{Predetermined overhead rate} = \frac{\text{Estimated overhead costs}}{\text{Estimated activity base}}$$

Estimated Activity Base The *activity* (or *allocation*) *base* is a measure of production, such as direct labor or machine hours. The activity base should relate to the use of overhead costs. The choice of which activity base to use affects the accuracy of job costs, which likely impacts prices set and other key decisions.

Diego Cervo/Shutterstock

Computing Predetermined Overhead Rate Let's return to Road Warriors and compute its predetermined overhead rate. At the start of the year, Road Warriors estimated total direct labor costs of $125,000 and total overhead costs of $200,000. Its predetermined overhead rate follows.

$$\frac{\$200{,}000}{\$125{,}000} = 160\% \text{ (or 1.6 times) of direct labor costs}$$

② Apply Estimated Overhead to Jobs

Overhead is applied to each job based on the actual activity base used for that job.

Applied overhead = Predetermined overhead rate × Actual activity base used

Activity base is direct labor cost for Road Warriors. Exhibit 15.13 shows overhead applied for its March production activity. Overhead costs for each job are often accumulated and recorded in one entry, as shown. Applied overhead is credited to Factory Overhead.

Point: Factory Overhead is a clearing (temporary) account that is closed to zero at each period-end.

EXHIBIT 15.13

Overhead Applied to Jobs

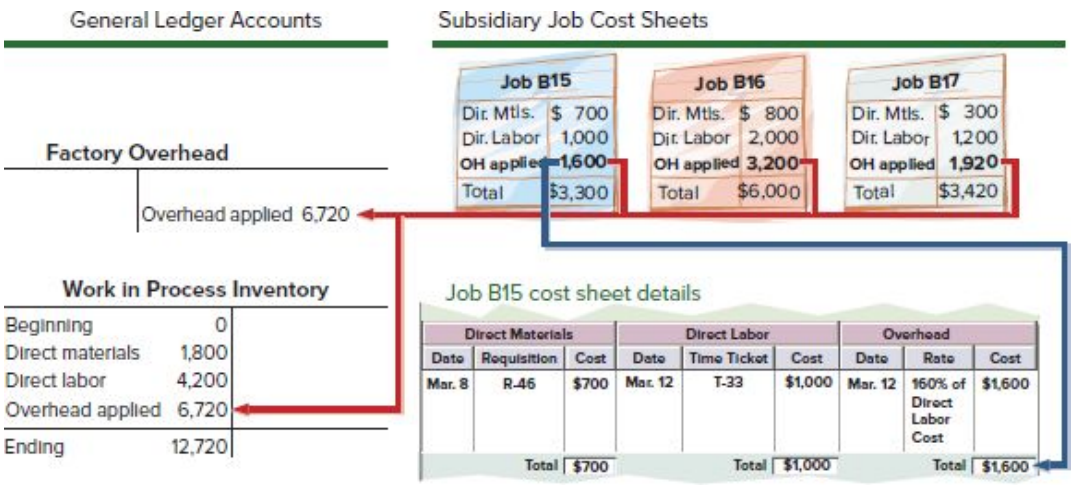
Job	Direct Labor Cost	Predetermined Overhead Rate	Applied Overhead
B15	$1,000	1.6	$1,600
B16	2,000	1.6	3,200
B17	1,200	1.6	1,920
Total	$4,200		$6,720

Mar. 31	Work in Process Inventory	6,720	
	Factory Overhead		6,720
	Apply overhead at 160% direct labor.		

This entry is posted to the Work in Process Inventory and the Factory Overhead accounts. Exhibit 15.14 shows these postings. The exhibit shows summary job cost sheets for all three jobs, and it shows a partial job cost sheet for Job B15.

EXHIBIT 15.14

Posting Overhead to Accounts and Job Cost Sheet



At this point, $6,720 of applied overhead has been posted to Work in Process Inventory and Factory Overhead accounts. The ending balance of $12,720 in the Work in Process Inventory account equals the sum of the ending balances in the job cost sheets.

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NEED-TO-KNOW 15-4

Recording Applied Overhead

P3

At the beginning of the year, a manufacturing company estimates it will incur $240,000 of overhead costs. The company applies overhead using machine hours and estimates it will use 1,600 machine hours for the year. During June, the company used 80 machine hours on Job 1 and 70 machine hours on Job 2.

1. Compute the predetermined overhead rate.
2. Determine overhead applied in June to (*a*) Job 1 and (*b*) Job 2.
3. Prepare the journal entry to record overhead applied for June.

Solution

1. $240,000⁄1,600 = $150 per machine hour.
2. (*a*) 80 × $150 = $12,000 applied to Job 1.

   (*b*) 70 × $150 = $10,500 applied to Job 2.
3.

Work in Process Inventory	22,500	
Factory Overhead		22,500
Applied overhead.		

Do More: QS 15-8, QS 15-9, QS 15-10, QS 15-11, E 15-17

③ Record Actual Overhead

We showed how applied (estimated) overhead costs are recorded on job cost sheets and in journal entries. We now show how *actual* overhead costs are accounted for, and that they are *not* recorded on job cost sheets.

Factory overhead includes indirect materials, indirect labor, and other overhead costs. These costs are recorded from materials requisition forms for indirect materials, and from salary contracts or time tickets for indirect labor. Other sources of actual overhead costs include vouchers authorizing payment for factory items such as supplies and utilities, and journal entries for costs such as depreciation on factory assets. Actual overhead costs are recorded with debits to the Factory Overhead account. We show these entries next.

Point: Nonmanufacturing costs such as advertising and sales commissions are not overhead, but instead are period costs and reported on the income statement.

Raw Materials Inventory

Beginning	1,000		
Purchases	2,750		
		Direct materials	1,800
		Indirect materials	550
Ending	1,400		

Record Indirect Materials Used During March, Road Warriors incurred $550 of actual indirect materials costs, which leads to the following entry. This entry is posted to the Factory Overhead and Raw Materials Inventory accounts. Unlike the recording of *direct* materials, the actual *indirect* materials costs incurred are *not* recorded in Work in Process Inventory and are *not* posted to job cost sheets.

Mar. 31	Factory Overhead.	550	
	Raw Materials Inventory		550
	Record indirect materials used.		

Record Indirect Labor Used During March, Road Warriors incurred $1,100 of actual indirect labor costs, which leads to the following entry. This entry is posted to the Factory Overhead and Factory Wages Payable accounts. Unlike the recording of *direct* labor, the actual *indirect* labor costs incurred are *not* recorded in Work in Process Inventory and are *not* posted to job cost sheets.

Mar. 31	Factory Overhead	1,100	
	Factory Wages Payable		1,100
	Record indirect labor used.		

Record Other Overhead Costs During March, Road Warriors page 585 incurred $5,270 of actual other overhead costs. These costs often include items such as depreciation on factory equipment, factory building rent, factory utilities, expired factory insurance, and other costs indirectly related to production. These costs are recorded with a debit to Factory Overhead and credits to other accounts such as Cash, Accounts Payable, Utilities Payable, and Accumulated Depreciation. The entry to record Road Warriors's actual other overhead costs for March follows.

Mar. 31	Factory Overhead	5,270	
	Accumulated Depreciation—Factory Equipment		2,400
	Rent Payable		1,620
	Utilities Payable		250
	Prepaid Insurance		1,000
	Actual other overhead costs.		

This entry is posted to the Factory Overhead account. These actual overhead costs are *not* recorded in Work in Process Inventory and are *not* posted to job cost sheets. Only applied overhead is recorded in Work in Process Inventory and posted to job cost sheets.

Factory Overhead

Indirect materials	550	6,720	Overhead applied
Indirect labor	1,100		
Other overhead	5,270		

NEED-TO-KNOW 15-5

Recording Actual Overhead

P3

A manufacturing company used $400 of indirect materials and $2,000 of indirect labor during the period. The company also incurred $1,200 for depreciation on factory equipment and $300 for factory utilities. Prepare the journal entry to record actual overhead costs.

Solution

Factory Overhead	3,900	
Raw Materials Inventory		400
Factory Wages Payable		2,000
Accumulated Depreciation—Factory Equipment		1,200
Utilities Payable		300
Actual other overhead costs.		

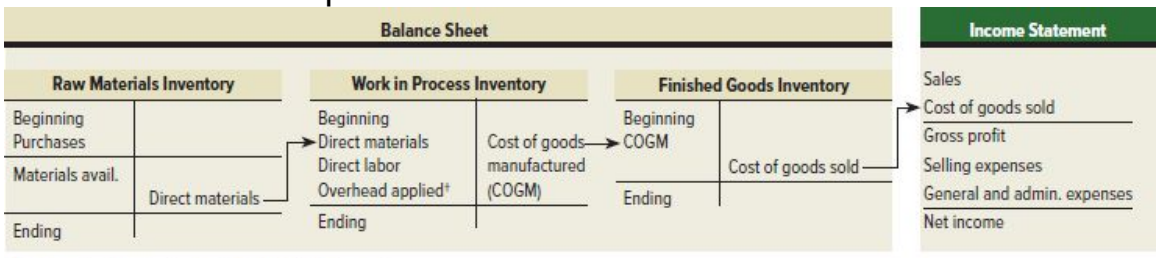
Do More: E 15-13, E 15-18

Cost Flows to Financial Statements

Exhibit 15.15 shows how costs for a manufacturing company flow to financial statements. We see that costs of direct materials used, direct labor used, and overhead applied flow through the Work in Process Inventory and Finished Goods Inventory balance sheet accounts. The cost of goods manufactured (COGM) is computed on the schedule of cost of goods manufactured. When goods are sold, their costs are transferred from Finished Goods Inventory on the balance sheet to the income statement as cost of goods sold.

EXHIBIT 15.15

Cost Flows and Reports



†Predetermined overhead rate × Actual activity base used.

Point: Sales revenue is also recorded for Job B15 (see Exhibit 15.17). page 586

For Road Warriors, the entries to record the flow of costs from Work in Process Inventory to Finished Goods Inventory (for Jobs B15 and B16), and from Finished Goods Inventory to Cost of Goods Sold (for Job B15), follow.

Mar. 31	Finished Goods Inventory	9,300	
	Work in Process Inventory		9,300
	Transfer cost of goods manufactured for Jobs B15 & B16.		

Mar. 31	Cost of Goods Sold	3,300	
	Finished Goods Inventory		3,300
	Record cost of goods sold for Job B15.		

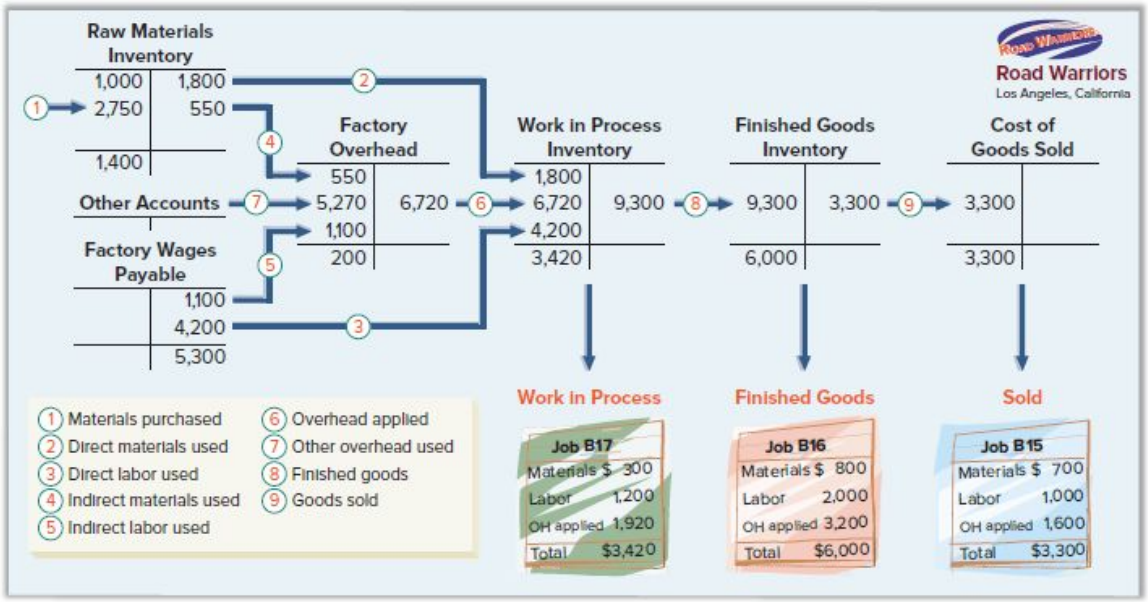
Period costs (selling expenses and general and administrative expenses) do not impact inventory accounts. As a result, they do not impact cost of goods sold, and they are not reported on the schedule of cost of goods manufactured. They are reported on the income statement as operating expenses.

Accounting for Cost Flows The upper part of Exhibit 15.16 shows the flow of direct materials, direct labor, and overhead costs through the inventory accounts and eventually cost of goods sold. Each numbered cost flow reflects journal entries.

The lower part of Exhibit 15.16 shows job cost sheets at the period-end. The costs assigned to the job in process (Job B17) equal the $3,420 balance in Work in Process Inventory. Costs assigned to the completed Job B16 equal the $6,000 balance in Finished Goods Inventory. The balances in Raw Materials Inventory, Work in Process Inventory, and Finished Goods Inventory are reported on the end-of-period balance sheet. The costs assigned to the sold Job B15 equals the $3,300 balance in Cost of Goods Sold. This is reported on the income statement for the period.

EXHIBIT 15.16

Job Order Cost Flows and Ending Job Cost Sheets



Point: *Actual* overhead is debited to Factory Overhead. *Applied* overhead is credited to Factory Overhead.

Exhibit 15.17 shows the journal entries. Each entry is numbered to link with the arrow lines in Exhibit 15.16. Exhibit 15.17 concludes with the sale of Job B15 for $5,500.

EXHIBIT 15.17

Entries for Job Order Costing

①	Raw Materials Inventory	2,750	
	Accounts Payable		2,750
	Acquired raw materials.		
②	Work in Process Inventory	1,800	
	Raw Materials Inventory		1,800
	Direct materials used.		
③	Work in Process Inventory	4,200	
	Factory Wages Payable		4,200
	Direct labor used.		
④	Factory Overhead	550	
	Raw Materials Inventory		550
	Indirect materials used.		
⑤	Factory Overhead	1,100	
	Factory Wages Payable		1,100
	Indirect labor used.		
⑥	Work in Process Inventory	6,720	
	Factory Overhead		6,720
	Apply overhead at 160% of direct labor.		

⑦	Factory Overhead	5,270	
	Accumulated Depreciation—Factory Equipment		2,400
	Rent Payable		1,620
	Utilities Payable		250
	Prepaid Insurance		1,000
	Actual overhead costs.		
⑧	Finished Goods Inventory	9,300	
	Work in Process Inventory		9,300
	Record completion of Jobs B15 and B16.		
⑨	Cost of Goods Sold	3,300	
	Finished Goods Inventory		3,300
	Record cost of goods sold for Job B15.		
⑩	Accounts Receivable	5,500	
	Sales		5,500
	Record sale of Job B15.		

Using Job Cost Sheets for Managerial Decisions

Controlling Managers depend on timely information in job cost sheets. In *controlling* operations, managers assess the profitability of the company's products or services. Road Warriors completed and sold Job B15 and earned a gross profit of $2,200 ($5,500 selling price − $3,300 cost of goods sold). If this gross profit is higher than expected, managers will try to determine if there are production efficiencies that can be page 587 applied to future jobs. For example, has the business found a way to reduce the amount of direct labor? If gross profit is low, managers will determine if costs are too high. In this case, can cheaper raw materials be used without sacrificing product quality? Is the company using costly overtime to complete jobs? Managers can also evaluate costs to date for in-process jobs (B17) to determine whether costs are as planned.

Planning In *planning* future production, managers consider selling prices. Can the company raise selling prices without losing business? Can the company match competitors' price cuts and earn profit? Managers can use information in job cost sheets to focus efforts toward more profitable types of jobs. The detailed and timely information in job cost sheets helps managers make better decisions for each job and for the business as a whole.

Bidding Job costs can be used in *bidding* on new custom jobs. Some companies use **cost-plus pricing**, where a markup is added to cost to yield a target price. For example, if the estimated production costs for a potential job are $1,000 and Road Warriors wants a markup of 30% of production costs, it could bid a price of $1,300 (computed as $1,000 + [$1,000 × 30%]).

Schedule of Cost of Goods Manufactured

Road Warriors' schedule of cost of goods manufactured is in Exhibit 15.18. This schedule is similar to that in the previous chapter, with one key difference: *Total manufacturing costs include overhead applied, not actual overhead costs*.

EXHIBIT 15.18

Schedule of Cost of Goods Manufactured

ROAD WARRIORS Schedule of Cost of Goods Manufactured For Month Ended March 31	
Direct materials used	$ 1,800
Direct labor	4,200
Factory overhead applied	6,720
Total manufacturing costs	12,720
Add work in process inventory, beginning	0
Total cost of work in process	12,720
Less work in process inventory, ending	3,420
Cost of goods manufactured	$ 9,300

Financial Statements

page 588

Road Warriors' income statement for March and a partial balance sheet as of March 31 follow. The income statement reports sales and cost of goods sold information from Exhibit 15.17. Selling expenses of $400 and general and administrative expenses of $1,200 are provided by management. The partial balance sheet reports inventory account balances from Exhibit 15.16.

ROAD WARRIORS Income Statement For Month Ended March 31	
Sales	$5,500
Cost of goods sold	3,300
Gross profit	2,200
Selling expenses	400
General and administrative expenses	1,200
Net income	$ 600

ROAD WARRIORS Inventory Balances on Balance Sheet March 31	
Current assets	
Raw materials inventory	$ 1,400
Work in process inventory	3,420
Finished goods inventory	6,000
Total inventory	$10,820

CLOSING OVERHEAD

P4

Close overapplied and underapplied factory overhead.

Refer to the debits in the Factory Overhead account in Exhibit 15.16 or Exhibit 15.17. The total cost of *actual* factory overhead during March is $6,920 ($550 + $5,270 + $1,100). The $6,920 actual overhead costs do not equal the $6,720 overhead *applied* to work in process inventory (see ⑥ in Exhibit 15.17). This leaves a debit balance of $200 in the Factory

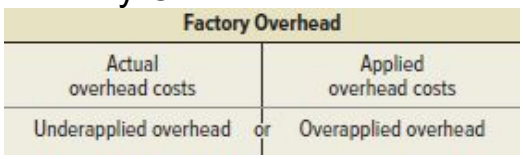
Overhead account. Because it is hard to precisely estimate future costs, actual overhead rarely equals applied overhead. Companies wait until the end of the period to close the Factory Overhead account for differences between actual and applied overhead. We show how this is done.

Factory Overhead Account

Exhibit 15.19 shows the Factory Overhead account. The company applies overhead (credits the Factory Overhead account) using a predetermined rate estimated at the beginning of the period. During the period, the company records actual overhead costs with debits to the Factory Overhead account. At period-end, we determine whether actual overhead is more or less than applied overhead.

EXHIBIT 15.19

Factory Overhead T-account



- When actual overhead is *more* than applied overhead, the remaining debit balance in the Factory Overhead account is **underapplied overhead**.
- When actual overhead is *less* than applied overhead, the resulting credit balance in the Factory Overhead account is **overapplied overhead**.

When overhead is underapplied, jobs have not been charged enough overhead during the period, and cost of goods sold is undercosted. When overhead is overapplied, jobs have been charged too much overhead during the period, and cost of goods sold is overcosted. In both cases, we close Factory Overhead to Cost of Goods Sold with a journal entry, see Exhibit 15.20.

EXHIBIT 15.20

Closing Factory Overhead

Overhead Costs	Overhead Balance	Overhead Is	Jobs Are	Journal Entry Required		
Actual > Applied	Debit	Underapplied	Undercosted	Cost of Goods Sold	#	
				Factory Overhead		#
Actual < Applied	Credit	Overapplied	Overcosted	Factory Overhead	#	
				Cost of Goods Sold . . .		#

page 589

④ Close Underapplied or Overapplied Overhead

Road Warriors applied $6,720 of overhead to jobs during March, but it incurred actual overhead of $6,920 during March. This means the Factory Overhead account has a debit balance of $200, see the following T-account.

Factory Overhead			
Indirect materials	550	6,720	Overhead applied
Indirect labor	1,100		
Other overhead	5,270		
Underapplied overhead	200		

Point: When underapplied or overapplied overhead is material, the amount can be divided among Cost of Goods Sold, Finished Goods Inventory, and Work in Process Inventory accounts. This is covered in advanced courses.

The $200 debit balance is *underapplied overhead*. This means the balances in Work in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold understate the manufacturing costs incurred. Assuming this difference is immaterial, it is closed to Cost of Goods Sold with the following entry.

Mar. 31	Cost of Goods Sold	200	
	Factory Overhead		200
	Close underapplied overhead costs.		

The $200 debit (increase) to Cost of Goods Sold reduces net income by $200. After this entry, the Factory Overhead account has a zero balance (is closed). Cost of Goods Sold now reflects actual overhead costs for the period. The entry to close Factory Overhead at period-end does not impact any job cost sheets. *Note:* If instead we had overapplied overhead at the end of the period, we would debit Factory Overhead and credit Cost of Goods Sold for the amount.

NEED-TO-KNOW 15-6

Closing Factory Overhead

P4

A manufacturing company applied $300,000 of overhead to its jobs during the period. Prepare the journal entry to close over- or underapplied overhead to Cost of Goods Sold for each of the following two separate cases.

1. Actual overhead costs equal $305,000.
2. Actual overhead costs equal $298,500.

Solution

1.

Cost of Goods Sold	5,000	
Factory Overhead		5,000
Close underapplied overhead to Cost of Goods Sold.		

2.

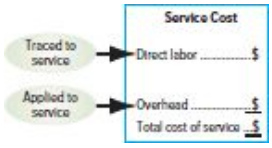
Factory Overhead	1,500	
Cost of Goods Sold		1,500
Close overapplied overhead to Cost of Goods Sold.		

Do More: QS 15-18, QS 15-19, QS 15-20, QS 15-21, E 15-25, E 15-26, E 15-27

Job Order Costing of Services

Job order costing also applies to service companies. Service companies often perform custom services for specific customers. Examples include an accountant auditing a client's financial statements, an interior designer remodeling an office, a wedding consultant planning and supervising a reception, and a lawyer defending a client.

Job order costing has some important differences for service firms.



- Most service firms do not have raw materials inventory nor finished goods inventory. However, they do have inventories of supplies, and they can have services in process inventory. Often these supplies are immaterial and are considered overhead costs.
- Direct labor is often used to apply overhead because service firms do not use direct materials.
- Service firms typically use different account titles, for example **Services in Process Inventory** and **Services Overhead**. When service jobs are completed, costs are transferred from Services in Process Inventory to **Cost of Services Provided**.

Exhibit 15.21 shows the flow of costs for a service firm called AdWorld, a developer of advertising materials. During the month, AdWorld worked on custom advertising campaigns for clients that wanted ads for three different platforms: mobile devices, television, and radio. In this chapter's Decision Analysis section, we show an example of using job order costing to price advertising services for AdWorld.

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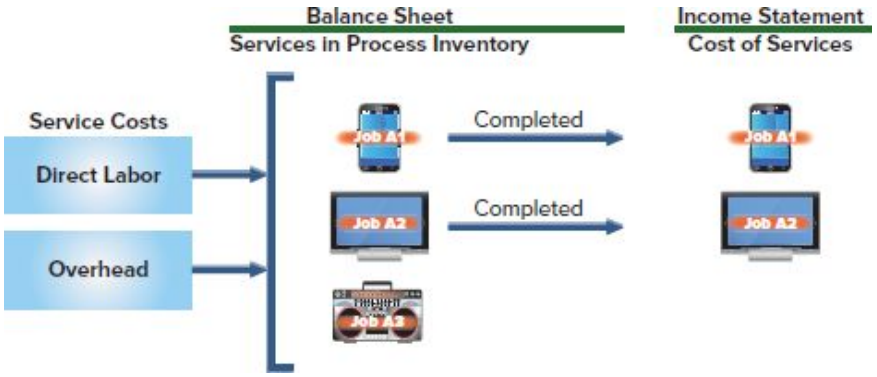
EXHIBIT 15.21

Flow of Costs for Service Firm



Analytics Insight

Picture of Health Health care providers use electronic records and data analytics to reduce costs and improve patient care. *Risk scores*, which combine data from lab tests, biometrics, health insurance claims, and health surveys, enable doctors to customize individual patient treatment and prevention plans. By analyzing patterns in historical patient data, doctors can better diagnose issues, plan better care, and reduce costs. ■

CORPORATE SOCIAL RESPONSIBILITY

Jesse David Green

Professional service firms in accounting, consulting, law, and financial services compete for highly talented employees with strong technical skills. In addition, a more diverse workforce is likely to lead to different points of view that arguably can produce even better services and ultimately more profit for the company. Enhancing workforce diversity can also help attract and retain talented people.

Although workforce diversity is not recorded on job cost sheets, many companies measure and report it. Along these lines, the Sustainability Accounting Standards Board has developed suggested reporting guidelines for professional service firms. The SASB recommends that companies disclose information on gender and ethnicity for both senior management employees and all other employees.

Consistent with SASB guidelines, the **United States Postal Service (USPS)**, a leading employer of women and minorities, discloses that women comprise roughly 40% and minorities comprise roughly 40% of its overall workforce. Moreover, roughly 21% of USPS's employees are Black, 8% Hispanic, and 8% Asian.

Wallace Detroit Guitars, the focus of this chapter's opening feature, uses reclaimed wood as direct materials in making electric guitars. Founder Mark Wallace requires his wood to be "responsibly harvested, and never from a property that could be renovated." He also sources his wood through local non-profit organizations that train and employ local residents. "It's exciting," says Mark, "we are revitalizing Detroit."

Decision Analysis — Pricing for Services

A1

Apply job order costing in pricing services.

The chapter describes job order costing mainly within a manufacturing setting. However, service providers also use job order costing. Consider AdWorld, a service company that prepares advertisements. Each customer has unique requirements, so costs for each individual job are tracked separately.

AdWorld uses two types of direct labor: designers ($65 per hour) and staff ($50 per hour). It applies overhead costs using a predetermined overhead rate of $108 per direct labor hour. For each job, AdWorld estimates the number of designer and staff hours needed. Then, total costs of each job are determined using job order costing.

To demonstrate, a manufacturer requests a quote from AdWorld for an advertising engagement. AdWorld estimates that the job will require 43 designer hours and 61 staff hours. Total estimated cost for this job follows.

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Estimated Job Cost—Advertising Services	
Direct Labor	
Designers (43 hours × $65)	$ 2,795
Staff (61 hours × $50)	3,050
Total direct labor	5,845
Overhead	
Total overhead (104 hours × $108)	11,232
Total estimated job cost	$17,077

AdWorld can use this cost information to help determine the price quote for the job. If AdWorld's normal pricing policy is to apply a markup of 18% on total costs, it would compute a quoted price as follows. *Hint:* An 18% markup on cost is the same as saying price is 118% of total cost.

$$\text{Price Quote} = 118\% \times \$17{,}077 = \$20{,}151.$$

AdWorld must also consider the market, that is, how much competitors will quote for this job. Competitor information is often unavailable. Therefore, AdWorld's managers must use estimates based on their assessment of the competitive environment.

	Price Quote
Job cost	$17,077
Markup (18%)	3,074
Price	$20,151

Service companies can use the *gross profit ratio*, also called *gross margin* ratio, computed as follows.

$$\text{Gross profit ratio} = \frac{\text{Service revenue} - \text{Cost of services}}{\text{Service revenue}}$$

A higher gross profit ratio indicates a company is more able to submit a lower price quote. This ability increases when a company increases its gross profit ratio. This also applies when comparing companies: the company with the higher gross profit ratio has more ability to bid a lower price for a job.

Decision Maker

Sales Manager As AdWorld's sales manager, you are planning to quote a price of $20,151 (computed above) for the advertising job. However, you learn that three other agencies are likely to bid for the same job, and that their quotes will range from $16,500 to $22,000. What price should you quote? What factors other than cost must you consider? ■ *Answer:* One option is to apply normal pricing policy and quote a price of $20,151. It is, however, useful to assess competitor pricing, especially in terms of service quality and other benefits. Although price is important, factors such as quality and timeliness (responsiveness) of suppliers are also important. Thus, another option is to highlight these factors.

NEED-TO-KNOW 15-7

COMPREHENSIVE

Job Costs, Journal Entries, and Schedule of Cost of Goods Manufactured

Miller Company reports the following for its job order production activities for May.

Raw materials purchases	$16,000	Indirect materials	$5,000
Direct materials used	8,450	Indirect labor	3,500
Direct labor	11,900	Other factory overhead	9,500

Miller's predetermined overhead rate is 150% of direct labor cost. Job cost sheet information for the three jobs worked on during May follows.

	Job 401	Job 402	Job 403
Work in process inventory, April 30			
Direct materials used (in April)	$3,600		
Direct labor used (in April)	1,700		
Overhead applied (April)	2,550		
Costs incurred in May			
Direct materials used	3,550	$3,500	$1,400
Direct labor used	5,100	6,000	800
Overhead applied	?	?	?
Status on May 31	Finished (sold)	Finished (unsold)	In process

Required

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1. Determine the cost for factory overhead, both actual and applied, during May. Compute the amount of any over- or underapplied overhead on May 31.
2. Compute the total cost of (*a*) each job as of May 31, (*b*) the May 31 inventories for both Work in Process and Finished Goods, and (*c*) the cost of goods sold for May.
3. Prepare journal entries for the month to record each part *a* through *f*.
   - **a.** Materials purchases (on credit), direct materials used, direct labor used, and overhead applied.
   - **b.** Actual overhead costs, consisting of indirect materials, indirect labor, and other overhead costs paid in cash.
   - **c.** Transfer of each completed job to the Finished Goods Inventory account.
   - **d.** Record cost of goods sold.
   - **e.** Record sale (on credit) of Job 401 for $35,000.
   - **f.** Close any underapplied or overapplied overhead in Factory Overhead to Cost of Goods Sold.
4. Prepare a schedule of cost of goods manufactured for May.

SOLUTION

1. Actual and applied factory overhead, and under- or overapplied.

Actual overhead	
Indirect materials	$ 5,000
Indirect labor	3,500
Other factory overhead	9,500
Total actual overhead	18,000
Overhead applied (150% × $11,900)	17,850
Underapplied overhead	$ 150

2. **a.** Total cost of each job.

	401	402	403
Work in process, April 30			
Direct materials used (in April)	$ 3,600		
Direct labor used (in April)	1,700		
Overhead applied (April)	2,550		
Costs incurred in May			
Direct materials used	3,550	$ 3,500	$1,400
Direct labor used	5,100	6,000	800
Overhead applied (150% of direct labor)	7,650	9,000	1,200
Total cost of each job	$24,150	$18,500	$3,400

b. Work in Process Inventory (Job 403) = $3,400

Finished Goods Inventory (Job 402) = $18,500

c. Cost of goods sold for May (Job 401) = $24,150

3. Journal entries.

a. Record raw materials purchases, direct materials used, direct labor used, and overhead applied.

Raw Materials Inventory	16,000	
Accounts Payable		16,000
Record materials purchases.		
Work in Process Inventory	8,450	
Raw Materials Inventory		8,450
Direct materials used.		

Work in Process Inventory	11,900	
Factory Wages Payable		11,900
Direct labor used.		
Work in Process Inventory	17,850	
Factory Overhead		17,850
Overhead applied to jobs.		

b. Record actual overhead costs.

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Factory Overhead	5,000	
Raw Materials Inventory		5,000
Indirect materials used.		
Factory Overhead	3,500	
Factory Wages Payable		3,500
Indirect labor used.		
Factory Overhead	9,500	
Cash		9,500
Record actual other overhead.		

c. Transfer cost of completed jobs to Finished Goods Inventory.

Finished Goods Inventory	42,650	
Work in Process Inventory		42,650
Record completion of jobs.		
$24,150 Job 401 + $18,500 Job 402.		

d. Record cost of job sold.

Cost of Goods Sold	24,150	
Finished Goods Inventory		24,150
Record costs for sale of Job 401.		

e. Record sales for job sold.

Accounts Receivable	35,000	
Sales		35,000
Record sale of Job 401.		

f. Close underapplied overhead to cost of goods sold.

Cost of Goods Sold	150	
Factory Overhead		150
Close underapplied overhead.		

4.

MILLER COMPANY
Schedule of Cost of Goods Manufactured
For Month Ended May 31

Direct materials used	$ 8,450
Direct labor	11,900
Factory overhead applied	17,850
Total manufacturing costs	38,200
Add: work in process inventory, beginning	7,850
Total cost of work in process	46,050
Less: work in process inventory, ending	3,400
Cost of goods manufactured	$42,650

Summary: Cheat Sheet

JOB ORDER COSTING

Job: Production of a custom product.

Job lot: Producing more than one unit of a custom product.

Job cost sheet: Cost record kept for each job or job lot.

Direct materials used in manufacturing and clearly identified with one job.

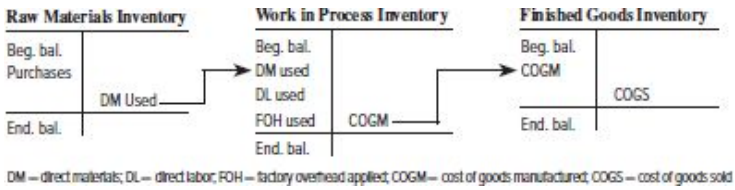
Direct labor is employee effort on one specific job.

Overhead costs support production of more than one job.

Direct materials
+ Direct labor
+ Overhead applied
= Total job cost

→ Total $ amounts on all job cost sheets = General ledger balances of Work in Process Inventory, Finished Goods Inventory, and COGS.

Flow of Manufacturing Costs



DM = direct materials; DL = direct labor; FOH = factory overhead applied; COGM = cost of goods manufactured; COGS = cost of goods sold

MATERIALS AND LABOR COSTS

Acquire raw materials

Raw Materials Inventory	2,750	
Accounts Payable		2,750

Record *direct* materials used

Work in Process Inventory	1,800	
Raw Materials Inventory		1,800

Record *direct* labor used

Work in Process Inventory	4,200	
Factory Wages Payable		4,200

OVERHEAD COSTS

$$\text{Predetermined overhead rate} = \frac{\text{Estimated overhead costs}}{\text{Estimated activity base}}$$

$$\text{Applied overhead} = \text{Predetermined overhead rate} \times \text{Actual activity base used}$$

Record *indirect* materials used

Factory Overhead	550	
Raw Materials Inventory		550

Record *indirect* labor used

Factory Overhead	1,100	
Factory Wages Payable		1,100

Apply overhead using predetermined rate

Work in Process Inventory	6,720	
Factory Overhead		6,720

Record *actual* overhead costs

Factory Overhead	5,270	
Accumulated Depreciation—Factory Equipment		2,400
Rent Payable		1,620
Utilities Payable		250
Prepaid Insurance		1,000

Record completion of jobs

Finished Goods Inventory	9,300	
Work in Process Inventory		9,300

Record cost of goods sold for sold jobs

Cost of Goods Sold	3,300	
Finished Goods Inventory		3,300

Record sales for sold jobs

Accounts Receivable	5,500	
Sales		5,500

CLOSING OVERHEAD

Factory Overhead		
Actual overhead costs		Applied overhead costs
Underapplied overhead	or	Overapplied overhead

Close overhead and COGS at period-end

Overhead Costs	Overhead Balance	Overhead Is	Journal Entry Required	
Actual > Applied	Debit	Underapplied	Cost of Goods Sold.....	#
			Factory Overhead	#
Actual < Applied	Credit	Overapplied	Factory Overhead.....	#
			Cost of Goods Sold	#

ROAD WARRIORS
Schedule of Cost of Goods Manufactured
For Month Ended March 31

Direct materials used	$ 1,800
Direct labor	4,200
Factory overhead applied	6,720
Total manufacturing costs	12,720
Add work in process inventory, beginning	0
Total cost of work in process	12,720
Less work in process inventory, ending	3,420
Cost of goods manufactured	$ 9,300

Key Terms

Cost accounting system (575)

Cost of Goods Sold (576)

Cost of Services Provided (590)

Cost-plus pricing (587)

Finished Goods Inventory (576)

General ledger (576)

Job (575)

Job cost sheet (576)

Job lot (575)

Job order costing system (576)

Job order production (575)

Materials ledger card (578)

Materials requisition (579)

Overapplied overhead (588)

Predetermined overhead rate (582)

Process operations (575)

Receiving report (578)

Services in Process Inventory (590)

Services Overhead (590)

Subsidiary records (576)

Target cost (577)

Time ticket (580)

Underapplied overhead (588)

Work in Process Inventory (576)

Multiple Choice Quiz

1. A company's predetermined overhead rate is 150% of its direct labor costs. How much overhead is applied to a job that used total direct labor costs of $30,000?
   - **a.** $15,000
   - **b.** $30,000
   - **c.** $45,000
   - **e.** $75,000
   - **d.** $60,000
2. A company uses direct labor costs to apply overhead. Its costs for the period are direct materials, $45,000; direct labor, $35,000; and overhead applied, $38,500. What is its predetermined overhead rate?
   - **a.** 10%
   - **b.** 110%
   - **c.** 86%

d. 91%

e. 117%

3. A company's ending inventory of finished goods has a total cost of $10,000 and consists of 500 units. If the overhead applied to these goods is $4,000 and the predetermined overhead rate is 80% of direct labor costs, how much direct materials cost was incurred in producing these 500 units?

a. $10,000

b. $6,000

c. $4,000

d. $5,000

e. $1,000

4. A company's Work in Process Inventory T-account follows. page 595

Work in Process Inventory		
Beginning	9,000	
Direct materials	94,200	
Direct labor	59,200	Cost of goods manufactured ?
Overhead applied	31,600	
Ending	17,800	

The cost of goods manufactured is

a. $193,000.

b. $211,800.

c. $185,000.

d. $144,600.

e. $176,200.

5. At the end of its current period, a company's overhead was underapplied by $1,500. This amount is not material. The company should

a. credit the $1,500 to Finished Goods Inventory.

b. credit the $1,500 to Cost of Goods Sold.

c. debit the $1,500 to Cost of Goods Sold.

d. do nothing as overhead is likely to be overapplied by a similar amount next period.

e. report the $1,500 on the income statement as "Other Expense."

ANSWERS TO MULTIPLE CHOICE QUIZ

1. c; $30,000 × 150% = $45,000

2. b; $38,500/$35,000 = 110%

3. e; Direct materials + Direct labor + Overhead = Total cost;

Direct materials + ($4,000/0.80) + $4,000 = $10,000

Direct materials = $1,000

4. e; $9,000 + $94,200 + $59,200 + $31,600 − Cost of goods manufactured = $17,800.

Thus, cost of goods manufactured = $176,200

5. c

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

connect

QUICK STUDY

QS 15-1

Distinguishing jobs and job lots **C1**

Indicate which of the following are most likely to be considered as a job and which as a job lot.

1. 200 hats imprinted with company logo

2. 80 Little League trophies

3. Unique handcrafted table

4. A 90-foot custom yacht

5. 50 advertisements for a chain of stores

6. A custom-designed home

QS 15-2

Comparing process and job order operations

C1

Indicate whether each item *a* through *e* is a feature of a job order or process operation.

a. Diverse products and services

b. Routine, repetitive procedures

c. Low product flexibility

d. Low production volume

e. Low product standardization

QS 15-3

Recording job completion and sale **C1**

Auto Safe's job cost sheet for Job A40 shows that the total cost to add security features to a car was $10,500. The car was delivered to the customer, who paid $14,900 cash for this job.

Prepare the journal entries for Job A40 to record (*a*) its completion and (*b*) its sale.

QS 15-4

Computing total cost and cost per unit **C1**

EcoSkate makes skateboards from recycled plastic. For a recent job lot of 100 skateboards, the company incurred direct materials costs of $600 and direct labor costs of $200. Factory overhead applied to this job is $900. (1) What is the total manufacturing cost of this job lot? (2) What is the cost per skateboard?

QS 15-5

Job cost sheet

C1

The following partial job cost sheet is for a job lot of 2,500 units completed.

JOB COST SHEET

Customer's Name: Huddits Company Quantity: 2,500 Job No.: 202

	Direct Materials		Direct Labor		Overhead		
Date	Requisition	Cost	Time Ticket	Cost	Date	Rate	Cost
Mar. 8	#55	$43,750	#1–10	$60,000	Mar. 8	160% of Direct Labor Cost	$96,000
Mar. 11	#56	25,250					

1. What is the total cost of this job lot?
2. What is the total cost per unit completed?

QS 15-6

Recording materials **P1 P3**

A company that uses job order costing purchases $50,000 in raw materials for cash. It then uses $12,000 of raw materials as indirect materials and uses $32,000 of raw materials as direct materials.

Prepare journal entries to record the (*a*) purchase of raw materials, (*b*) use of indirect materials, and (*c*) use of direct materials.

QS 15-7

Recording labor **P2 P3**

A company that uses job order costing incurred a monthly factory payroll of $180,000. Of this amount, $30,000 is indirect labor and $150,000 is direct labor.

Prepare journal entries to record the (*a*) use of direct labor and (*b*) use of indirect labor.

QS 15-8

Computing predetermined overhead rates **P3**

A company estimates the following manufacturing costs at the beginning of the period: direct labor, $468,000; direct materials, $390,000; and factory overhead, $117,000. Compute its predetermined overhead rate as a percent of (1) direct labor and (2) direct materials. Express answers as percents.

QS 15-9

Applying overhead **P3**

At the beginning of the year, a company estimates total overhead costs of $560,000. The company applies overhead using machine hours and estimates it will use 1,400 machine hours during the year.

What amount of overhead should be applied to Job 65A if that job uses 13 machine hours that year?

QS 15-10

Computing predetermined overhead rate **P3**

At the beginning of the year, a company estimates total direct materials costs of $900,000 and total overhead costs of $1,170,000. If the company uses direct materials costs as its activity base to apply overhead, what is the predetermined overhead rate it should use during the year?

QS 15-11

Applying overhead

P3

On March 1, a dressmaker starts work on three different custom-designed wedding dresses. The company uses job order costing and applies overhead to each job (dress) at the rate of 40% of direct materials costs. During the month, the jobs used direct materials as shown below. Compute the amount of overhead applied to each of the three jobs.

	Job 1	Job 2	Job 3
Direct materials used	$5,000	$7,000	$1,500

QS 15-12

Computing overhead applied; service company

P3

Ace Patios applies overhead using direct labor hours as its activity base. At the beginning of the year, the company estimates total direct labor hours of 20,000 and total overhead costs of $600,000 for the year.

1. Determine the company's predetermined overhead rate.
2. Job A2 used 50 direct labor hours. What is the total of overhead costs applied to this job?

QS 15-13

Recording actual overhead costs **P3**

A manufacturer incurred the following actual factory overhead costs: indirect materials, $6,200; indirect labor (factory wages payable), $9,000; depreciation on factory equipment, $12,000; factory utilities (utilities payable), $800; and factory insurance expired, $500. Prepare journal entries to record (*a*) indirect materials, (*b*) indirect labor, and (*c*) other actual overhead costs.

QS 15-14

Recording job completion and sale **P3**

A custom manufacturer completed Jobs 103 and 104. Job 103 cost $12,000 and was sold (on credit) for $20,000. Job 104 cost $15,000. Prepare journal entries to record (*a*) the completion of both jobs, (*b*) the sale of Job 103, and (*c*) cost of goods sold for Job 103.

QS 15-15

Computing overhead cost flows **P4**

Built-Tite uses job order costing. The T-account below summarizes Factory Overhead activity for the current year.

Factory Overhead	
16,000	105,800
25,000	
60,000	

1. Compute total *applied* overhead cost.
2. Compute total *actual* overhead cost.
3. Compute the underapplied or overapplied overhead.

QS 15-16

Preparing and interpreting job cost sheet

P1 P2 P3

A company that uses job order costing reports the costs incurred below. Overhead is applied at the rate of 60% of direct materials cost. The company has no beginning Work in Process or Finished Goods inventories. Jobs 1 and 3 are not finished by the end of the month, and Job 2 is finished but not sold by month-end.

	Job 1	Job 2	Job 3
Direct materials used	$5,000	$7,000	$1,500
Direct labor used	$9,000	$4,000	$3,000

1. Prepare job cost sheets that have direct materials, direct labor, and overhead applied for *each of the three jobs* for the month.
2. Determine the total dollar amount of Work in Process Inventory at the end of the month.
3. Determine the total dollar amount of Finished Goods Inventory at the end of the month.

QS 15-17

Preparing a schedule of cost of goods manufactured

P3

Shen Co. reports the costs incurred below for the month ended May 31. The company has no beginning Work in Process Inventory. Overhead is applied using a predetermined overhead rate of 120% of direct materials costs. Job 4 was completed and Job 5 is still in process at month-end. Prepare a schedule of cost of goods manufactured for the month.

	Job 4	Job 5
Direct materials used	$1,500	$1,000
Direct labor used	2,100	200

QS 15-18

Computing and recording over- or underapplied overhead **P4**

A company applies overhead at a rate of 150% of direct labor cost. Actual overhead cost for the current period is $950,000, and direct labor cost is $600,000.

1. Compute the under- or overapplied overhead.
2. Prepare the journal entry to close over- or underapplied overhead to Cost of Goods Sold.

QS 15-19

Computing and recording over- or underapplied overhead **P4**

A company's Factory Overhead account shows total debits of $624,000 and total credits of $646,000 at the end of the year.

1. Compute the under- or overapplied overhead.
2. Prepare the journal entry to close the balance in the Factory Overhead account to Cost of Goods Sold.

QS 15-20

Computing and recording under- or overapplied overhead **P4**

Rize Co. reports the following (partial) T-account activity at the end of its first year of operations.

Factory Overhead	
80,500	404,000
125,100	
194,400	

1. Compute the under- or overapplied overhead for the year.
2. Prepare the journal entry to close Factory Overhead to Cost of Goods Sold.

QS 15-21

Computing and recording under- or overapplied overhead **P4**

Custom Co. reports the following (partial) T-account activity at the end of its first year of operations.

Factory Overhead	
80,400 130,000 184,600	390,000

1. Compute the under- or overapplied overhead for the year.
2. Prepare the journal entry to close Factory Overhead to Cost of Goods Sold.

QS 15-22

Job order costing of services **A1**

An advertising agency is estimating costs for promoting a music festival. The job will require 200 direct labor hours at a cost of $50 per hour. Overhead costs are applied at a rate of $65 per direct labor hour.

1. What is the total estimated cost for this job?
2. If the company applies a markup of 20% of total costs (price quote is 120% of total costs), what price should it quote for this job?

QS 15-23

Job order costing of services **A1**

A marketing agency used 60 hours of direct labor in creating advertising for a film festival. Direct labor costs $50 per hour. The agency applies overhead at a rate of $40 per direct labor hour.

1. What is the total estimated cost for this job?
2. If the company applies a markup of 10% of total costs (price quote is 110% of total costs), what price should it quote for this job?

QS 15-24

Gross profit ratio **A1**

A manufacturer reports sales of $80,000 and cost of goods sold of $60,000.

1. Compute its gross profit ratio.
2. If competitors average a 10% gross profit ratio, does this manufacturer compare favorably or unfavorably to its peers?

EXERCISES

Exercise 15-1

Defining production activities **C1**

Match each of the terms with the best definition *a* through *d*.

1. Cost accounting system

2. Target cost

3. Job

4. Process operation

a. Production activities for a custom product.

b. Mass production in a continuous flow of steps.

c. A system that records manufacturing costs.

d. The expected selling price of a job minus its desired profit.

Exercise 15-2

Preparing job cost sheet and computing costs

C1

The following information is from the materials requisitions and time tickets for Job 9 completed by Great Bay Boats. Materials requisitions are identified by code numbers starting with the letter M, and the time tickets start with T. Estimated (applied) overhead for Job 9 is $1,400. Prepare a job cost sheet for Job 9, which includes costs for direct materials, direct labor, overhead, and total cost.

Date	Document	Amount
July 1.....	M-46	$1,250
July 1.....	T-33	600
July 5.....	M-47	1,000
July 5.....	T-34	450
July 10.....	T-35	300

Exercise 15-3

Interpreting job cost sheets

C1

Following are simplified job cost sheets for three custom jobs at the end of June for Custom Patios.

Job No. 102	
Materials	$15,000
Labor	8,000
Overhead	4,000

Job No. 103	
Materials	$33,000
Labor	14,200
Overhead	7,100

Job No. 104	
Materials	$27,000
Labor	21,000
Overhead	10,500

All jobs were started in June. Overhead is applied with a predetermined rate based on direct labor cost. Jobs 102 and 103 were finished in June, and Job 104 will be finished in July.

1. What was the total cost of direct materials requisitioned in June?
2. How much total direct labor cost was incurred in June?
3. How much total cost is transferred to Finished Goods Inventory in June?

Exercise 15-4

Computing cost per unit

C1

Bell Co. produces stainless steel drink tumblers, its only product. These tumblers are stamped with company logos and used as promotional items. Following are simplified job cost sheets for two separate recently completed job lots. Job 1 was for 250 units and Job 2 was for 260 units.

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Job No. 1	250 units
Materials	$425
Labor	750
Overhead	900

Job No. 2	260 units
Materials	$403
Labor	780
Overhead	936

1. Compute total cost per unit for Job 1 and for Job 2. Which job has a higher total cost per unit?
2. Compute direct materials cost per unit for each job. Which job has a higher direct materials cost per unit?

Exercise 15-5

Record materials purchase and use **P1 P3**

A manufacturer's Raw Materials Inventory account appears as follows.

Raw Materials Inventory			
Beginning	25,000		
Purchases	100,000		
		80,000	Direct materials used
		15,000	Indirect materials used
Ending	30,000		

All raw materials purchases are made on credit. Prepare journal entries to record the:

1. Purchase of raw materials.
2. Direct materials used.
3. Indirect materials used.

Exercise 15-6

Computing job costs and gross profit **P1 P2 P3**

Information on Kwon Mfg.'s activities for its first month of operations follows.

a. Purchased $100,000 of raw materials on credit.

b. Materials requisitions show the following materials used for the month.

Job 201	$48,200
Job 202	23,600
Total direct materials	71,800
Indirect materials	8,620
Total materials used	$80,420

c. Time tickets show the following labor used for the month.

Job 201	$39,200
Job 202	12,600
Total direct labor	51,800
Indirect labor	24,200
Total labor used	$76,000

d. Applied overhead to Job 201 and to Job 202 using a predetermined overhead rate of 80% of direct materials cost.

e. Transferred Job 201 to Finished Goods Inventory.

f. (1) Sold Job 201 for $163,760 on credit. (2) Record cost of goods sold for Job 201.

g. Incurred the following actual other overhead costs for the month.

Depreciation of factory equipment	$32,000
Rent on factory building (payable)	500
Factory utilities (payable)	800
Expired factory insurance	3,000
Total other factory overhead costs	$36,300

1. Prepare a job cost sheet for Job 201 and for Job 202 for the month. Use the following simplified form.

Job No. _____	
Materials.	$ _____
Labor.	_____
Overhead	_____
Total cost	$ _____

2. Compute gross profit on the sale of Job 201.

Exercise 15-7

Recording materials, labor, overhead, and sales

P1 P2 P3

Refer to information in Exercise 15-6. Prepare journal entries to record the transactions reflected in items *a* through *g*.

Exercise 15-8

T-accounts for manufacturing activities

P1 P2 P3

Refer to information in Exercises 15-6 and 15-7. Set up T-accounts for each of the following accounts, each of which started the month with a zero balance: Raw Materials Inventory, Work in Process Inventory, Finished Goods Inventory, Factory Overhead, Cost of Goods Sold. Then post entries for transactions *a* through *g* to the T-accounts and determine the balance of each account.

Exercise 15-9

Recording materials, labor, and overhead

P1 P2 P3

Starr Company shows the following information for the month.

Raw materials purchased on credit	$76,200	Direct labor used	$15,350
Direct materials used	$48,000	Overhead rate	120% of direct labor cost

Prepare journal entries to record the following.

1. Raw materials purchased.
2. Direct materials used.
3. Direct labor used.
4. Applied overhead.

Exercise 15-10

Recording materials, labor, overhead, and sales; computing inventory cost

P1 P2 P3

Custom Cabinetry has one job in process (Job 120) as of June 30; at that time, its job cost sheet reports direct materials of $6,000, direct labor of $2,800, and applied overhead of $2,240. Custom Cabinetry applies overhead at the rate of 80% of direct labor cost. During July, Job 120 is sold (on credit) for $22,000, Job 121 is started and completed, and Job 122 is started and still in process at the end of July. Custom Cabinetry incurs the following costs during July.

	Job 120	Job 121	Job 122
Direct materials used	$1,000	$6,000	$2,500
Direct labor used	2,200	3,700	2,100

1. Prepare journal entries for the following July transactions and events *a* through *e*.
   - **a.** Direct materials used.
   - **b.** Direct labor used.
   - **c.** Overhead applied. costs from June and July.
   - **d.** Sale of Job 120.

e. Cost of goods sold for Job 120. *Hint*: Job 120 has

2. Compute the July 31 balances of the Work in Process Inventory and the Finished Goods Inventory accounts. (There were no jobs in Finished Goods Inventory at June 30.)

Exercise 15-11

Computing inventory balances and over- or underapplied overhead

P1 P2 P3 P4

The following information is available for a custom manufacturer.

Inventories		Costs incurred for the period	
Raw materials, beginning	$ 38,000	Raw materials purchases	$18,460
Work in process, beginning	12,400	Direct materials used	43,250
Finished goods, beginning	8,750	Direct labor used	22,800
Cost of goods manufactured	95,290	Factory overhead (actual)	
Cost of goods sold (not considering over- or underapplied overhead)	83,200	Indirect materials used	9,300
Sales	100,000	Indirect labor used	16,400
Predetermined overhead rate based on direct materials used	80%	Other overhead costs	4,300

1. Compute the ending balances of Raw Materials Inventory, Work in Process Inventory, and Finished Goods Inventory. *Hint:* Set up T-accounts for each of these three inventory accounts.

2. Compute overapplied or underapplied overhead.

Exercise 15-12

Computing materials, labor, overhead, and cost of goods manufactured

P1 P2 P3 P4

The following information is available for ADT Company, which produces special-order security products and uses a job order costing system. Overhead is applied using a predetermined overhead rate of 70% of direct labor cost.

Inventories	Beginning of Period	End of Period
Raw materials	$43,000	$52,000
Work in process	10,200	21,300
Finished goods	63,000	35,600

Costs incurred for the period	
Raw materials purchases	$210,000
Factory payroll	345,000
Factory overhead (actual)	
Indirect materials used	15,000
Indirect labor used	80,000
Other overhead costs	120,000

1. Set up a Raw Materials Inventory T-account and insert amounts for beginning and ending balances along with purchases and indirect materials used. Solve for direct materials used in the period.
2. Compute the cost of direct labor used for the period.
3. Set up a Work in Process Inventory T-account and insert amounts for beginning and ending balances along with direct materials used (from part 1), direct labor used (from part 2), and applied overhead. Solve for cost of goods manufactured in the period.
4. Set up a Finished Goods Inventory T-account and insert amounts for beginning and ending balances along with cost of goods manufactured (from part 3). Solve for cost of goods sold in the period (do not consider any under- or overapplied overhead).
5. Set up a Factory Overhead T-account and insert amounts for indirect materials used, indirect labor used, other overhead costs, and applied overhead. Solve for underapplied or overapplied overhead.

Exercise 15-13

Recording materials; direct and indirect **P1 P3**

Use information in Exercise 15-12 to prepare journal entries for the following events for the period.

1. Raw materials purchases for cash.
2. Direct materials used.
3. Indirect materials used.

Exercise 15-14

Recording direct and indirect labor **P2 P3**

Use information in Exercise 15-12 to prepare journal entries for the following events for the period.

1. Direct labor used (recorded as factory wages payable).
2. Indirect labor used (recorded as factory wages payable).

Exercise 15-15

Recording actual and applied overhead **P3**

Use information in Exercise 15-12 to prepare journal entries for the following events for the period.

1. Incurred other actual overhead costs (all paid in Cash).
2. Applied overhead to work in process.

Exercise 15-16

Manufacturing cost flows

P1 P2 P3

Telstar uses job order costing. The T-accounts below summarize its production activity for the year.

Raw Materials Inventory	
45,000	24,250
	8,000

Factory Wages Payable	
126,000	85,750
	40,250

Factory Overhead	
8,000	102,684
40,250	
61,370	

Work in Process Inventory	
24,250	170,320
85,750	
102,684	

Finished Goods Inventory	
170,320	153,290

1. Compute the amount for each of the following.
    a. Direct materials used
    b. Indirect materials used
    c. Direct labor used
    d. Indirect labor used
    e. Cost of goods manufactured over- or underapplied overhead)
    f. Cost of goods sold (before closing
2. Compute the amount that overhead is overapplied or underapplied.

Exercise 15-17

Overhead rate; costs assigned to jobs

P3

Shire Company's predetermined overhead rate is based on direct labor cost. Management estimates the company will incur $747,500 of overhead costs and $575,000 of direct labor cost for the period. During March, Shire began and completed Job 56.

1. What is the predetermined overhead rate for this period?
2. Use the information on the following job cost sheet to determine the total cost of Job 56.

JOB COST SHEET

Customer's Name Keiser Co. **Job No.** 56

Job Description 3 customized systems

	Direct Materials		Direct Labor		Overhead	
Date	**Requisition No.**	**Cost**	**Time-Ticket No.**	**Cost**	**Rate**	**Cost**
Mar. 8	M-129	$5,000	T-306	$ 700		
Mar. 11	M-142	7,000	T-432	1,250		
Mar. 18	M-167	3,640	T-456	1,250		
Totals						

Exercise 15-18

Recording transactions in job order costing

P1 P2 P3 P4

Prepare journal entries to record transactions *a* through *h*.

a. Raw materials purchased on credit, $90,000.

b. Direct materials used, $36,500. Indirect materials used, $19,200.

c. Direct labor used, $38,000. Indirect labor used, $12,000. (Record using Factory Wages Payable.)

d. Paid cash for other actual overhead costs, $11,475.

e. Applied overhead at the rate of 125% of direct labor cost.

f. Transferred cost of jobs completed to finished goods, $56,800.

g. Sales of jobs on credit was $82,000.

h. Cost of jobs sold was $56,800.

Exercise 15-19

Analyzing costs assigned to work in process

P3

Lorenzo Company applies overhead to jobs on the basis of direct materials cost. At year-end, the Work in Process Inventory account shows the following.

Work in Process Inventory			
Beginning	0		
Direct materials used	1,500,000		
Direct labor used	300,000		
Overhead applied	600,000		
		2,350,000	Cost of goods manufactured
Ending	50,000		

1. Determine the predetermined overhead rate used (based on direct materials cost).
2. Only one job remains in work in process inventory at year-end. Its direct materials cost is $30,000. How much direct labor cost and applied overhead are assigned to this job?

Exercise 15-20

Computing overhead rate and direct materials

P3

Tasty Bakery applies overhead based on direct labor costs. The company reports the following costs for the year: direct materials, $650,000; direct labor, $3,000,000; and overhead applied, $1,800,000.

1. Determine the company's predetermined overhead rate for the year.
2. The ending balance of its Work in Process Inventory account was $71,000, which included $20,000 of direct labor costs. Determine the direct materials costs in ending Work in Process Inventory.

Exercise 15-21

Preparing an income statement and determining inventory balances

P3

Tyler Corp. reports the following results for its first month of operations ended December 31. Overhead is applied using a predetermined overhead rate of 80% of direct materials cost.

Raw materials purchased	$18,400	Sales	$36,000
Direct materials used	12,000	Cost of goods sold	28,400
Direct labor used	18,400	Selling expenses	2,100
Cost of goods manufactured	32,000	General and administrative expenses	3,200

1. Prepare an income statement for the month ended December 31.
2. Determine the December 31 ending inventory balances for Raw Materials, Work in Process, and Finished Goods. *Hint:* Because Tyler is in its first month of operations, each account begins with a $0 balance; also, there were no indirect materials used this month.

Exercise 15-22

Computing inventory balances and gross profit

P3

A manufacturer began operations on April 1 and reports the information below. All jobs are sold for 20% above cost.

	Manufacturing Costs		
Job number	April	May	Job Status at May 31
1	$ 800	$2,120	Completed and sold during May
2	650	1,840	In process
3	1,200	2,630	Completed but not sold
4	475	400	Completed and sold during May
5		3,600	In process

1. Compute the May 31 balance in (*a*) Work in Process Inventory and (*b*) Finished Goods Inventory.
2. Compute gross profit for May.

Exercise 15-23

Computing inventory balances and cost of goods sold **P3**

A manufacturer reports the following information at **June 30**.

Job number	Started	Completed	Sold	Cost at June 30
46	April 5	May 25	June 1	$1,775
47	May 2	May 30	June 2	625
48	May 21	July 1	July 2	640
49	June 8	June 29	July 6	585
50	June 19	July 5	July 10	960

1. Compute Work in Process Inventory at June 30.
2. Compute Finished Goods Inventory at June 30.
3. Compute cost of goods sold for June.

Exercise 15-24

Preparing a cost of goods manufactured schedule

P3

A manufacturing company reports the following for the period.

Inventories	Beginning	Ending
Raw materials	$18,020	$12,000
Work in process	9,400	11,200
Finished goods	12,460	8,630

Activities for the period	
Raw materials purchases	$ 8,100
Direct materials used	14,120
Direct labor used	9,200
Overhead applied	11,040
Sales	40,000

1. Prepare a schedule of cost of goods manufactured.
2. Compute gross profit.

Exercise 15-25

Closing over- or underapplied overhead

P4

Prepare the journal entry to close over- or underapplied overhead to Cost of Goods Sold for each of the two companies below.

	Star Promotions	Valle Builders
Indirect materials	$22,000	$ 12,500
Indirect labor	46,000	46,500
Other overhead	17,000	47,000
Overhead applied	88,000	105,000

Exercise 15-26

Computing applied overhead and closing over- or underapplied overhead

P4

At the beginning of the year, Custom Mfg. set its predetermined overhead rate using the following estimates: overhead costs, $750,000, and direct materials costs, $625,000. At year-end, the company reports that actual overhead costs for the year are $758,000 and actual direct materials costs for the year are $625,000.

1. Determine the predetermined overhead rate using estimated direct materials costs.
2. Set up a T-account for Factory Overhead and enter the actual overhead costs incurred *and* the amount of overhead cost applied to jobs during the year using the predetermined overhead rate. Determine whether overhead is over- or underapplied (and the amount) for the year.
3. Prepare the entry to close any over- or underapplied overhead to Cost of Goods Sold.

Exercise 15-27

Computing applied overhead and closing over- or underapplied overhead

P4

At the beginning of the year, Mirmax set its predetermined overhead rate for movies produced during the year by using the following estimates: overhead costs, $1,680,000, and direct labor costs, $480,000. At year-end, the company's actual overhead costs for the year are $1,670,000 and actual direct labor costs for the year are $480,000.

1. Determine the predetermined overhead rate using estimated direct labor costs.

2. Set up a T-account for Factory Overhead and enter the actual overhead costs incurred *and* the amount of overhead cost applied to movies during the year using the predetermined overhead rate. Determine whether overhead is over- or underapplied (and the amount) for the year.
3. Prepare the entry to close any over- or underapplied overhead to Cost of Goods Sold.

Exercise 15-28

Computing overhead rate; setting price quote—service company

A1

Sofía Gomez runs a mobile pet grooming service. She charges $35 direct labor per grooming hour. She applies overhead to jobs on the basis of grooming hours. She predicts 800 grooming hours for the year. Her estimated overhead costs for the year follow.

Van depreciation	$5,500	Van insurance expense	$1,000	Tool depreciation	$350
Van maintenance	1,200	Indirect materials	600	Other overhead	950

1. Compute the predetermined overhead rate using estimated grooming hours.
2. Sofía has been asked to groom three large dogs. She expects this job to require a total of 12 direct labor grooming hours. Compute her total cost (direct labor plus applied overhead) for this job.
3. If Sofía targets a markup of 25% on the total cost for each job, what price should she quote for the job in part 2?

Exercise 15-29

Pricing services using job order costing

A1

Hansel Company has requested bids from several architects to design its new corporate headquarters. Frey Architects is bidding on the job. Frey estimates that the job will require the following direct labor.

Direct Labor	Estimated Hours	Hourly Rate
Architects	150	$300
Staff	300	75
Clerical	500	20

Frey applies overhead to jobs at 175% of direct labor cost. Frey wants to earn at least $80,000 profit on the architectural job. Based on past experience and market research, it estimates that the competition will bid between $285,000 and $350,000 for the job.

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Check (1) $213,125

1. What is Frey's estimated cost of the architectural job?
2. If Frey bids a price of $285,000, what is its expected profit? Will it earn its target profit of $80,000?
3. What bid price would earn the desired $80,000 target profit?

Exercise 15-30

Determining cost and price for services

A1

Diaz and Associates incurred the following direct labor costs in completing tax services job for a client. Diaz applies overhead at 50% of direct labor cost.

Direct Labor on Tax Job	Hours Used	Hourly Rate
Partner	5	$500
Senior manager	12	200
Staff accountants	100	50

1. Determine the total cost of this tax services job.
2. If Diaz charged $20,000 for this tax services job, what is the gross profit for the job?

Exercise 15-31

Gross profit ratio

A1

Rolex Company reports the following information.

	Current Year	Prior Year
Sales	$220,000	$180,000
Cost of goods sold	132,000	135,000

1. Compute the gross profit ratio for each of the two years reported.
2. Did the company outperform or underperform the industry average gross profit ratio of 30% in the current year?
3. Did the gross profit ratio improve or decline in the current year?

connect

PROBLEM SET A

Problem 15-1A

Computing job costs and overhead rate; assigning costs to inventory

C1 P3

At the end of June, the job cost sheets at Ace Roofers show the following costs accumulated on three jobs.

At June 30	Job 5	Job 6	Job 7
Direct materials	$15,000	$33,000	$27,000
Direct labor	8,000	14,200	21,000
Overhead applied	4,000	7,100	10,500

Additional information

a. Job 5 was started in May, and the following costs were assigned to it in May: direct materials, $6,000; direct labor, $1,800; and applied overhead, $900. Job 5 was finished in June.

b. Job 6 and Job 7 were started in June; Job 6 was finished in June, and Job 7 is to be completed in July.

c. Overhead cost is applied with a predetermined rate based on direct labor cost. The predetermined overhead rate did not change across these months.

Required

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1. What is the total cost of direct materials requisitioned in June?
2. What is the total cost of direct labor used in June?
3. What is the predetermined overhead rate?

4. What is the total cost transferred to Finished Goods Inventory in June?

Problem 15-2A

Computing and recording job costs; preparing schedule of cost of goods manufactured

P1 P2 P3 P4

Marco Company shows the following costs for three jobs worked on in April.

	Job 306	Job 307	Job 308
Balances on March 31			
Direct materials used (in March)	$ 29,000	$ 35,000	
Direct labor used (in March)	20,000	18,000	
Overhead applied (March)	10,000	9,000	
Costs during April			
Direct materials used	135,000	220,000	$100,000
Direct labor used	85,000	150,000	105,000
Overhead applied	?	?	?
Status on April 30	Finished (sold)	Finished (unsold)	In process

Additional information

a. Raw Materials Inventory has a March 31 balance of $80,000.

b. Raw materials purchases in April are $500,000, and total factory payroll cost in April is $363,000.

c. Actual overhead costs incurred in April are indirect materials, $50,000; indirect labor, $23,000; factory rent, $32,000; factory utilities, $19,000; and factory equipment depreciation, $51,000.

d. Predetermined overhead rate is 50% of direct labor cost.

e. Job 306 is sold for $635,000 cash in April.

Required

1. Determine the amount of overhead applied to each job in April.
2. Determine the total cost assigned to each job as of April 30 (including the balances from March 31).
3. Prepare journal entries for the month of April to record the following.
    a. Materials purchases (on credit).

b. Direct materials used.

c. Direct labor used (and paid in cash) and assigned to Work in Process Inventory.

d. Indirect materials used and assigned to Factory Overhead.

e. Indirect labor used (and paid in cash) and assigned to Factory Overhead.

f. Overhead costs applied to Work in Process Inventory.

g. Actual other overhead costs incurred. (Factory rent and utilities are paid in cash.)

h. Transfer of Jobs 306 and 307 to Finished Goods Inventory.

i. Cost of goods sold for Job 306.

j. Revenue from the sale of Job 306 received in cash.

k. Close underapplied or overapplied overhead to the Cost of Goods Sold account.

4. Prepare a schedule of cost of goods manufactured.

5. Compute gross profit for April. Show how the three inventory accounts are reported on the April 30 balance sheet.

Check (4) Cost of goods manufactured, $828,500

Problem 15-3A

Computing and recording job costs; preparing income statement and balance sheet **P1 P2 P3 P4**

Bergo Bay's accounting system generated the following account balances on December 31. The company's manager knows something is wrong with this list of balances because it does not show any balance for Work in Process Inventory, and the accrued factory payroll (Factory Wages Payable) has not been recorded.

	Debit	Credit
Cash	$170,000	
Accounts receivable	75,000	
Raw materials inventory	80,000	
Work in process inventory	0	
Finished goods inventory	15,000	
Prepaid rent	3,000	
Accounts payable		$ 17,000
Notes payable		25,000
Common stock		50,000
Retained earnings (prior year)		271,000
Sales		373,000
Cost of goods sold	218,000	
Factory overhead	115,000	
General and administrative expenses	60,000	
Totals	$736,000	$736,000

These six documents must be processed to bring the accounting records up to date.

Materials requisition 10: $10,200 direct materials to Job 402	Labor time ticket 52: $36,000 direct labor to Job 402
Materials requisition 11: $18,600 direct materials to Job 404	Labor time ticket 53: $23,800 direct labor to Job 404
Materials requisition 12: $5,600 indirect materials	Labor time ticket 54: $8,200 indirect labor

Jobs 402 and 404 are the only jobs in process at year-end. The predetermined overhead rate is 200% of direct labor cost.

Required

1. Use the document information above to prepare journal entries for the following costs.
   - **a.** Direct materials.
   - **b.** Direct labor.
   - **c.** Overhead applied.
   - **d.** Indirect materials.
   - **e.** Indirect labor.
2. Set up a Factory Overhead T-account and enter amounts from part 1 related to factory overhead. Determine the amount of over- or underapplied overhead. Prepare the entry to close any over- or underapplied overhead to Cost of Goods Sold.

3. Prepare a revised list of account balances as of December 31. *Hint:* Use the prior year's Retained Earnings balance of $271,000 in this list.
4. Prepare an income statement for the year and a balance sheet as of December 31. *Hint:* Retained earnings is $356,800 at the end of the current year.
5. Assume that the $5,600 on materials requisition 12 should have been direct materials charged to Job 404. Does this error result in overstatement or understatement of total assets on the balance sheet at December 31?

Check (4) Total assets, $516,800

Problem 15-4A

Preparing job cost sheets, recording costs, preparing inventory ledger accounts

P1 P2 P3

Watercraft's predetermined overhead rate is 200% of direct labor. Information on the company's production activities during May follows.

a. Purchased raw materials on credit, $200,000.

b. Materials requisitions record use of the following materials for the month.

Job 136	$ 48,000
Job 137	32,000
Job 138	19,200
Job 139	22,400
Job 140	6,400
Total direct materials	128,000
Indirect materials	19,500
Total materials requisitions	$147,500

c. Time tickets record use of the following labor for the month. page 608 These wages were paid in cash.

Job 136	$ 12,000
Job 137	10,500
Job 138	37,500
Job 139	39,000
Job 140	3,000
Total direct labor	102,000
Indirect labor	24,000
Total labor cost	$126,000

d. Applied overhead to Jobs 136, 138, and 139.

e. Transferred Jobs 136, 138, and 139 to Finished Goods Inventory.

f. Sold Jobs 136 and 138 on credit at a total price of $525,000.

g. Recorded the cost of goods sold for Jobs 136 and 138.

h. Incurred the following actual other overhead costs during the month.

Depreciation of factory building	$68,000	Expired factory insurance	$10,000
Depreciation of factory equipment	36,500	Accrued property taxes payable	35,000

i. Applied overhead at month-end to the Work in Process Inventory account (for Job 137 and Job 140) using the predetermined overhead rate of 200% of direct labor cost.

Required

1. Prepare a job cost sheet for each job worked on during the month. Use the following simplified form.

Job No. _____	
Materials	$
Labor	
Overhead	
Total cost	$

2. Prepare journal entries to record the events and transactions *a* through *i*.

3. Set up T-accounts for each of the following accounts, each of which started the month with a zero balance: Raw Materials Inventory, Work in Process Inventory, Finished Goods Inventory, Factory Overhead, Cost of Goods Sold. Post the journal entries to these T-accounts and determine the ending balance of each account.

4. (a) Compute the total cost of each job in process and prove that the sum of their costs equals the Work in Process Inventory account

balance. (b) Compute the total cost of each job finished but not sold, and prove that the sum of their costs equals the Finished Goods Inventory balance. (c) Compute the total cost of each job sold, and prove that the sum of their costs equals the Cost of Goods Sold balance.

Check (2*d*) Cr. Factory Overhead, $177,000

(4) Finished Goods Inventory, $139,400

Problem 15-5A

Computing and applying overhead to jobs; recording under- or overapplied overhead

P3 P4

At the beginning of the year, Learer Company's manager estimated total direct labor cost to be $2,500,000. The manager also estimated the following overhead costs for the year.

Indirect labor	$ 559,200
Rent on factory building	140,000
Factory utilities	156,000
Depreciation—Factory equipment	480,000
Repairs expense—Factory equipment	60,000
Indirect materials	104,800
Total estimated overhead costs	$1,500,000

For the year, the company incurred $1,520,000 of actual page 609 overhead costs. It completed and sold five jobs with the following direct labor costs: Job 201, $604,000; Job 202, $563,000; Job 203, $298,000; Job 204, $716,000; and Job 205, $314,000. In addition, Job 206 is in process at the end of the year and had been charged $17,000 for direct labor. No jobs were in process at the beginning of the year. The company's predetermined overhead rate is based on a percent of direct labor cost.

Required

1. Determine the following.
   - **a.** Predetermined overhead rate for the year.
   - **b.** Overhead applied to each of the six jobs during the year.

c. Over- or underapplied overhead at year-end.

2. Prepare the entry to close any over- or underapplied overhead to Cost of Goods Sold at year-end.

Problem 15-6A

Preparing job cost sheets and materials ledger cards; computing inventory

P1 P2 P3 P4

Sager Company builds custom retaining walls for large commercial customers. On May 1, the company had no inventories of work in process or finished goods but held the following raw materials.

Cinder block	200 units @ $250 =	$50,000
Boulders	95 units @ 180 =	17,100
Stain (indirect materials)	55 units @ 75 =	4,125
Total		$71,225

On May 4, the company began work on Job 102 for Woz Company and Job 103 for Reuben Company.

Required

1. Prepare job cost sheets for Jobs 102 and 103 using the layout in Exhibit 15.3, and prepare three materials ledger cards for cinder blocks, boulders, and stain using the layout in Exhibit 15.5. Enter the beginning raw materials inventory amounts from above for each of these materials on their ledger cards. Then, follow the instructions in this list of activities to complete the job cost sheets and the materials ledger cards.

a. Purchased raw materials on credit and recorded the following information from receiving reports.

Receiving Report No. 426, cinder blocks, 250 units at $250 each. Receiving Report No. 427, boulders, 90 units at $180 each.

Instructions: Enter the receiving report information on the materials ledger cards.

b. Requisitioned the following raw materials for production.

Requisition No. 35, for Job 102, 135 units of cinder blocks.
Requisition No. 36, for Job 102, 72 units of boulders.
Requisition No. 37, for Job 103, 70 units of cinder blocks.
Requisition No. 38, for Job 103, 38 units of boulders.
Requisition No. 39, for 15 units of stain.

Instructions: Enter amounts for direct materials requisitions on the materials ledger cards and the job cost sheets. Enter the indirect materials amount on the materials ledger card.

c. Received the following employee time tickets for work in May.

Time tickets Nos. 1 to 10 for direct labor on Job 102, $90,000.
Time tickets Nos. 11 to 30 for direct labor on Job 103, $65,000.
Time tickets Nos. 31 to 36 for indirect labor, $19,250.

Instructions: Record direct labor from the time tickets on the job cost sheets.

d. Finished Job 102. The company applies overhead to each job with a predetermined overhead rate of 80% of direct labor cost.

Instructions: Enter the applied overhead on the cost sheet for Job 102, fill in the cost summary section of the cost sheet, and then mark the cost sheet "Finished."

e. Applied overhead cost to Job 103 based on the job's direct labor used to date.

Instructions: Enter applied overhead on the job cost sheet for Job 103.

2. Job 102 was sold on credit for $400,000. Compute gross profit for the month.

3. Determine the balances reported on the month-end balance sheet for Raw Materials Inventory and Work in Process Inventory.

PROBLEM SET B

Problem 15-1B

Computing job costs and overhead rate; assigning costs to inventory

C1 P3

At the end of May, the job cost sheets at Cool Pool show the following costs accumulated on three jobs.

At May 31	Job 8	Job 9	Job 10
Direct materials.	$25,000	$23,240	$26,800
Direct labor	10,000	8,600	9,500
Overhead applied. . . .	6,000	5,160	5,700

Additional information

a. Job 8 was started in April, and the following costs were assigned to it in April: direct materials, $8,000; direct labor, $2,000; and applied overhead, $1,200. Job 8 was finished in May.

b. Job 9 and Job 10 were started in May; Job 9 was finished in May, and Job 10 is to be completed in June.

c. Overhead cost is applied with a predetermined rate based on direct labor cost. The predetermined overhead rate did not change across these months.

Required

1. What is the total cost of direct materials requisitioned in May?

2. What is the total cost of direct labor used in May?

3. What is the predetermined overhead rate?

4. What is the total cost transferred to Finished Goods Inventory in May?

Problem 15-2B

Computing and recording job costs; preparing schedule of cost of goods manufactured

P1 P2 P3 P4

Perez Company shows the following costs for three jobs worked on in September.

	Job 114	Job 115	Job 116
Balances on August 31			
Direct materials used (in August)	$ 14,000	$ 18,000	
Direct labor used (in August)	18,000	16,000	
Overhead applied (August)	9,000	8,000	
Costs during September			
Direct materials used	100,000	170,000	$ 80,000
Direct labor used	30,000	68,000	120,000
Overhead applied	?	?	?
Status on September 30	Finished (sold)	Finished (unsold)	In process

Additional information

a. Raw Materials Inventory has an August 31 balance of $150,000.

b. Raw materials purchases in September are $400,000, and total factory payroll cost in September is $232,000.

c. Actual overhead costs incurred in September are indirect materials, $30,000; indirect labor, $14,000; factory rent, $20,000; factory utilities, $12,000; and factory equipment depreciation, $30,000.

d. Predetermined overhead rate is 50% of direct labor cost.

e. Job 114 is sold for $380,000 cash in September.

Required

1. Determine the amount of overhead applied to each job in September.

2. Determine the total cost assigned to each job as of September 30 (including the balances from August 31).

3. Prepare journal entries for the month of September to record the following.

- **a.** Materials purchases (on credit).
- **b.** Direct materials used.
- **c.** Direct labor used (and paid in cash) and assigned to Work in Process Inventory.
- **d.** Indirect materials used and assigned to Factory Overhead.
- **e.** Indirect labor used (and paid in cash) and assigned to Factory Overhead.
- **f.** Overhead costs applied to Work in Process Inventory.

g. Actual other overhead costs incurred. (Factory rent and utilities are paid in cash.)

h. Transfer of Jobs 114 and 115 to the Finished Goods Inventory.

i. Cost of Job 114 in the Cost of Goods Sold account.

j. Revenue from the sale of Job 114 received in cash.

k. Close underapplied or overapplied overhead to the Cost of Goods Sold account.

4. Prepare a schedule of cost of goods manufactured. page 611
5. Compute gross profit for September. Show how the three inventory accounts are reported on the September 30 balance sheet.
6. Over- or underapplied overhead is closed to Cost of Goods Sold but not posted to job cost sheets. For this period, is gross profit at the job level understated or overstated?

Check (4) Cost of goods manufactured, $500,000

Problem 15-3B

Computing and recording job costs; preparing income statement and balance sheet

P1 P2 P3 P4

Cavallo Mfg.'s computer system generated the following account balances on December 31. The company's manager knows that this list of balances is wrong because it does not show any balance for Work in Process Inventory, and the accrued factory payroll (Factory Wages Payable) has not been recorded.

	Debit	Credit
Cash	$ 64,000	
Accounts receivable	42,000	
Raw materials inventory	26,000	
Work in process inventory	0	
Finished goods inventory	9,000	
Prepaid rent	3,000	
Accounts payable		$ 10,500
Notes payable		13,500
Common stock		30,000
Retained earnings (prior year)		87,000
Sales		180,000
Cost of goods sold	105,000	
Factory overhead	27,000	
General and administrative expenses	45,000	
Totals	$321,000	$321,000

These six documents must be processed to bring the accounting records up to date.

Materials requisition 31: $4,600 direct materials to Job 603	Labor time ticket 65: $5,000 direct labor to Job 603
Materials requisition 32: $7,600 direct materials to Job 604	Labor time ticket 66: $8,000 direct labor to Job 604
Materials requisition 33: $2,100 indirect materials	Labor time ticket 77: $3,000 indirect labor

Jobs 603 and 604 are the only jobs in process at year-end. The predetermined overhead rate is 200% of direct labor cost.

Required

1. Use the document information above to prepare journal entries for the following costs.
   - **a.** Direct materials.
   - **b.** Direct labor.
   - **c.** Overhead applied.
   - **d.** Indirect materials.
   - **e.** Indirect labor.
2. Set up a Factory Overhead T-account and enter amounts from part 1 related to factory overhead. Determine the amount of over- or underapplied overhead. Prepare the entry to close any over- or underapplied overhead to Cost of Goods Sold.

3. Prepare a revised list of account balances as of December 31. *Hint:* Use the prior year's Retained Earnings balance of $87,000.
4. Prepare an income statement for the year and a balance sheet as of December 31. *Hint:* Retained earnings is $110,900 at the end of the current year.
5. Assume that the $2,100 indirect materials on materials requisition 33 should have been direct materials charged to Job 604. Does this error result in overstatement or understatement of total assets on the balance sheet at December 31?

Check (4) Net income, $23,900

Problem 15-4B

Preparing job cost sheets, recording costs, preparing inventory ledger accounts

P1 P2 P3

Starr Mfg.'s predetermined overhead rate is 200% of direct labor. Information on the company's production activities during September follows.

a. Purchased raw materials on credit, $125,000.

b. Materials requisitions record use of the following materials for the month.

Job 487	$30,000
Job 488	20,000
Job 489	12,000
Job 490	14,000
Job 491	4,000
Total direct materials	80,000
Indirect materials	12,000
Total materials requisitions	$92,000

c. Time tickets record use of the following labor for the month. These wages are paid in cash.

Job 487	$ 8,000
Job 488	7,000
Job 489	25,000
Job 490	26,000
Job 491	2,000
Total direct labor	68,000
Indirect labor	16,000
Total labor cost	$84,000

d. Applied overhead to Jobs 487, 489, and 490.

e. Transferred Jobs 487, 489, and 490 to Finished Goods Inventory.

f. Sold Jobs 487 and 489 on credit for a total price of $340,000.

g. Recorded the cost of goods sold for Jobs 487 and 489.

h. Incurred the following actual other overhead costs during the month.

Depreciation of factory building	$37,000	Expired factory insurance	$ 7,000
Depreciation of factory equipment	21,000	Accrued property taxes payable	31,000

i. Applied overhead at month-end to the Work in Process Inventory account (for Job 488 and Job 491) using the predetermined overhead rate of 200% of direct labor cost.

Required

1. Prepare a job cost sheet for each job worked on in the month. Use the following simplified form.

Job No. _____	
Materials	$
Labor	
Overhead	
Total cost	$

2. Prepare journal entries to record the events and transactions *a* through *i*.

3. Set up T-accounts for each of the following accounts, each of which started the month with a zero balance: Raw Materials Inventory, Work in Process Inventory, Finished Goods Inventory, Factory Overhead, Cost of Goods Sold. Post the journal entries to these T-accounts and determine the ending balance of each account.

4. (a) Compute the total cost of each job in process and prove that the sum of their costs equals the Work in Process Inventory account balance. (b) Compute the total cost of each job finished but not sold, and prove that the sum of their costs equals the Finished Goods Inventory balance. (c) Compute the total cost of each job sold, and prove that the sum of their costs equals the Cost of Goods Sold balance.

Check (2*d*) Cr. Factory Overhead, $118,000

(3) Finished Goods Inventory, $92,000 bal.

Problem 15-5B

Computing and applying overhead to jobs; recording under- or overapplied overhead

P3 P4

At the beginning of the year, Pavelka Company's manager estimated total direct labor cost to be $1,500,000. The manager also estimated the following overhead costs for the year.

Indirect labor	$279,600
Rent on factory building	70,000
Factory utilities	78,000
Depreciation—Factory equipment	240,000
Repairs expense—Factory equipment	30,000
Indirect materials	52,400
Total estimated overhead costs	$750,000

For the year, the company incurred $725,000 of actual overhead costs. It completed and sold five jobs with the following direct labor costs: Job 625, $354,000; Job 626, $330,000; Job 627, $175,000; Job 628, $420,000; and Job 629, $184,000. In addition, Job 630 is in process at the end of the year and had been charged $10,000 for direct labor. No jobs were in process at the beginning of the year. The company's predetermined overhead rate is based on a percent of direct labor cost.

Required

1. Determine the following.
   a. Predetermined overhead rate for the year.

b. Overhead applied to each of the six jobs during the year.

c. Over- or underapplied overhead at year-end.

2. Prepare the entry to close any over- or underapplied overhead to Cost of Goods Sold at year-end.

Problem 15-6B

Preparing job cost sheets and materials ledger cards; computing inventory

P1 P2 P3 P4

King Company builds custom order fulfillment centers for large e-commerce companies. On June 1, the company had no inventories of work in process or finished goods but held the following raw materials.

Steel	120 units @ $200 =	$24,000
Wood	80 units @ 160 =	12,800
Paint (indirect materials)	44 units @ 72 =	3,168
Total		$39,968

On June 3, the company began work on Job 450 for Encinita Company and Job 451 for Fargo Inc.

Required

1. Prepare job cost sheets for Jobs 450 and 451 using the layout in Exhibit 15.3, and prepare three materials ledger cards for steel, wood, and paint using the layout in Exhibit 15.5. Enter the beginning raw materials inventory amounts from above for each of these materials on their ledger cards. Then, follow instructions in this list of activities to complete the job cost sheets and the materials ledger cards.

a. Purchased raw materials on credit and recorded the following information from receiving reports.

Receiving Report No. 20, steel, 150 units at $200 each.	Receiving Report No. 21, wood, 70 units at $160 each.

Instructions: Enter the receiving report information on the materials ledger cards.

b. Requisitioned the following raw materials for production.

Requisition No. 223, for Job 450, 80 units of steel.
Requisition No. 224, for Job 450, 60 units of wood.
Requisition No. 225, for Job 451, 40 units of steel.
Requisition No. 226, for Job 451, 30 units of wood.
Requisition No. 227, for 12 units of paint.

Instructions: Enter amounts for direct materials requisitions on the materials ledger cards and the job cost sheets. Enter the indirect materials amount on the materials ledger card. page 614

c. Received the following employee time tickets for work in June.

Time tickets Nos. 1 to 10 for direct labor on Job 450, $40,000.
Time tickets Nos. 11 to 20 for direct labor on Job 451, $32,000.
Time tickets Nos. 21 to 24 for indirect labor, $12,000.

Instructions: Record direct labor from the time tickets on the job cost sheets.

d. Finished Job 450. The company applies overhead to each job with a predetermined overhead rate equal to 70% of direct labor cost.

Instructions: Enter the applied overhead on the cost sheet for Job 450, fill in the cost summary section of the cost sheet, and then mark the cost sheet "Finished."

e. Applied overhead cost to Job 451 based on the job's direct labor used to date.

Instructions: Enter applied overhead on the job cost sheet for Job 451.

2. Job 450 was sold on credit for $290,000. Compute gross profit for the month.

3. Determine the balances reported on the month-end balance sheet for Raw Materials Inventory and Work in Process Inventory.

connect

SERIAL PROBLEM

Business Solutions

P1 P2 P3

Alexander Image/Shutterstock

Serial problem began in Chapter 1. If previous chapter segments were not completed, the serial problem can begin at this point. It is available in **Connect** *with an algorithmic option*.

SP 15 The computer workstation furniture manufacturing that Santana Rey started is progressing well. As of the end of June, **Business Solutions**'s job cost sheets show the following total costs accumulated on three furniture jobs.

	Job 602	Job 603	Job 604
Direct materials	$1,500	$3,300	$2,700
Direct labor	800	1,420	2,100
Overhead applied	400	710	1,050

Job 602 was started in May, and the following costs were assigned to it in May: direct materials, $600; direct labor, $180; and overhead, $90. Jobs 603 and 604 were started in June. Overhead cost is applied with a predetermined rate as a percent of direct labor costs. Jobs 602 and 603 are finished in June, and Job 604 is expected to be finished in July. The company's predetermined overhead rate did not change over these months.

Check (1) Total direct materials, $6,900

Required

1. What is the cost of direct materials used in June for each of the three jobs and in total?
2. What is the cost of direct labor used in June for each of the three jobs and in total?

3. What predetermined overhead rate is used in June?

4. How much cost is transferred to Finished Goods Inventory in June?

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments (1) do not require instructors to know Tableau, (2) are accessible to introductory students, (3) do not require Tableau software, and (4) run in **Connect**. All are auto-gradable.

Tableau DA 15-1 Quick Study, Computing cost of direct materials used, **P1**—similar to Exercise 15-12.

Tableau DA 15-2 Exercise, Computing cost of goods sold, **P1**, **P2**,**P3**—similar to Exercise 15-12.

Tableau DA 15-3 Mini-case, Computing gross profit and overapplied or underapplied overhead, **P1**,**P2**,**P3**,**P4**—similar to Exercise 15-12 and Exercise 15-20.

connect

GENERAL LEDGER PROBLEM

General Ledger (GL) Assignments expose students to general ledger software similar to that in practice. **GL** is part of **Connect**, and **GL** assignments are auto-gradable and have algorithmic options. For the following **GL** assignment, prepare summary journal entries to record the transactions. Calculate the total cost of each job worked on. Then prepare a schedule of cost of goods manufactured and compute gross profit.

GL 15-1 Based on Problem 15-2A

Accounting Analysis connect

COMPANY ANALYSIS

A1

AA 15-1 **Apple** provides device support services to large business clients. These services use direct labor and overhead costs. Assume Apple uses two types of direct labor: phone support staff, paid $12 per hour, and technical specialists, paid $25 per hour. Overhead is applied using a rate of $18 per direct labor hour (for both types of labor). A potential client requests a price quote for services that Apple estimates will use 1,800 phone support hours and 2,200 technical specialist hours.

APPLE

Required

1. What is this job's total estimated cost?
2. If Apple applies a markup of 40% on total estimated cost of these services, what price will it quote?

COMPARATIVE ANALYSIS

A1

AA 15-2 **Apple** and **Google** report the following income statement data (some are assumed). Use the companies' service revenue and cost data to answer the requirements.

APPLE

GOOGLE

	Apple		Google	
$ millions	Current Year	Prior Year	Current Year	Prior Year
Service revenue	$46,291	$39,748	$134,811	$116,461
Cost of services	16,786	15,592	59,856	50,661

Required

1. Compute the gross profit ratio for each of the two years shown for each company.
2. Is the change in Apple's current year gross profit ratio on its services favorable or unfavorable?
3. Is the change in Google's current year gross profit ratio on its services favorable or unfavorable?

4. Does Google's current year gross profit ratio underperform or outperform the industry (assumed) average of 60%?

EXTENDED ANALYSIS

A1

AA 15-3 Assume **Samsung** and **Apple** are bidding on a large device support service job for a U.S.-based business. Samsung estimates direct labor for this service job to include 800 phone support hours and 1,200 technical specialist hours. Samsung pays phone support staff $11 per hour and technical specialists $22 per hour. Overhead is applied using a rate of $24 per direct labor hour (for both types of labor).

APPLE

Samsung

Required

1. For Samsung, what is this job's estimated total cost?
2. Samsung believes that the customer will choose the company that offers the lower price. If Samsung applies a markup of 30% on total cost, will its quoted price be lower than Apple's expected quoted price of $105,000?

Discussion Questions

1. Why must a company estimate the amount of factory overhead applied to individual jobs or job lots?
2. Many companies use direct labor cost to apply factory overhead to jobs. Identify another activity base a company might use to apply overhead costs.
3. What information is recorded on a job cost sheet? How do management and employees use job cost sheets?
4. How do the balances in the Work in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold general ledger accounts link to job cost sheets?

5. What journal entry is recorded when a materials manager receives a materials requisition and then issues direct materials for use in the factory? What journal entry is recorded for requisitions of indirect materials?

6. Distinguish between a receiving report and a materials requisition.

7. **Google** uses an electronic "time ticket" for some employees. How are time tickets used in job order costing?

GOOGLE

8. What events cause debits to be recorded in the Factory Overhead account? What events cause credits to be recorded in the Factory Overhead account?

9. **Google** applies overhead to product costs. What account is used to close the Factory Overhead account, assuming the amount is not material?

GOOGLE

10. Assume that **Apple** produces a batch of 1,000 iPhones. Does it account for this as 1,000 individual jobs or as a job lot? Explain (consider costs and benefits).

APPLE

11. Why must a company use predetermined overhead rates when using job order costing?

12. How would a hospital apply job order costing? Explain.

13. **Harley-Davidson** manufactures 30 custom-made, luxury-model motorcycles. Each is unique. Does it account for these motorcycles as 30 individual jobs or as a job lot? Explain.

14. Assume **Verizon** will install and service a server to link all of a customer's employees' smartphones to a centralized cloud server for an up-front flat price. How can Verizon use a job order costing system?

15. What is cost-plus pricing?

Beyond the Numbers

ETHICS CHALLENGE

P3

BTN 15-1 Assume that your company sells portable housing to both general contractors and the government. It sells jobs to contractors on a bid basis. A contractor asks for three bids from different manufacturers. The combination of low bid and high quality wins the job. However, jobs sold to the government are bid on a cost-plus basis. This means price is determined by adding all costs plus a profit based on cost at a specified percent, such as 10%. You observe that the amount of overhead applied to government jobs is much higher than that applied to similar contract jobs. This concerns you.

Point: Students could compare responses and discuss differences in concerns with allocating overhead.

Required

Write a half-page memo to your company's chief financial officer outlining your concerns with overhead application.

COMMUNICATING IN PRACTICE

P3

BTN 15-2 Assume you are preparing for a class presentation on the accounting for factory overhead. Prepare a set of notes to guide a presentation that addresses the questions below.

Required

1. Describe the four-step overhead process.
2. How are applied and actual factory overhead costs recorded in general ledger accounts?
3. Explain how underapplied or overapplied factory overhead impacts cost of goods sold.

Point: Have a student make the presentation in class, with another student acting as the instructor.

TEAMWORK IN ACTION

C1

BTN 15-3 Consider the activities of a medical clinic in your area.

Required

1. Is a job order costing system appropriate for the clinic? Explain.
2. Identify as many factors as possible to lead you to conclude that the clinic uses a job order system.

ENTREPRENEURIAL DECISION

C1

BTN 15-4 Refer to the chapter opener regarding Mark Wallace and his company, **Wallace Detroit Guitars**. All successful businesses track their costs, and it is especially important for start-up businesses to monitor and control costs.

Required

1. Assume that Mark uses a job order costing system. For the basic cost category of direct materials, explain how Mark's job cost sheet would differ from a job cost sheet for a service company.
2. For the basic cost categories of direct materials, direct labor, and overhead, provide examples of the types of costs that would fall into each category for Wallace Detroit Guitars.

16 Process Costing and Analysis

page 618

Chapter Preview

PROCESS OPERATIONS

C1 Organization of process operations

Comparing process and job order systems

NTK 16-1

PROCESS COSTING DEMONSTRATION

P1 Physical flow of units

Equivalent units of production (EUP)

Cost per EUP

Cost assignment

P2 Production cost report

NTK 16-2, 16-3

ACCOUNTING FOR COSTS AND TRANSFERS

P3 Accounting for production costs

P4 Accounting for transfers

A1 Hybrid costing

C2 *Appendix:* FIFO

NTK 16-4

Learning Objectives

CONCEPTUAL

C1 Explain process costing and contrast it with job order costing.

C2 *Appendix*—Compute process activity costs and prepare a production cost report using FIFO.

ANALYTICAL

A1 Illustrate a hybrid costing system and analyze process system yield.

PROCEDURAL

P1 Compute process activity costs using weighted average.

P2 Prepare a production cost report using weighted average.

P3 Record the flow of production costs in process costing.

P4 Record the transfer of goods across departments, to Finished Goods Inventory, and to Cost of Goods Sold.

¡Todos Gritamos por Helado!

“Always room for ice cream”—**Suzy Batlle**

MIAMI—Suzy Batlle was new to running a business when she started **Azucar Ice Cream Company** (azucaricecream.com). But Suzy knew ice cream, having grown up in a family that ate it nearly every night. “We Cuban people love ice cream,” exclaims Suzy from her shop in the Little Havana section of Miami. Suzy took classes to learn the ice cream–making process and mastered the permitting process to open her store.

Suzy’s recipes use tropical fruits found throughout Central and South America—ruby-red guava, mamey, papaya, and plantains, for example—and stem from an adventurous streak passed down through her family.

“My grandmother traveled extensively,” explains Suzy, “and always made ice cream with the new exotic fruits she found. We have Cuban-inspired flavors you won’t see anywhere else.”

Ice cream is made in a process operation and produced in large volumes. “I’ll buy 1,000 pounds of mamey at a time” says Suzy. These perishable raw materials enter a continuous production process that also uses direct labor (Suzy has 14 employees) and overhead (depreciation on processing machines, for example).

Each production run yields many gallons of ice cream. Suzy uses a process costing system to determine her production costs per gallon. Suzy credits courses from nearby Miami Dade College with improving her management and accounting skills.

Azucar is flourishing, and Suzy opened a new store in Dallas. Suzy advises, “Work hard and love what you do!”

Sources: *Azucar Ice Cream Company website*, January 2021; *Saveur*, July 7, 2016; *Miami Today*, February 2, 2016; *Mic.com*, November 28, 2016

PROCESS OPERATIONS

C1

Explain process costing and contrast it with job order costing.

Process operations involve the mass production of similar products in a continuous flow of sequential processes. Process operations use a standardized process to make large volumes of similar products; job order operations use a customized process to make unique products.

Kraft Heinz makes trail mix in a process operation at its Planters division. Ingredients are often roasted, then blended and carefully mixed, in a standardized process that can produce large quantities of trail mix to exact specifications. Process operations also extend to services, such as mail sorting in large post offices and order processing in retailers like **Amazon**. Other companies using process operations follow.

Company	Product	Company	Product
General Mills	Cereals	PepsiCo	Beverages
Pfizer	Pharmaceuticals	Kar's	Trail mix
Procter & Gamble	Household products	Hershey	Chocolate
Coca-Cola	Soft drinks	Suja	Organic juice

Organization of Process Operations

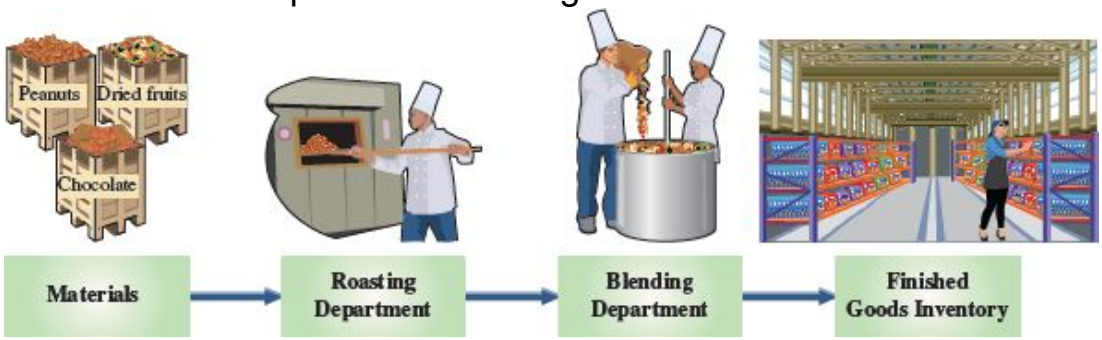
Each of the above products is made in a series of repetitive *processes*, or steps. Understanding such processes is crucial for measuring product costs. Increasingly, process operations use machines and automation to control product quality and reduce manufacturing costs.

In a process operation, each process is a separate *production department* or *workstation*. Each process applies direct labor, overhead, and often direct materials to move the product toward completion. The final process or department in the series finishes the goods and makes them ready for sale.

Exhibit 16.1 shows the production of FitMix, an organic trail mix by GenX Company. FitMix is manufactured in a continuous, two-process operation: Roasting and Blending.

EXHIBIT 16.1

GenX Process Operations: Making Trail Mix



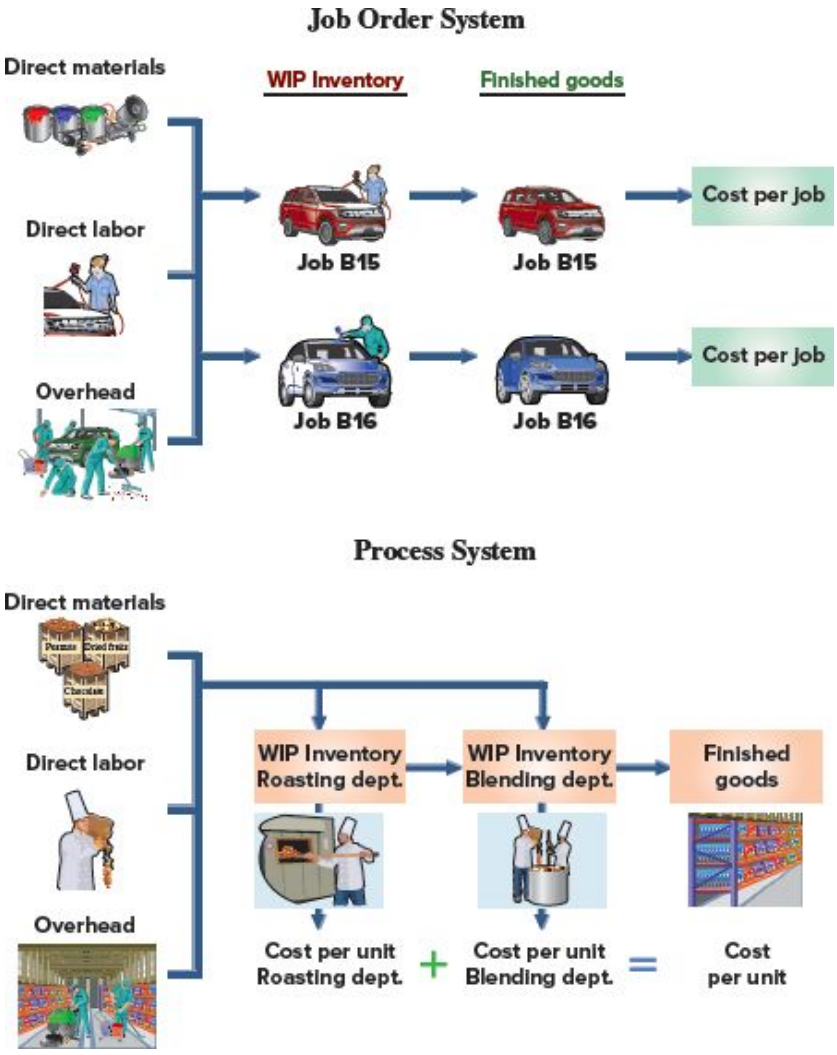
In the first process (Roasting department), the company roasts with oils, salts, and organic peanuts. The roasted peanuts are then passed to the Blending department, the second process. In the Blending department, workers blend organic chocolate pieces and organic dried fruits with the peanuts from the first process. The blended mix is then inspected and packaged for sale.

Comparing Process and Job Order Costing Systems

Exhibit 16.2 shows similarities and differences in job order and process systems.

EXHIBIT 16.2

Comparing Process and Job Order Costing



Job order and process operations share these features.

- Both use materials, labor, and overhead costs.
- Both aim to compute the cost per unit of product (or service).

Job order and process operations have important differences. page 621

Cost object	Job order system: cost object is a job or job lot. Process system: cost object is the process or department.
Cost per unit	Job order system: measures cost per unit after completion of a job. Process system: measures unit costs at the end of a period (such as a month) by combining costs per unit from each process.
Internal reporting	Job order system: job cost sheets. Process system: production cost report.
Work in process inventory	Job order system: one Work in Process Inventory account. Process system: one Work in Process Inventory account *per process*.

NEED-TO-KNOW 16-1

Job Order vs. Process Costing Systems

C1

Complete the table with either a *yes* or *no* regarding the attributes of job order and process costing systems.

	Job Order	Process
Uses direct materials, direct labor, and overhead costs	a.____	e.____
Uses job cost sheets to accumulate costs	b.____	f.____
Typically uses several Work in Process Inventory accounts	c.____	g.____
Yields a cost per unit of product	d.____	h.____

Solution

a. yes **b**. yes **c**. no **d**. yes **e**. yes **f**. no **g**. yes **h**. yes

Do More: QS 16-1, QS 16-2, QS 16-3, E 16-1, E 16-2

PROCESS COSTING DEMONSTRATION

P1

Compute process activity costs using weighted average.

We provide a step-by-step demonstration of process costing for GenX's production of FitMix, an organic trail mix. FitMix is manufactured in a continuous, two-process operation: Roasting and Blending. We focus on the first process, Roasting. Accounting for each process or department in a process operation follows four steps.

1. **Determine the physical flow of units.**
2. **Compute equivalent units of production.**
3. **Compute cost per equivalent unit of production.**
4. **Assign and reconcile costs.**

The following sections on process costing use the *weighted average method*. The *FIFO method* is in Appendix 16A. These methods make different assumptions about cost flows.

- Weighted average method combines units and costs across two periods in computing equivalent units and cost per equivalent unit.
- FIFO method computes equivalent units and cost per equivalent unit based only on production activity in the current period.

The objectives, concepts, and journal entries (but not dollar amounts) are the same under both methods; the computation of equivalent units differs. Both methods are used in practice, but weighted average requires fewer calculations. Differences between the two methods are often small. With a just-in-time inventory system, those differences are even less because inventories are immaterial.

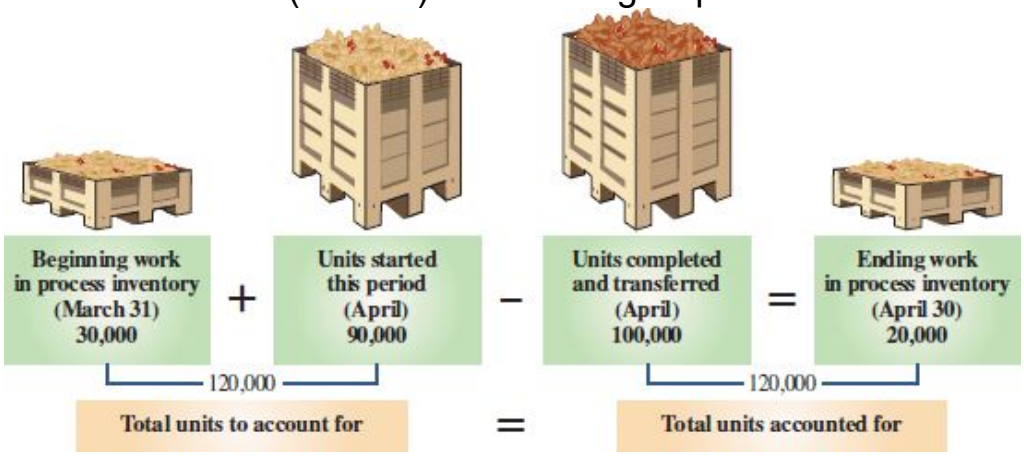
Step 1: Determine Physical Flow of Units

Step 1 is to determine the number of units to account for and units accounted for. For FitMix, a unit is a cup of trail mix.

Exhibit 16.3 shows production data in units for the first process: page 622 Roasting department. On the left we compute the 120,000 *units to account for*, which are the 30,000 units in beginning work in process inventory plus 90,000 units started this period. On the right we reconcile (match) with the 120,000 *units accounted for*, which are the 100,000 units completed and transferred out plus 20,000 units in ending work in process inventory.

EXHIBIT 16.3

Production Data (in units) for Roasting Department



A *physical unit flow reconciliation* proves that (1) beginning units in process plus those started in the period equals the (2) ending units in process plus those completed and transferred out in the period. A physical unit flow reconciliation for the Roasting department for April is in Exhibit 16.4.

EXHIBIT 16.4

Physical Unit Flow Reconciliation

Roasting Department			
Units to Account For		**Units Accounted For**	
Beginning work in process	30,000 units	Units completed and transferred out	100,000 units
Units started this period	90,000 units	Ending work in process	20,000 units
Total units to account for	**120,000 units**	Total units accounted for	**120,000 units**

reconciled

WIP–Roasting (in units)			
Beginning	30,000		
Started	90,000		
To account for	120,000		
		100,000	Transferred out
Ending	20,000		

Step 2: Compute Equivalent Units of Production

Step 2 is to compute *equivalent units of production*. **Equivalent units of production (EUP)** is the number of whole units that *could have been* started and completed given the costs incurred in the period. The reason we use equivalent units of production is that some units are not finished at the end of a period but still need to be assigned costs.

Point: Whole units is the number of physical units in production in a period.

To demonstrate, 10 cups of trail mix 60% through the production process is *equivalent to* 6 (10 × 60%) cups of completed trail mix. This means that the cost of 10 units that are 60% complete is *equivalent to* the cost of 6 completed units.

Exhibit 16.5 shows *percent complete* data for direct materials and conversion for the Roasting department. Those percents are needed to compute equivalent units of production. In both Roasting and Blending, direct materials enter production at the beginning of the process, while conversion costs occur throughout each department's processing. **Conversion costs** consist of direct labor and applied overhead. They are called conversion costs because they are the costs of converting raw materials into finished goods.

Point: Units transferred out are always 100% complete for direct materials and conversion.

We see that beginning work in process inventory is 100% complete for direct materials but only 65% complete for conversion. Ending work in

process inventory is 100% complete for direct materials but only 25% complete for conversion. Units completed and transferred to the Blending department are 100% complete for both direct materials and conversion.

We separately compute equivalent units of production for direct materials and conversion costs. This is because direct materials and conversion costs typically enter processes at different rates. We see this for FitMix in Exhibit 16.5 where there are different percents of completion for direct materials and conversion costs for both beginning and ending work in process inventories.

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EXHIBIT 16.5

Percent Complete Data

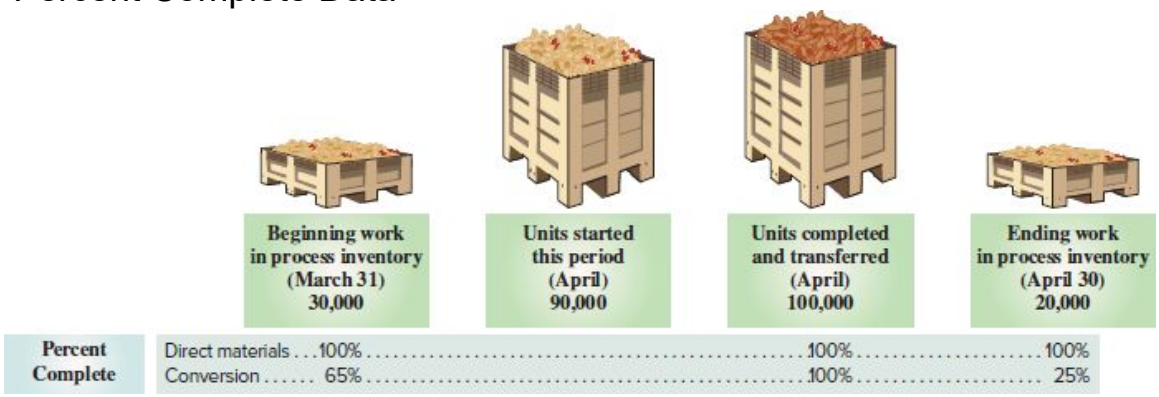

Exhibit 16.6 shows the formula to compute equivalent units of production under the weighted average method for both direct materials and conversion costs.

EXHIBIT 16.6

Computing EUP—Weighted Average Method

$$\text{Equivalent units of production (EUP)} = \text{Equivalent units completed and transferred out} + \text{Equivalent units in ending work in process}$$

We compute the equivalent units of production (EUP) for both direct materials and conversion in Exhibit 16.7. We start with the 120,000 units accounted for from Step 1 and convert them to EUP. Units completed and transferred out are *always* 100% complete for both materials and conversion. This means the Roasting department completed and transferred 100,000 EUP for both materials and conversion.

EXHIBIT 16.7

Equivalent Units of Production—Weighted Average

	Roasting Department				
		Direct Materials		Conversion	
	Units	Percent Complete	Equivalent Units of Production	Percent Complete	Equivalent Units of Production
Completed and transferred out	100,000	100%	100,000	100%	100,000
Ending work in process	20,000	100%	20,000	25%	5,000
			120,000 EUP		105,000 EUP

Units Accounted For (Step 1)

Ending work in process inventory has 20,000 partially complete units. Direct materials is 100% complete. This means it has 20,000 EUP (20,000 units × 100%). Conversion is 25% complete. This means it has 5,000 EUP (20,000 units × 25%).

Total equivalent units of production equals 120,000 for direct materials (100,000 + 20,000) and 105,000 for conversion (100,000 + 5,000). The amount of inputs used to produce 100,000 completed units and to start 20,000 additional units is equivalent to the amount of direct materials in 120,000 whole units and the amount of conversion in 105,000 whole units.

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NEED-TO-KNOW 16-2

Compute EUP (Weighted Average)

P1

A department began the month with 8,000 units in work in process inventory. These units were 100% complete with respect to direct materials and 40% complete with respect to conversion.

During the month, the department started 56,000 units and completed and transferred out 58,000 units. Ending work in process inventory includes 6,000 units, 80% complete with respect to direct materials and 70% complete with respect to conversion. The weighted average method of process costing is used.

1. Compute the department's equivalent units of production for the month for direct materials.
2. Compute the department's equivalent units of production for the month for conversion.

Solution

	Units	Direct Materials		Conversion	
		Percent Complete	Equivalent Units of Production	Percent Complete	Equivalent Units of Production
Completed and transferred out . .	58,000	100%	58,000	100%	58,000
Ending work in process	6,000	80%	4,800	70%	4,200
			62,800 EUP		62,200 EUP

Do More: QS 16-5, QS 16-10, E 16-4, E 16-8

Step 3: Compute Cost per Equivalent Unit

Step 3 uses equivalent units of production from step 2, along with cost data, to compute cost per equivalent unit. Production cost data for the Roasting department are in Exhibit 16.8. *Recall:* Conversion costs equal direct labor costs plus overhead costs applied.

EXHIBIT 16.8

Roasting Department Production Cost Data

Roasting Department: Production Cost Data (April)		
Beginning work in process inventory		
Direct materials	$ 81,000	
Conversion	108,900	$ 189,900
Costs added this period		
Direct materials	279,000	
Conversion	376,200	655,200
Total production costs		$845,100

To compute **cost per equivalent unit**, we add costs for beginning work in process to costs added this period, and then divide by equivalent units of production from step 2. Exhibit 16.9 shows this separately for direct

materials and for conversion. The cost for direct materials is $3.00 per EUP, and for conversion is $4.62 per EUP.

EXHIBIT 16.9

Cost per Equivalent Unit of Production—Weighted Average

Roasting Department		
Cost per Equivalent Unit of Production	**Direct Materials**	**Conversion**
Costs of beginning work in process	$ 81,000	$108,900
Costs added this period	279,000	376,200
Total costs	$360,000	$485,100
÷ Equivalent units of production (from step 2)	120,000 EUP	105,000 EUP
= Cost per equivalent unit of production	$3.00 per EUP	$4.62 per EUP

$$\text{Cost per EUP} = \frac{\text{Total costs}}{\text{EUP}}$$

Step 4: Assign and Reconcile Costs

Step 4 uses the EUP from step 2 and the cost per EUP from step 3 to assign costs to the 100,000 units completed and transferred out and to the 20,000 units in ending work in process. Those costs are accounted for in Exhibit 16.10.

EXHIBIT 16.10

Cost Assignment—Weighted Average

From Step 2 From Step 3

Roasting Department				
	EUP	**Cost per EUP**	**Total Cost**	
Completed and transferred out				
Direct materials	100,000	$3.00	$300,000	
Conversion	100,000	$4.62	462,000	
				$762,000
Ending work in process				
Direct materials	20,000	$3.00	$ 60,000	
Conversion	5,000	$4.62	23,100	
				83,100
Total costs accounted for				**$845,100**

Point: See that 'Total costs accounted for' equals 'Total production costs' to account for from Exhibit 16.8.

Cost of Units Completed and Transferred Out The 100,000 units completed and transferred out used 100,000 EUP of direct materials and 100,000 EUP of conversion. We assign $300,000 (100,000 EUP × $3.00 per EUP) of direct materials cost and $462,000 (100,000 EUP × $4.62 per EUP) of conversion cost to those units. Total cost of the 100,000 units completed and transferred out is $762,000 ($300,000 + $462,000).

Cost of Units in Ending Work in Process Inventory There are 20,000 units in work in process inventory at period-end. For direct materials, those units have 20,000 EUP (from step 2) at a cost of $3.00 per EUP (from step 3), which results in direct materials cost of work in process inventory of $60,000 (20,000 EUP × $3.00 per EUP). For conversion, we use the 5,000 EUP (from step 2) and the $4.62 conversion cost per EUP (from step 3) to compute conversion costs for work in process inventory of $23,100 (5,000 EUP × $4.62 per EUP). Total cost of work in process inventory at period-end is $83,100 ($60,000 + $23,100).

Reconciliation Management verifies that total costs assigned to units completed and transferred out plus the costs of units in ending work in process (from Exhibit 16.10) equal the costs incurred by production. Exhibit 16.10 shows total costs accounted for of $845,100 equals total production costs of $845,100 from Exhibit 16.8.

Using Process Cost Information

Process cost information is used to:

- **Control costs**—The department's equivalent costs per unit can be compared with prior months. If materials and/or conversion costs have changed a lot, managers should determine why and take corrective action.
- **Evaluate performance**—Top management can evaluate department managers based on their control of costs. Costs per equivalent unit are often compared to budgeted amounts.
- **Evaluate process improvements**—Organizations strive to improve processes. The success of process improvements can be evaluated by examining how costs per equivalent unit change after process improvements.
- **Prepare financial statements**—Cost of goods sold and ending inventory amounts computed from process cost data are reported on the income statement and balance sheet, respectively.

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NEED-TO-KNOW 16-3

Cost per EUP and Cost Assignment

A department reports the following equivalent units of production and production cost data for the month. The weighted-average method is used.

	Direct Materials	Conversion
	EUP	EUP
Completed and transferred out	58,000	58,000
Ending work in process	4,800	4,200
	62,800 EUP	62,200 EUP

Beginning work in process		
Direct materials	$ 26,960	
Conversion	25,700	$ 52,660
Costs added this period		
Direct materials	98,640	
Conversion	129,800	228,440
Total production costs		$281,100

1. Compute the department's cost per equivalent unit for direct materials and conversion for the month.
2. Assign costs to units completed and transferred out and to ending work in process inventory.

Solution

1.

Cost per Equivalent Unit of Production	Direct Materials	Conversion
Costs of beginning work in process	$ 26,960	$ 25,700
Costs added this period	98,640	129,800
Total costs	$125,600	$155,500
÷ Equivalent units of production	62,800 EUP	62,200 EUP
= Cost per equivalent unit of production	$2.00 per EUP	$2.50 per EUP

2.

	EUP	Cost per EUP	Total Cost	
Completed and transferred out				
Direct materials	58,000	$2.00	$116,000	
Conversion	58,000	$2.50	145,000	
				$261,000
Ending work in process				
Direct materials	4,800	$2.00	$ 9,600	
Conversion	4,200	$2.50	10,500	
				20,100
Total costs accounted for				$281,100

Do More: QS 16-11, E 16-6

Production Cost Report

P2

Prepare a production cost report using weighted average.

The **production cost report**, or *process cost summary*, summarizes the four-step process. It shows the results of Exhibits 16.4, 16.7, 16.9, and 16.10 in one report. The production cost report for the Roasting department is in Exhibit 16.11.

1. Physical flow of units. This reconciles the beginning units in process and those started in a period with the ending units in process and those completed and transferred out.
2. Equivalent units of production for direct materials and for conversion.
3. Costs per equivalent unit of production for direct materials and for conversion.
4. Assignment of total costs among units worked on in the period.

The $762,000 is the total cost of the 100,000 units transferred out of the Roasting department to the Blending department. The $83,100 is the cost of the 20,000 partially completed units in ending work in process inventory in the Roasting department. The assigned costs are then added to show that the total $845,100 cost charged to the Roasting department is now assigned to the units.

EXHIBIT 16.11

Production Cost Report—Weighted Average

GenX—ROASTING DEPARTMENT
Production Cost Report (Weighted Average Method)
For Month Ended April 30

① **Units to Account For:**

Beginning work in process	30,000
Units started this period	90,000
Total units to account for	120,000

Units Accounted For:

Completed and transferred out	100,000
Ending work in process	20,000
Total units accounted for	120,000

② **Equivalent Units of Production (EUP)**

	Units	Direct Materials: Percent Complete	Direct Materials: Equivalent Units of Production	Conversion: Percent Complete	Conversion: Equivalent Units of Production
Completed and transferred out	100,000	100%	100,000	100%	100,000
Ending work in process	20,000	100%	20,000	25%	5,000
			120,000 EUP		105,000 EUP

③ **Cost per EUP**

	Direct Materials	Conversion
Costs of beginning work in process	$ 81,000	$108,900
Costs added this period	279,000	376,200
Total costs	$360,000	$485,100
÷ Equivalent units of production	120,000 EUP	105,000 EUP
Cost per EUP	$3.00 per EUP	$4.62 per EUP

④ **Cost assignment**

	EUP	Cost per EUP	Total Cost	
Completed and transferred out				
Direct materials	100,000	$3.00	$300,000	
Conversion	100,000	$4.62	462,000	
				$ 762,000
Ending work in process				
Direct materials	20,000	$3.00	$ 60,000	
Conversion	5,000	$4.62	23,100	
				83,100
Total costs accounted for				$845,100

WIP Inventory–Roasting

Beginning	189,900	
Direct materials	279,000	
Conversion	376,200	
Costs to account for	845,100	
		762,000 Transferred out
Ending	83,100	

ACCOUNTING FOR PROCESS COSTING

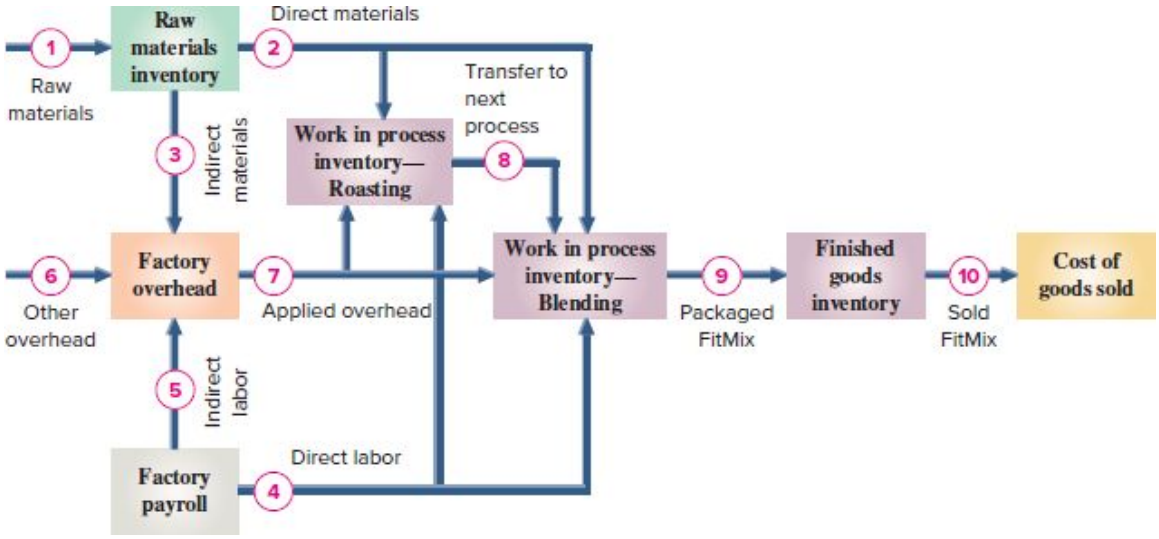
P3

Record the flow of production costs in process costing.

Exhibit 16.12 shows the flow of materials, labor, and overhead costs through the manufacturing processes. There are separate Work in Process Inventory accounts for the Roasting and Blending departments; when goods are packaged and ready for sale, their costs are transferred to the Finished Goods Inventory account. When goods are sold, their costs are transferred to Cost of Goods Sold.

EXHIBIT 16.12

Process Manufacturing Operations and Costs: GenX



While many companies combine direct labor and overhead into conversion costs when computing costs per equivalent unit (as we showed), direct labor and overhead costs are accounted for separately in general ledger accounts. Because overhead costs typically cannot be tied to individual processes, most process operations use a single Factory Overhead account to accumulate actual and applied overhead costs.

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Exhibit 16.13 presents cost data for GenX's Roasting and Blending departments. We use these data to show the journal entries in a process costing system.

EXHIBIT 16.13

Cost Data—GenX (Weighted Average)

GenX—Cost Data for Month Ending April 30

Raw materials inventory (March 31)	$100,000	Factory payroll for April	
Beginning work in process inventories (March 31)		Direct labor—Roasting	$171,000
Work in process—Roasting	$189,900	Direct labor—Blending	183,160
Work in process—Blending	151,688	Indirect labor	78,350
Materials purchased (on credit)	$400,000	Other overhead costs added in April	
Materials requisitions during April		Insurance expense—Factory	$ 11,930
Direct materials—Roasting	$279,000	Utilities expense—Factory	7,945
Direct materials—Blending	102,000	Depreciation expense—Factory equipment	220,650
Indirect materials	71,250	Other (paid in cash)	34,867

Accounting for Production Costs

Materials Costs In Exhibit 16.12, arrow line ① reflects the purchase of raw materials. These materials include organic peanuts, chocolate pieces,

dried fruits, oil, salt, and packaging. GenX uses a perpetual inventory system and makes all purchases on credit. The summary entry for receipt of raw materials in April follows.

Assets	= Liabilities + Equity
+400,000	+400,000

①	Raw Materials Inventory	400,000	
	Accounts Payable		400,000
	Purchased materials on credit for factory use.		

Arrow line ② in Exhibit 16.12 shows the flow of *direct* materials to production in the Roasting and Blending departments. The manager of a process usually obtains materials by submitting a *materials requisition* to the materials storeroom manager. The entry to record the use of direct materials follows. These direct materials costs flow into each department's separate Work in Process Inventory account.

Assets	= Liabilities + Equity
+279,000	
+102,000	
−381,000	

②	Work in Process Inventory—Roasting	279,000	
	Work in Process Inventory—Blending	102,000	
	Raw Materials Inventory		381,000
	Record direct materials used.		

Arrow line ③ reflects the flow of *indirect* materials to factory overhead. These materials cannot be cost-effectively traced to any specific production process or department but are used in production. These costs are recorded in the single Factory Overhead account with this entry.

③	Factory Overhead	71,250	
	Raw Materials Inventory		71,250
	Record indirect materials used.		

Labor Costs Factory payroll costs are $171,000 for Roasting department direct labor, $183,160 for Blending department direct labor, and $78,350 for indirect labor. This total factory payroll of $432,510 is assigned to either Work in Process Inventory (for direct labor) or Factory Overhead (for indirect labor).

Arrow line ④ shows use of *direct* labor. The following entry page 629 records direct labor used. Direct labor costs flow into each department's separate Work in Process Inventory account.

④	Work in Process Inventory—Roasting	171,000	
	Work in Process Inventory—Blending	183,160	
	Factory Wages Payable		354,160
	Record direct labor used.		

Assets	= Liabilities + Equity
+171,000	+354,160
+183,160	

Arrow line ⑤ reflects *indirect* labor costs. This is labor that supports or supervises production in both the Roasting and Blending departments. For

example, they order materials and deliver them to the factory floor, repair equipment, program computers used in production, clean up, and move goods across departments. The following entry records indirect labor costs.

⑤	Factory Overhead	78,350	
	Factory Wages Payable		78,350
	Record indirect labor used.		

Other Factory Overhead Costs Overhead costs other than indirect materials and indirect labor are reflected by arrow line ⑥. Other overhead items include costs of insuring production assets, renting the factory building, using factory utilities, and depreciating factory equipment not directly related to a specific process. The following entry records these other overhead costs.

⑥	Factory Overhead	275,392	
	Prepaid Insurance		11,930
	Utilities Payable		7,945
	Cash		34,867
	Accumulated Depreciation—Factory Equipment		220,650
	Record other overhead costs incurred.		

Applying Overhead to Work in Process Companies use *predetermined overhead rates* to apply overhead. These rates are estimated at the beginning of a period and used to apply overhead during the period. This is important for process costing, where goods are transferred across departments before the entire production process is complete. Factory overhead is applied to processes using activity bases such as direct labor or machine hours.

Arrow line ⑦ in Exhibit 16.12 shows factory overhead applied to the two production departments. GenX applies overhead using a predetermined rate of 120% of direct labor cost in Exhibit 16.14.

EXHIBIT 16.14

Applying Factory Overhead

Production Department	Direct Labor Cost	Predetermined Rate	Overhead Applied
Roasting	$171,000	120%	$205,200
Blending	183,160	120	219,792
Total			$424,992

GenX records applied overhead with this entry.

⑦	Work in Process Inventory—Roasting	205,200	
	Work in Process Inventory—Blending	219,792	
	Factory Overhead		424,992
	Applied overhead at 120% of direct labor.		

Point: GenX's applied and actual overhead both equal $424,992, so no period-end closing entry for factory overhead is recorded. If actual overhead > applied overhead, we debit cost of goods sold and credit factory overhead for the difference. If applied overhead < actual overhead, we debit factory overhead and credit cost of goods sold for the difference.

page 630

Decision Ethics

Entrepreneur Your company makes similar products for three different customers. One customer demands 100% quality inspection of products at your location before shipping. The added costs of that inspection are spread across all three customers. If you charge the customer the costs of 100% quality inspection, you could lose that customer and experience a loss. Moreover, your other two customers do not question the amounts they pay. What actions (if any) do you take? ■ *Answer:* By spreading the added quality-related costs across three customers, the price you charge is lower for the customer that demands the 100% quality inspection. You recover much of the added costs from the other two customers. This act likely breaches the trust placed by the other two customers. You should consider renegotiating the pricing and/or quality test agreement with this one customer (at the risk of losing this customer).

NEED-TO-KNOW 16-4

Overhead Rate and Costs

P3

Tower Mfg. applies overhead based on machine hours. Tower estimates it will incur $200,000 of total overhead costs and use 10,000 machine hours this year. During February, the Fabricating department used 425 machine hours and the Assembly department used 375 machine hours. In addition, Tower incurred actual overhead costs as follows during February: indirect materials, $1,800; indirect labor, $5,700; depreciation on factory equipment, $8,000; and utilities payable, $500.

1. Compute the predetermined overhead rate.
2. Prepare journal entries to record (a) overhead applied for the Fabricating department and the Assembly department for February and (b) actual overhead costs incurred during February for indirect materials, indirect labor, and other overhead.

Solution

1. Predetermined overhead rate = Estimated overhead costs ÷ Estimated activity base
= $200,000/10,000 machine hours = $20 per machine hour

2a.

Work in Process Inventory—Fabricating	8,500	
Work in Process Inventory—Assembly	7,500	
Factory Overhead		16,000
Applied overhead at $20 per machine hour.		

2b.

Factory Overhead	1,800	
Raw Materials Inventory		1,800
Record indirect materials used.		
Factory Overhead	5,700	
Factory Wages Payable		5,700
Record indirect labor used.		
Factory Overhead	8,500	
Accumulated Depreciation—Factory Equipment		8,000
Utilities Payable		500
Record other actual overhead used.		

Do More: QS 16-25, E 16-20, E 16-21

Accounting for Transfers

P4

Record the transfer of goods across departments, to Finished Goods Inventory, and to Cost of Goods Sold.

Transfers across Departments Arrow line ⑧ in Exhibit 16.12 shows the transfer of partially completed units from Roasting to Blending. The production cost report for the Roasting department (Exhibit 16.11) shows that the 100,000 units transferred to the Blending department are assigned a cost of $762,000. The entry to record this transfer follows.

Assets = Liabilities + Equity
+762,000
−762,000

⑧	Work in Process Inventory—Blending	762,000	
	Work in Process Inventory—Roasting		762,000
	Transfer units from Roasting to Blending.		

Units and costs *transferred out* of the Roasting department are *transferred into* the Blending department. Exhibit 16.15 shows this transfer

using T-accounts for the separate Work in Process Inventory accounts (first in units and then in dollars).

EXHIBIT 16.15

Transfers using T-accounts

WIP Inventory—Roasting (Units)

Beginning	30,000 units		
Started	90,000 units		
Subtotal	120,000 units	100,000 units transferred to Blending	
Ending	20,000 units		

WIP Inventory—Blending (Units)

Beginning	12,000 units		
Transferred from Roasting	100,000 units		
Subtotal	112,000 units	97,000 units transferred to Finished Goods Inventory	
Ending	15,000 units		

WIP Inventory—Roasting ($)

Beginning*	189,900		
Direct materials	279,000		
Conversion	376,200		
Subtotal	845,100	762,000 Transferred to Blending	
Ending	83,100		

WIP Inventory—Blending ($)

Beginning	151,688		
Transferred from Roasting	762,000		
Direct materials	102,000		
Conversion	402,952		
Subtotal	1,418,640	1,262,940 Transferred to Finished Goods	
Ending	155,700		

*$81,000 direct materials + $108,900 conversion

We see that the Blending department began the month with 12,000 units in beginning inventory with a cost of $151,688. Then 100,000 units and costs of $762,000 are transferred to the Blending department from the Roasting department. The Blending department adds direct materials costs of $102,000 and conversion costs of $402,952 during the month.

Industryview/Getty Images

Transfer to Finished Goods Arrow line ⑨ in Exhibit 16.12 shows the transfer of units and costs from the Blending department to finished goods inventory. The Blending department transferred 97,000 completed units along with costs of $1,262,940 to finished goods. The entry to record this transfer follows.

Computing Cost of Goods Sold Arrow line ⑩ shows the sale of finished goods. Assume that GenX sold 103,000 units of FitMix this

period, and that its beginning finished goods inventory was 26,000 units with a cost of $338,520. Also assume that its ending finished goods inventory consists of 20,000 units at a cost of $260,400. Using this information, cost of goods sold is computed in Exhibit 16.16.

EXHIBIT 16.16

Cost of Goods Sold

(9)	Finished Goods Inventory	1,262,940	
	Work in Process Inventory—Blending		1,262,940
	Record transfer of completed goods.		

Assets = Liabilities + Equity
+1,262,940
−1,262,940

Finished Goods Inventory

Beginning	338,520		
COGM	1,262,940		
Available	1,601,460		
		COGS	1,341,060
Ending	260,400		

GenX—Cost of Goods Sold

Beginning finished goods inventory	$ 338,520
+ Cost of goods manufactured	1,262,940
= Cost of goods available for sale	1,601,460
− Ending finished goods inventory	260,400
= Cost of goods sold	$1,341,060

Sales and the Transfer to Cost of Goods Sold GenX's selling price for FitMix is $18.60 per unit. The entry to record sales of 103,000 units (on credit) for this period follows (103,000 units × $18.60 price per unit = $1,915,800).

(10)	Accounts Receivable	1,915,800	
	Sales		1,915,800
	Record sales for April.		

Assets = Liabilities + Equity
+1,915,800 +1,915,800

The entry to record cost of goods sold for this period follows. page 632 This entry moves production costs from the balance sheet to the income statement.

Assets = Liabilities + Equity
−1,341,060 −1,341,060

(10)	Cost of Goods Sold	1,341,060	
	Finished Goods Inventory		1,341,060
	Record cost of goods sold for April.		

Financial Statement Reporting GenX prepares monthly financial statements. It reports the following on its April income statement (partial) and April 30 balance sheet (partial).

GenX Income Statement (partial) For Month Ended April 30	
Sales	$1,915,800
Cost of goods sold	1,341,060
Gross profit	$ 574,740

GenX Balance Sheet (partial) April 30	
Inventories	
Raw materials*	$ 47,750
Work in process†	238,800
Finished goods‡	260,400
Total	$546,950

*Beginning raw materials inventory + Raw materials purchased – Materials requisitioned (from Exhibit 16.13)
= $100,000 + $400,000 – $279,000 – $102,000 – $71,250 = $47,750.

†Work in Process Inventory Roasting + Work in Process Inventory Blending (from Exhibit 16.15) = $83,100 + $155,700 = $238,800.

‡From Exhibit 16.16.

Cost per Completed Unit In making pricing decisions, managers often use the cost per completed unit. This computation for FitMix follows.

$$\text{Cost per completed unit} = \frac{\text{Cost of goods manufactured this period}}{\text{Number of units transferred to finished goods}} = \frac{\$1,262,940}{97,000} = \$13.02$$

The cost of goods manufactured for a process manufacturer equals the costs transferred from the last production process to finished goods inventory. GenX must set the price of FitMix high enough to cover its cost of completed units, plus its selling and general and administrative costs, to be profitable.

Trends in Process Operations

Process Design Concerns with production efficiency can lead companies to reorganize production processes. For example, instead of producing different types of computers in a series of departments, a separate work center for each computer type can be set up in one department. The process cost system is then changed to account for each work center's costs.

Just-in-Time Production With a just-in-time production system, inventory levels can be minimal. If raw materials are not ordered or received until needed, a Raw Materials Inventory account might be unnecessary. Instead, direct materials cost is immediately debited to Work in Process Inventory. Similarly, a Finished Goods Inventory account may not be needed. Instead, cost of goods manufactured might be immediately debited to Cost of Goods Sold.

Robotics and Automation Many production processes are automated. This results in reduced direct labor costs. Machine learning can lead to process improvements that reduce costs and increase efficiency.

PopTika/Shutterstock

Continuous Processing In some companies, like **Pepsi Bottling**, materials move continuously through the manufacturing process. In these cases, a **materials consumption report** summarizes the materials used and replaces materials requisitions.

Services Service-based businesses are common. For page 633 standardized services like oil changes and simple tax returns, computing costs based on the process is simpler and more useful than a cost per individual job. More complex service companies use process departments to perform specific tasks for consumers. Hospitals, for example, have radiology and physical therapy facilities, each with special equipment and trained employees. When patients need services, they are processed through departments to receive prescribed care.

Customer Orientation Focus on customer orientation leads to improved processes. A manufacturer of control devices improved quality and reduced production time by forming teams to study processes and suggest improvements. An ice cream maker studied customer tastes to develop a more pleasing ice cream texture.

CORPORATE SOCIAL RESPONSIBILITY

Food processor **General Mills** needs a steady supply of high-quality corn, oats, and sugarcane. These agricultural inputs face risks due to water scarcity and climate change that could disrupt General Mills's process operations and hurt profits.

Buying from suppliers that follow sustainable principles reduces risk of reputational damage. The Sustainability Accounting Standards Board (SASB) recommends that food processors disclose information on *priority*

food ingredients (those that are essential to the company's products), including details on the company's strategies to address strategic risks.

Consistent with SASB guidelines, General Mills disclosed the following in its recent *Global Responsibility Report*.

General Mills Performance Dashboard (partial)

Ingredient	Target*	Progress
Vanilla	100%	32%
Oats	100	90
Sugarcane	100	70
Palm oil	100	100

*Target and progress amounts are the percent of the ingredient sourced sustainably.
Source: General Mills, *Global Sustainability Report*, 2019.

Emily Michot/TNS/Newscom

In addition to making continuous process improvements to reduce materials waste and increase yield, Suzy Batlle, founder of **Azucar Ice Cream Company**, seeks high-quality fresh ingredients. For Suzy, buying from local suppliers provides a sustainable supply chain that benefits her business and the local community.

Decision Analysis — Hybrid Costing System

A1

Illustrate a hybrid costing system and analyze process system yield.

A **hybrid costing system** contains features of both process and job order operations and is also called an **operation costing system**. To illustrate, consider a car manufacturer's assembly line. The line resembles a process operation in that the assembly steps for each car are nearly identical. But the specifications of most cars have several

important differences. Each car assembled can be different from the previous car and the next car. This means that the costs of direct materials (subassemblies or components) for each car can differ. While the conversion costs can be accounted for using a process costing system, direct materials are accounted for using a job order system (separately for each car or type of car).

A hybrid system of processes requires a *hybrid costing system* to properly cost products or services. Assembly costs per car are computed using process costing. The costs of additional custom components are computed using job order costing. The costs page 634 of custom choices are then added to the assembly process costs to determine each car's total cost. To illustrate, consider the following information for a daily assembly process.

StudioByTheSea/Shutterstock

Hybrid Costs	Per Car
Direct materials (excluding wheels and sound system)	$10,600
Conversion	12,000
Assembly process costs	$22,600
Customer choices: Wheel types	$240; $330; $480
Customer choices: Sound system types	$620; $840; $1,360

The assembly process costs $22,600 per car. Depending on the type of wheels and sound system the customer requests, the cost of a car can range from $23,460 to $24,440. If the company's target markup is 20% above cost, its selling prices would range from $28,152 ($23,460 × 120%) to $29,328 ($24,440 × 120%).

Yield, which is a measure of *output* divided by *input*, can be used to measure the efficiency of process operations. If **Ford** entered enough direct materials into production to produce 10,000 Mustangs, but only 9,900 nondefective cars were produced, yield is computed as follows.

$$\text{Yield} = \frac{\text{Nondefective units produced}}{\text{Units that could have been produced}} = \frac{9{,}900}{10{,}000} = 99\%$$

If a trail mix manufacturer started 10,000 pounds of peanuts in production and ended with processed peanuts of 9,650 pounds, its yield

is 96.5% (9,650/10,000). Yield might be less than expected due to inferior direct materials or issues with the production process. When yields are lower than expected, managers ask why and take corrective action.

Analytics Insight

Right-Sized Using machine learning and data analytics, **Hershey** discovered that making candy in smaller sizes enables it to better control cooking temperatures and produce Twizzlers licorice in more precise weights. The company estimates savings of about $500,000 per batch from this process improvement. ■

NEED-TO-KNOW 16-5

COMPREHENSIVE 1

Weighted Average Method

Mortar Company produces a product that passes through two processes: Grinding and Mixing. Information related to its Grinding department manufacturing activities for July follows. The company uses the weighted average method of process costing.

Cost Data		
Beginning work in process		
Direct materials	$ 20,000	
Conversion	28,747	$ 48,747
Costs added this period		
Direct materials	$190,000	
Conversion	166,553	356,553
Total production costs		$405,300

Units Data	
Beginning work in process	5,000 units
Percent Complete: Direct materials	100%
Percent Complete: Conversion	70%
Units started this period	20,000 units
Units completed and transferred out	17,000 units
Ending work in process	8,000 units
Percent Complete: Direct materials	100%
Percent Complete: Conversion	20%

Required

page 635

Complete the requirements below for the Grinding department.

1. Prepare a physical unit flow reconciliation for July.
2. Compute the equivalent units of production in July for direct materials and conversion.
3. Compute the costs per equivalent unit of production in July for direct materials and conversion.

4. Assign costs to units completed and transferred out and to units in ending work in process inventory.

Solution

1. Physical unit flow reconciliation.

Units to Account For		Units Accounted For	
Beginning work in process. . .	5,000 units	Units completed and transferred out . .	17,000 units
Units started this period.	20,000 units	Ending work in process.	8,000 units
Total units to account for	**25,000 units**	Total units accounted for.	**25,000 units**

reconciled

2. Equivalent units of production (weighted average).

		Direct Materials		Conversion	
	Units	Percent Complete	Equivalent Units of Production	Percent Complete	Equivalent Units of Production
Completed and transferred out . . .	17,000	100%	17,000	100%	17,000
Ending work in process	8,000	100%	8,000	20%	1,600
			25,000 EUP		18,600 EUP

3. Costs per equivalent unit of production (weighted average).

Costs per Equivalent Unit of Production	Direct Materials	Conversion
Costs of beginning work in process.	$ 20,000	$ 28,747
Costs added this period	190,000	166,553
Total costs	$210,000	$ 195,300
÷ Equivalent units of production (from part 2)	25,000 EUP	18,600 EUP
= Costs per equivalent unit of production	$8.40 per EUP	$10.50 per EUP

4. Assign and reconcile costs (weighted average).

	EUP	Cost per EUP	Total Cost	
Completed and transferred out				
Direct materials	17,000	$ 8.40	$142,800	
Conversion	17,000	$10.50	178,500	
				$ 321,300
Ending work in process				
Direct materials	8,000	$ 8.40	$ 67,200	
Conversion	1,600	$10.50	16,800	
				84,000
Total costs accounted for.				$405,300

Cost Data (given)		
Beginning work in process		
Direct materials	$ 20,000	
Conversion	28,747	$ 48,747
Costs added this period		
Direct materials	$190,000	
Conversion	166,553	356,553
Total production costs . . .		$405,300

reconciled

NEED-TO-KNOW 16-6

COMPREHENSIVE 2

FIFO Method (Appendix 16A)

Refer to the information in Need-To-Know 16-5. For the Grinding department, complete requirements 1 through 4 using the **FIFO** method. (Round the cost per equivalent unit of conversion to two decimal places.)

SOLUTION

1. Physical unit flow reconciliation (FIFO).

Units started and completed = Units completed and transferred − Units in beginning work in process

12,000 units = 17,000 units − 5,000 units

Units to Account For		Units Accounted For	
Beginning work in process	5,000 units	Beginning work in process	5,000 units
Units started	20,000 units	Units started and completed	12,000 units
		Ending work in process	8,000 units
Total units to account for	25,000 units	Total units accounted for	25,000 units

reconciled

2. Equivalent units of production (FIFO).

		Direct Materials		Conversion	
	Units	Percent Added	Equivalent Units of Production	Percent Added	Equivalent Units of Production
Beginning work in process	5,000	0%	0	30%	1,500
Started and completed	12,000	100%	12,000	100%	12,000
Ending work in process	8,000	100%	8,000	20%	1,600
			20,000 EUP		15,100 EUP

3. Costs per equivalent unit of production (FIFO).

Costs per Equivalent Unit of Production	Direct Materials	Conversion
Costs added this period	$190,000	$ 166,553
÷ Equivalent units of production (from part 2)	20,000 EUP	15,100 EUP
= Costs per equivalent unit of production	$9.50 per EUP	$11.03 per EUP

4. Assign and reconcile costs (FIFO).

	EUP	Cost per EUP	Total Cost	
Beginning work in process				$ 48,747
To complete beginning work in process				
Direct materials	0	$ 9.50	$ 0	
Conversion	1,500	$11.03	16,545	
				16,545
Started and completed				
Direct materials	12,000	$ 9.50	114,000	
Conversion	12,000	$11.03	132,360	
				246,360
Completed and transferred out				311,652
Ending work in process				
Direct materials	8,000	$ 9.50	76,000	
Conversion	1,600	$11.03	17,648	
				93,648
Total costs accounted for				$405,300

Cost Data		
Beginning work in process inventory		
Direct materials	$ 20,000	
Conversion	28,747	$ 48,747
Costs added this period		
Direct materials	190,000	
Conversion	166,553	356,553
Total costs to account for		$405,300

reconciled

NEED-TO-KNOW 16-7

COMPREHENSIVE 3

Journal Entries for Process Costing

Garcia Manufacturing produces a product that passes through a molding process and then through an assembly process. Partial information related to its manufacturing activities for July follows.

Direct materials	
Raw materials purchased on credit	$400,000
Direct materials used—Molding	190,000
Direct materials used—Assembly	88,600
Direct Labor	
Direct labor—Molding	$ 42,000
Direct labor—Assembly	55,375
Factory Overhead (Actual costs)	
Indirect materials used	$ 51,400
Indirect labor used	50,625
Other overhead costs	71,725
Total factory overhead incurred	$173,750

Factory Overhead Applied	
Molding (150% of direct labor)	$ 63,000
Assembly (200% of direct labor)	110,750
Total factory overhead applied	$173,750
Cost Transfers	
From Molding to Assembly	$277,200
From Assembly to finished goods	578,400
From finished goods to cost of goods sold	506,100
Sales	$900,000

Required

Prepare journal entries to record the transactions and events of July for (a) raw materials purchases, (b) direct materials usage, (c) indirect materials usage, (d) direct labor usage, (e) indirect labor usage, (f) other overhead costs (paid in cash), (g) application of overhead to the two

departments, (h) transfer of partially completed goods from Molding to Assembly, (i) transfer of finished goods out of Assembly, (j) sales on credit, and (k) cost of goods sold.

Solution

Journal entries for the transactions and events in July.

a.	Raw Materials Inventory	400,000	
	Accounts Payable		400,000
	Record raw materials purchases.		
b.	Work in Process Inventory—Molding	190,000	
	Work in Process Inventory—Assembly	88,600	
	Raw Materials Inventory		278,600
	Record direct materials used.		
c.	Factory Overhead	51,400	
	Raw Materials Inventory		51,400
	Record indirect materials used.		
d.	Work in Process Inventory—Molding	42,000	
	Work in Process Inventory—Assembly	55,375	
	Factory Wages Payable		97,375
	Record direct labor used.		
e.	Factory Overhead	50,625	
	Factory Wages Payable		50,625
	Record indirect labor used.		

f.	Factory Overhead	71,725	
	Cash		71,725
	Record other overhead costs.		
g.	Work in Process Inventory—Molding	63,000	
	Work in Process Inventory—Assembly	110,750	
	Factory Overhead		173,750
	Record applied overhead.		
h.	Work in Process Inventory—Assembly	277,200	
	Work in Process Inventory—Molding		277,200
	Transfer from Molding to Assembly.		
i.	Finished Goods Inventory	578,400	
	Work in Process Inventory—Assembly		578,400
	Transfer to finished goods.		
j.	Accounts Receivable	900,000	
	Sales		900,000
	Record sales for July.		
k.	Cost of Goods Sold	506,100	
	Finished Goods Inventory		506,100
	Record cost of goods sold.		

APPENDIX

16A FIFO Method of Process Costing

C2

Compute process activity costs and prepare a production cost report using FIFO.

We provide a step-by-step demonstration of process costing for GenX's production of FitMix, an organic trail mix. FitMix is manufactured in a continuous, two-process operation: Roasting and Blending. We focus on the first process, Roasting. Accounting for each process or department in a process operation follows four steps.

1. Determine the physical flow of units.

2. **Compute equivalent units of production.**
3. **Compute cost per equivalent unit of production.**
4. **Assign and reconcile costs.**

In each step, we demonstrate process costing using the first-in, first-out (FIFO) method. FIFO assigns costs to units assuming a first-in, first-out flow of product. We explain how this affects process costing in each step.

The following sections on process costing use the *first-in, first out (FIFO) method*. The *weighted average method* is in the chapter under learning objectives P1 and P2. These methods make different assumptions about cost flows.

- Weighted average method combines units and costs across two periods in computing equivalent units and cost per equivalent unit.
- FIFO method computes equivalent units and cost per equivalent unit based only on production activity in the current period.

The objectives, concepts, and journal entries (but not dollar amounts) are the same under both methods; the computation of equivalent units differs. Both methods are used in practice, but weighted average requires fewer calculations. Differences between the two methods are often small. With a just-in-time inventory system, those differences are even less because inventories are immaterial.

Step 1: Determine Physical Flow of Units Step 1 is to determine the number of units to account for and units accounted for. For FitMix, a unit is a cup of trail mix.

Exhibit 16.A1 shows production data in units for the first process: Roasting.

EXHIBIT 16A.1

Unit Data—Roasting Department

Beginning work in process inventory	30,000 units	Units completed and transferred out.	100,000 units
Units started this period.	90,000 units	Ending work in process inventory	20,000 units

Units to Account For Units to account for is computed for FitMix as follows.

$$\begin{aligned}\textbf{Units to account for} &= \textbf{Beginning work in process inventory} + \textbf{Units started this period}\\ &= 30{,}000 \text{ units} + 90{,}000 \text{ units}\\ &= 120{,}000 \text{ units}\end{aligned}$$

Units Accounted For Using FIFO, we look at three groups of units when determining units accounted for:

- Beginning work in process inventory.

  Units started and completed this period.

- Ending work in process inventory.

Beginning work in process inventory for Roasting is 30,000 units, and its ending work in process inventory is 20,000 units (from Exhibit 16A.1). To get the number of units started and completed this period we apply the following procedure.

Units Started and Completed FIFO assumes that the units in beginning work in process inventory are the first units completed in the period. For FitMix, this means that of the 100,000 units completed and transferred out this period, we assume 30,000 are from beginning work in process inventory. This implies that 70,000 (100,000 − 30,000) units were started and completed this period. The computation follows.

Point: Units Started and Completed is also computed as: Units started – Ending work in process.

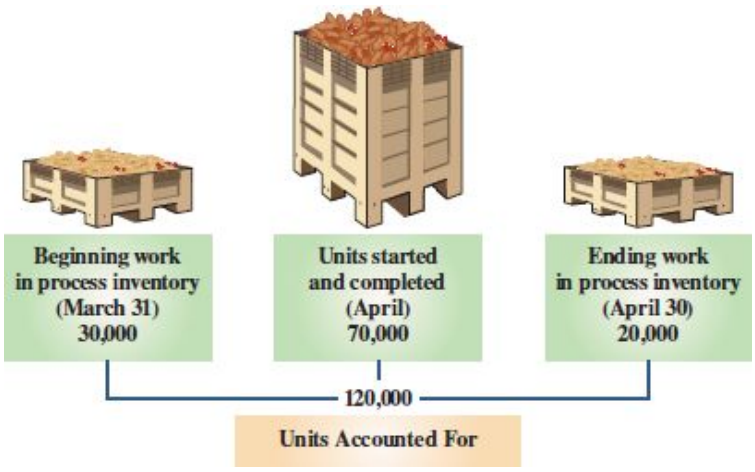
For FitMix, **90,000** units started – **20,000** units in ending work in process = **70,000** units started and completed.

$$\begin{aligned}\text{Units started and completed} &= \text{Completed and transferred out} - \text{Beginning work in process inventory}\\ &= 100{,}000 \text{ units} - 30{,}000 \text{ units}\\ &= 70{,}000 \text{ units}\end{aligned}$$

Exhibit 16A.2 shows the three groups of units for determining units accounted for. page 639

EXHIBIT 16A.2

Units Accounted For

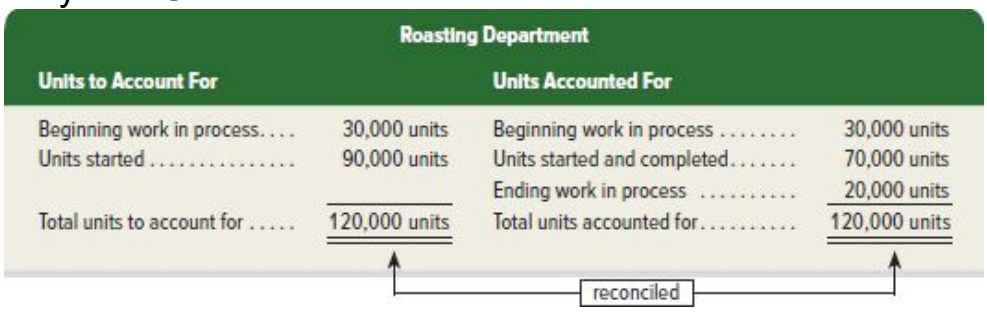


Determine Flow of Units A *physical unit flow reconciliation* proves that (1) beginning units in process plus units started in the period equals the

(2) beginning units in process plus units started and completed plus units in ending work in process. A physical unit flow reconciliation for the Roasting department for April is in Exhibit 16A.3.

EXHIBIT 16A.3

Physical Unit Flow Reconciliation



Roasting Department			
Units to Account For		**Units Accounted For**	
Beginning work in process	30,000 units	Beginning work in process	30,000 units
Units started	90,000 units	Units started and completed	70,000 units
		Ending work in process	20,000 units
Total units to account for	120,000 units	Total units accounted for	120,000 units

reconciled

Step 2: Compute Equivalent Units of Production Step 2 is to compute *equivalent units of production*. **Equivalent units of production (EUP)** is the number of whole units that *could have been* started and completed given the costs incurred in the period. The reason we use equivalent units of production is that some units are not finished in beginning and ending work in process inventory but still need to be assigned costs.

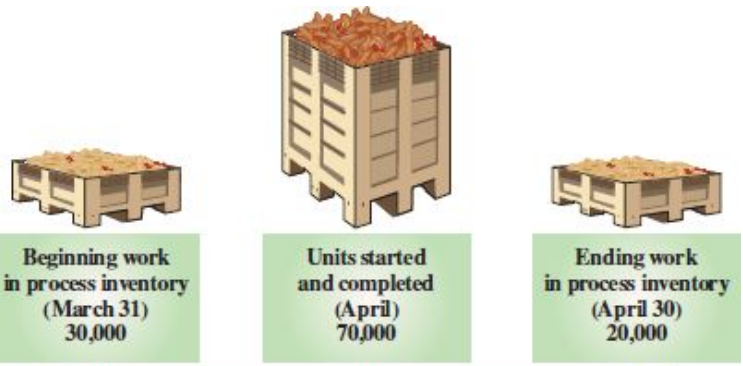
Point: Whole units is the number of physical units in production in a period.

To demonstrate, 10 cups of trail mix 60% through the production process is *equivalent to* 6 (10 × 60%) cups of completed trail mix. This means that the cost of 10 units that are 60% complete is *equivalent to* the cost of 6 completed units.

Exhibit 16A.4 shows *percent complete* data for direct materials and conversion for the Roasting department. The percents are needed to compute equivalent units of production. In both Roasting and Blending, direct materials enter production at the beginning of the process, while conversion costs occur throughout each department's processing. **Conversion costs** consist of direct labor and overhead. They are called conversion costs because they are the costs of *converting* raw materials into finished goods.

EXHIBIT 16A.4

Percent Complete Data



Percent Complete	Beginning work in process inventory (March 31) 30,000	Units started and completed (April) 70,000	Ending work in process inventory (April 30) 20,000
Direct materials	100%	100%	100%
Conversion	65%	100%	25%

We see that beginning work in process inventory is 100% page 640 complete for direct materials but only 65% complete for conversion. Ending work in process inventory is 100% complete for direct materials but only 25% complete for conversion. Units started and completed that are sent to the Blending department are 100% complete for both direct materials and conversion.

Point: Units started and completed are always 100% complete for direct materials and conversion.

We separately compute equivalent units of production for direct materials and conversion costs. This is because direct materials and conversion costs typically enter processes at different rates. We see this for FitMix in Exhibit 16A.4, where there are different percents of completion for direct materials and conversion costs for both beginning and ending work in process inventories.

Exhibit 16A.5 shows the formula to compute equivalent units of production under the FIFO method for both direct materials and conversion.

EXHIBIT 16A.5

Computing EUP—FIFO

$$\text{Equivalent units of production (EUP)} = \text{Equivalent units needed to complete beginning work in process} + \text{Whole units started, completed, and transferred out} + \text{Equivalent units in ending work in process}$$

We compute the equivalent units of production (EUP) for both direct materials and conversion in Exhibit 16A.6.

EXHIBIT 16A.6

Equivalent Units of Production—FIFO

Roasting Department					
		Direct Materials		Conversion	
	Units	Percent Added	Equivalent Units of Production	Percent Added	Equivalent Units of Production
Beginning work in process. . . .	30,000	0%	0	35%	10,500
Started and completed.	70,000	100%	70,000	100%	70,000
Ending work in process	20,000	100%	20,000	25%	5,000
			90,000 EUP		85,500 EUP

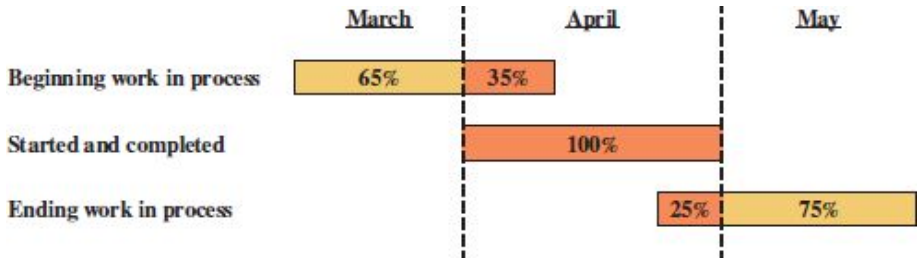
Direct Materials Total equivalent units of production is 90,000 for direct materials (0 + 70,000 + 20,000).

- **Beginning work in process** had 30,000 units that were 100% complete with respect to direct materials. EUP is 0 as no additional direct materials were added to complete these units.
- **Started and completed** units were 70,000. These units received 100% of direct materials during the month, so EUP is 70,000.
- **Ending work in process** had 20,000 units started but not completed during the month. These units received 100% of its direct materials this period, so EUP is 20,000.

Conversion Total equivalent units of production is 85,500 for conversion (10,500 + 70,000 + 5,000).

- **Beginning work in process** had 30,000 units that were 65% complete for conversion. These units needed another 35% (100% − 65%) of conversion costs to complete them, so EUP is 10,500 (30,000 × 35%).
- **Started and completed** units were 70,000. These units received 100% of conversion costs during the month, so EUP is 70,000.
- **Ending work in process** had 20,000 units started but not completed during the month. These units received 25% of conversion costs this period, so EUP is 5,000 (20,000 × 25%).

The following graphic shows conversion costs added in April.



Point: FIFO focuses on production activity in the current period only.

NEED-TO-KNOW 16-8

Compute EUP (FIFO)

C2

A department began the month with 8,000 units in work in process inventory. These units were 100% complete for direct materials and 40% complete for conversion.

During the month, the department started 56,000 units and completed and transferred out 58,000 units. Ending work in process inventory is 6,000 units, 80% complete for direct materials and 70% complete for conversion. The FIFO method of process costing is used.

1. Compute units started and completed this month.
2. Compute the department's equivalent units of production for the month for direct materials and for conversion.

Solution

1. **Units started and completed** = Completed and transferred out – Beginning work in process inventory
   = 58,000 units – 8,000 units
   = 50,000 units

2.

		Direct Materials		Conversion	
	Units	Percent Added	Equivalent Units of Production	Percent Added	Equivalent Units of Production
Beginning work in process....	8,000	0%	0	60%	4,800
Started and completed.....	50,000	100%	50,000	100%	50,000
Ending work in process	6,000	80%	4,800	70%	4,200
			54,800 EUP		59,000 EUP

Point: Or **56,000** units started – **6,000** units in ending work in process = **50,000** units started and completed.

Do More: QS 16-14, QS 16-15, E 16-5, E 16-10

Step 3: Compute Cost per Equivalent Unit Step 3 uses equivalent units of production from step 2, along with cost data, to compute cost per equivalent unit. FIFO computes the cost per equivalent unit based solely

on this period's costs (unlike the weighted average method, which includes costs of beginning work in process inventory). Production cost data for the Roasting department are in Exhibit 16A.7. *Recall:* Conversion costs equal direct labor costs plus overhead costs applied.

EXHIBIT 16A.7

Roasting Department Production Cost Data

Roasting Department: Production Cost Data (April)		
Beginning work in process inventory		
Direct materials	$ 81,000	
Conversion	108,900	$ 189,900
Costs added this period		
Direct materials	279,000	
Conversion	376,200	655,200
Total production costs		$845,100

To compute cost per equivalent unit, we take only the direct materials and conversion costs *added this period* and then divide by equivalent units of production from step 2. Exhibit 16A.8 shows this separately for direct materials and for conversion. The cost for direct materials is $3.10 per EUP, and for conversion is $4.40 per EUP.

EXHIBIT 16A.8

Cost per Equivalent Unit of Production—FIFO

Roasting Department		
Cost per Equivalent Unit of Production	**Direct Materials**	**Conversion**
Costs added this period	$279,000	$376,200
÷ Equivalent units of production (from step 2)	90,000 EUP	85,500 EUP
Cost per equivalent unit of production	$3.10 per EUP	$4.40 per EUP

Step 4: Assign and Reconcile Costs The EUP from step 2 and the cost per EUP from step 3 are used in step 4 to assign costs to (a) units that the Roasting department completed and transferred out to the Blending department and (b) units that remain in process in the Roasting department. This is shown in Exhibit 16A.9.

EXHIBIT 16A.9

Cost Assignment—FIFO

Roasting Department	EUP	Cost per EUP	Total Cost	
Beginning work in process				$ 189,900
To complete beginning work in process				
Direct materials	0	$3.10	$ 0	
Conversion	10,500	$4.40	46,200	46,200
Started and completed				
Direct materials	70,000	$3.10	217,000	
Conversion	70,000	$4.40	308,000	
				525,000
Completed and transferred out				761,100
Ending work in process				
Direct materials	20,000	$3.10	62,000	
Conversion	5,000	$4.40	22,000	84,000
Total costs accounted for				$845,100

Beginning Work in Process Inventory The cost of beginning work in process is $189,900 (from Exhibit 16A.7). These costs were carried over from the prior period for work already completed on the 30,000 units in beginning work in process inventory.

To Complete Beginning Work in Process Inventory The cost to complete beginning work in process inventory is $46,200. We assign $0 of direct materials as there were 0 equivalent units. Recall, EUP is 0 because beginning inventory was already 100% complete for direct materials. We assign $46,200 (10,500 EUP × $4.40 per EUP) of conversion cost. This is the remaining conversion costs required on beginning work in process inventory to complete it for the next department.

Started and Completed The 70,000 units started and completed this month used 70,000 EUP of direct materials and 70,000 EUP of conversion. We assign $217,000 (70,000 EUP × $3.10 per EUP) of direct materials cost and $308,000 (70,000 EUP × $4.40 per EUP) of conversion cost to these units.

Completed and transferred-out costs total $761,100 ($189,900 + $46,200 + $525,000). This consists of the cost of beginning work in process, the costs to complete beginning work in process, and the cost of started and completed units. These units and costs move on to Blending.

Ending Work in Process Inventory There are 20,000 units in work in process inventory at period-end. We assign $62,000 (20,000 EUP × $3.10 per EUP) of direct materials cost and $22,000 (5,000 EUP × $4.40 per

EUP) of conversion cost to these units. Total cost of work in process inventory at period-end is $84,000 ($62,000 + $22,000).

Reconciliation Management verifies that total costs assigned to units completed and transferred out plus the costs of units in ending work in process equal total production costs. Exhibit 16A.9 shows total costs accounted for of $845,100, which equals total production costs of $845,100 from Exhibit 16A.7.

NEED-TO-KNOW 16-9

Cost per EUP and Cost Assignment

C2

A department reports the following equivalent units of production along with production cost data for the month. It uses the FIFO method.

	Direct Materials	Conversion
	EUP	EUP
Beginning work in process	0	4,800
Started and completed	50,000	50,000
Ending work in process	4,800	4,200
	54,800 EUP	59,000 EUP

Beginning work in process		
Direct materials	$ 26,960	
Conversion	25,700	$ 52,660
Costs added this period		
Direct materials	98,640	
Conversion	129,800	228,440
Total production costs		$281,100

1. Compute the department's cost per equivalent unit for direct materials and conversion. page 643
2. Assign costs to units completed and transferred out to ending work in process inventory.

Solution

1.

Cost per Equivalent Unit of Production	Direct Materials	Conversion
Costs added this period	$ 98,640	$129,800
÷ Equivalent units of production	54,800 EUP	59,000 EUP
= Cost per equivalent unit of production	$1.80 per EUP	$2.20 per EUP

2.

	EUP	Cost per EUP	Total Cost	
Beginning work in process				$ 52,660
To complete beginning work in process				
Direct materials	0	$1.80	$ 0	
Conversion	4,800	$2.20	10,560	
				10,560
Started and completed				
Direct materials	50,000	$1.80	90,000	
Conversion	50,000	$2.20	110,000	
				200,000
Completed and transferred out				263,220
Ending work in process				
Direct materials	4,800	$1.80	8,640	
Conversion	4,200	$2.20	9,240	
				17,880
Total costs accounted for				$281,100

Do More: QS 16-15, QS 16-16, E 16-7

Production Cost Report The **production cost report**, or *process cost summary*, summarizes the four-step process. It shows the results of Exhibits 16A.3, 16A.6, 16A.8, and 16A.9 in one report. The production cost report for the Roasting department is in Exhibit 16A.10.

1. Physical flow of units. This reconciles the units started with the units completed and in-process at period-end.
2. Equivalent units of production for direct materials and for conversion.
3. Costs per equivalent unit of production for direct materials and for conversion.
4. Assignment of total costs among units worked on in the period.

EXHIBIT 16A.10

Production Cost Report—FIFO

GenX—ROASTING DEPARTMENT
Production Cost Report (FIFO Method)
For Month Ended April 30

Units to Account For:		Units Accounted For:	
Beginning work in process	30,000 units	Beginning work in process	30,000 units
Units started	90,000 units	Units started and completed	70,000 units
		Ending work in process	20,000 units
Total units to account for	120,000 units	Total units accounted for	120,000 units

Equivalent Units of Production (EUP)		Direct Materials		Conversion	
	Units	Percent Added	Equivalent Units of Production	Percent Added	Equivalent Units of Production
Beginning work in process	30,000	0%	0	35%	10,500
Started and completed	70,000	100%	70,000	100%	70,000
Ending work in process	20,000	100%	20,000	25%	5,000
			90,000 EUP		85,500 EUP

Cost per EUP	Direct Materials	Conversion
Costs added this period	$279,000	$376,200
÷ Equivalent units of production	90,000 EUP	85,500 EUP
Cost per equivalent unit of production	$3.10 per EUP	$4.40 per EUP

Cost Assignment	EUP	Cost per EUP	Total Cost	
Beginning work in process				$ 189,900
To complete beginning work in process				
Direct materials	0	$3.10	$ 0	
Conversion	10,500	$4.40	46,200	
				46,200
Started and completed				
Direct materials	70,000	$3.10	217,000	
Conversion	70,000	$4.40	308,000	
				525,000
Completed and transferred out				761,100
Ending work in process				
Direct materials	20,000	$3.10	62,000	
Conversion	5,000	$4.40	22,000	
				84,000
Total costs accounted for				$845,100

WIP Inventory–Roasting

Beginning	189,900		
Direct materials	279,000		
Conversion	376,200		
Costs to account for	845,100		
		761,100	Transferred out
Ending	84,000		

The $761,100 is the total cost of the 100,000 units transferred out of the Roasting department to the Blending department. The $84,000 is the cost of the 20,000 partially completed units in ending work in process inventory in the Roasting department. The assigned costs are then added to show that the total $845,100 production cost charged to the Roasting department is now assigned to the units.

Decision Maker

Cost Manager As cost manager for an electronics manufacturer, you apply a process costing system using FIFO. Your company plans to adopt a just-in-time system and eliminate inventories. What is the impact of using FIFO (versus the weighted average method) given these plans? ■

Answer: Differences between the FIFO and weighted average methods are greatest when large work in process inventories exist and when costs fluctuate. The method used if inventories are eliminated does not matter; both produce identical costs.

Summary: Cheat Sheet

PROCESS OPERATIONS

Process operation: Mass production of similar products in a flow of sequential processes.

Process costing system: Measures costs per equivalent unit at period-end. Each process has a separate Work in Process Inventory account.

Conversion costs: Direct labor + Applied factory overhead.

Equivalent units is the number of whole units that could have been started and completed given the costs incurred. Compute separately for direct materials and conversion costs.

PROCESS COSTING

Equivalent Units of Production (EUP)

Weighted average: Combines units and costs across *two periods* in computing EUP.

Weighted average (WA) computations:

$$\text{Equivalent units of production (EUP)} = \text{Equivalent units completed and transferred out} + \text{Equivalent units in ending work in process}$$

$$\text{Cost per EUP (WA)} = \frac{\text{Costs of beginning WIP} + \text{Costs added this period}}{\text{Equivalent units of production}}$$

Production Cost Report (Weighted Average)

page 645

GenX—ROASTING DEPARTMENT
Production Cost Report (Weighted Average Method)
For Month Ended April 30

Units to account for:		Units accounted for:	
Beginning work in process	30,000	Completed and transferred out	100,000
Units started this period	90,000	Ending work in process	20,000
Total units to account for	120,000	Total units accounted for	120,000

Equivalent Units of Production (EUP)		Direct Materials		Conversion	
	Units	Percent Complete	Equivalent Units of Production	Percent Complete	Equivalent Units of Production
Completed and transferred out	100,000	100%	100,000	100%	100,000
Ending work in process	20,000	100%	20,000	25%	5,000
			120,000 EUP		105,000 EUP

Cost per EUP	Direct Materials	Conversion
Costs of beginning work in process	$ 81,000	$108,900
Costs added this period	279,000	376,200
Total costs	$360,000	$485,100
÷ Equivalent units of production	120,000 EUP	105,000 EUP
Cost per EUP	$3.00 per EUP	$4.62 per EUP

Cost assignment	EUP	Cost per EUP	Total Cost	
Completed and transferred out				
Direct materials	100,000	$3.00	$300,000	
Conversion	100,000	$4.62	462,000	
				$ 762,000
Ending work in process				
Direct materials	20,000	$3.00	$ 60,000	
Conversion	5,000	$4.62	23,100	
				83,100
Total costs accounted for				$845,100

ACCOUNTING FOR COSTS AND TRANSFERS

Acquire raw materials:

Raw Materials Inventory	16,000	
Accounts Payable		16,000

Record *direct* materials used:

Work in Process Inventory—Process 1	279,000	
Work in Process Inventory—Process 2	102,000	
Raw Materials Inventory		381,000

Record *indirect* materials used:

Factory Overhead	71,250	
Raw Materials Inventory		71,250

Record *direct* labor used:

Work in Process Inventory—Process 1	171,000	
Work in Process Inventory—Process 2	183,160	
Factory Wages Payable		354,160

Record *indirect* labor used:

Factory Overhead	78,350	
Factory Wages Payable		78,350

Record *actual* other overhead costs such as insurance, rent, utilities, and depreciation on factory assets:

Factory Overhead	275,392	
Prepaid Insurance		11,930
Utilities Payable		7,945
Cash		34,867
Accumulated Depreciation—Factory Equipment		220,650

***Apply* overhead using predetermined rate:**

Work in Process Inventory—Process 1	205,200	
Work in Process Inventory—Process 2	219,792	
Factory Overhead		424,992

Record transfer of costs to next department:

Work in Process Inventory—Process 2	762,000	
Work in Process Inventory—Process 1		762,000

Record transfer of costs to finished goods (cost of goods manufactured):

Finished Goods Inventory	1,262,940	
Work in Process Inventory—Process 2		1,262,940

Record sales:

Accounts Receivable	1,915,800	
Sales		1,915,800

Record cost of goods sold:

Cost of Goods Sold	1,341,060	
Finished Goods Inventory		1,341,060

FIFO—APPENDIX

FIFO: Based on *current-period* production activity.

FIFO computations:

$$\text{Equivalent units of production (EUP)} = \text{Equivalent units to complete beginning work in process} + \text{Units started and completed} + \text{Equivalent units in ending work in process}$$

$$\text{Cost per EUP (FIFO)} = \frac{\text{Costs added this period}}{\text{Equivalent units of production}}$$

Key Terms

Conversion cost (622)
Cost per equivalent unit (624)
Equivalent units of production (EUP) (622)
FIFO method (621)
Hybrid costing system (633)
Materials consumption report (632)
Operation costing system (633)
Process operations (619)
Production cost report (626)
Weighted average method (621)
Whole units (622)
Yield (634)

Multiple Choice Quiz

1. Equivalent units of production are equal to

a. Units that were completed this period from all effort being applied to them.

b. The number of units introduced to the process this period.

c. The number of finished units completed this period.

d. The number of units that could have been started and completed given the cost incurred.

e. The number of units in the process at period-end.

2. Recording the cost of raw materials purchased for use in a process costing system includes a

a. Credit to Raw Materials Inventory.

b. Debit to Work in Process Inventory.

c. Debit to Factory Overhead.

d. Credit to Factory Overhead.

e. Debit to Raw Materials Inventory.

3. The Cutting department started the month with a beginning work in process inventory of $20,000. During the month, it was assigned the following costs: direct materials, $152,000; direct labor, $45,000; and overhead applied at the rate of 40% of direct labor cost. Inventory with a cost of $218,000 was transferred to the next department. The ending balance of Work in Process Inventory—Cutting is

a. $330,000.

b. $17,000.

c. $220,000.

d. $112,000.

e. $118,000.

4. A process's beginning work in process inventory consists of 10,000 units that are 20% complete with respect to conversion costs. A total of 40,000 units are completed this period. There are 15,000 units in ending work in process, one-third complete for conversion. The equivalent units of production (EUP) with respect to conversion at period-end, assuming the weighted average method, are

a. 45,000 EUP.

b. 40,000 EUP.

c. 5,000 EUP.

d. 37,000 EUP.

e. 43,000 EUP.

5. Assume the same information as in question 4. Also assume that beginning work in process had $6,000 in conversion cost and that $84,000 in conversion is added during this period. What is the cost per EUP for conversion?

a. $0.50 per EUP

b. $1.87 per EUP

c. $2.00 per EUP

d. $2.10 per EUP

e. $2.25 per EUP

ANSWERS TO MULTIPLE CHOICE QUIZ

1. d

2. e

3. b; $20,000 + $152,000 + $45,000 + $18,000 − $218,000 = $17,000

4. a; 40,000 + (15,000 × 1⁄3) = 45,000 EUP

5. c; ($6,000 + $84,000) ÷ 45,000 EUP = $2 per EUP

Superscript letter A denotes assignments based on Appendix 16A.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in ***Connect*** *. Hints use different numbers, and instructors can turn this feature on or off.*

connect

QUICK STUDY

QS 16-1

Process vs. job order operations C1

For each of the following products and services, indicate whether it is more likely produced in a process operation or in a job order operation.

1. Tennis courts
2. Organic juice
3. Audit of financial statements
4. Luxury yachts
5. Ice cream
6. Tennis balls
7. House painting
8. Granola bars
9. Backpacks

QS 16-2

Process vs. job order costing

C1

Label each statement below as either true or false.

1. Cost per unit is computed by combining costs per unit across separate processes.
2. Service companies cannot use process costing.
3. Costs per job are computed in both job order and process costing systems.
4. Both job order and process operations combine materials, labor, and overhead in producing products.

QS 16-3

Process vs. job order operations

C1

For each of the following products and services, indicate whether it is more likely produced in a process operation or a job order operation.

1. Beach toys

2. Custom swimming pool
3. Smartphones
4. Wedding reception
5. Custom suits
6. Juice
7. Tattoos
8. Guitar picks
9. Solar panels

QS 16-4

Weighted average: Physical unit flow reconciliation

P1

Prepare a physical unit flow reconciliation with the following information.

Blending Process	Units of Product
Beginning work in process inventory	150,000
Units started this period	310,000
Units completed and transferred out	340,000
Ending work in process inventory	120,000

QS 16-5

Weighted average: Computing equivalent units of production **P1**

A process manufacturer reports the following. Compute the total equivalent units of production for conversion. The company uses the weighted average method.

		Conversion
	Units	Percent Complete
Beginning work in process inventory	150,000	80%
Units started this period	310,000	
Units completed and transferred out	340,000	
Ending work in process inventory	120,000	25%

QS 16-6[A]

FIFO: Computing equivalent units **C2**

Refer to the information in QS 16-5. (*a*) Compute the number of units started and completed this period. (*b*) Compute the total equivalent units of production for conversion. The company uses the FIFO method.

QS 16-7

Weighted average: Cost per EUP **P1**

A production department reports the following conversion costs. Equivalent units of production for conversion total 450,000 units this period. Calculate the cost per equivalent unit of production for conversion. The company uses the weighted average method.

Costs of beginning work in process	$200,000
Costs added this period	700,000

QS 16-8

Weighted average: Computing equivalent units of production **P1**

An ice cream maker reports the following. Compute the total equivalent units of production for conversion. The company uses the weighted average method.

		Conversion
	Units	Percent Complete
Beginning work in process inventory	320,000	25%
Units started this period	620,000	
Units completed and transferred out	680,000	
Ending work in process inventory	260,000	60%

QS 16-9[A]

FIFO: Computing equivalent units **C2**

Refer to the information in QS 16-8. (*a*) Compute the number of units started and completed this period. (*b*) Compute the total equivalent units of production for conversion. The company uses the FIFO method.

QS 16-10

Weighted average: Equivalent units of production **P1**

The following information applies to QS 16-10 through QS 16-17.

Carlberg Company has two manufacturing departments, Assembly and Painting. The Assembly department started 10,000 units during November. The following production activity in both units and costs refers to the Assembly department's November activities.

Assembly Department	Units	Percent Complete for Direct Materials	Percent Complete for Conversion
Beginning work in process inventory	2,000	60%	40%
Units started this period	10,000		
Units completed and transferred out	9,000		
Ending work in process inventory	3,000	80%	30%

Cost of beginning work in process		
Direct materials	$ 996	
Conversion	585	$ 1,581
Costs added this month		
Direct materials	10,404	
Conversion	12,285	22,689

Required

page 648

Calculate the Assembly department's equivalent units of production for materials and for conversion for November. Use the weighted average method.

QS 16-11

Weighted average: Cost per EUP **P1**

Refer to the information in QS 16-10. Calculate the Assembly department's cost per equivalent unit of production for materials and for conversion for November. Use the weighted average method.

QS 16-12

Weighted average: Assigning costs to output

P1

Refer to the information in QS 16-10. Assign costs to the Assembly department's output—specifically, the units transferred out to the Painting department and the units that remain in process in the Assembly department at month-end. Use the weighted average method.

QS 16-13

Weighted average: Entry to transfer costs **P4**

Refer to the information in QS 16-10. Prepare the November 30 journal entry to record the transfer of costs from the Assembly department to the Painting department. Use the weighted average method.

QS 16-14[A]

FIFO: Equivalent units of production **C2**

Refer to the information in QS 16-10. For the Assembly department: (*a*) Compute the number of units started and completed this period. (*b*) Compute the equivalent units of production for materials and for conversion for November. Use the FIFO method.

QS 16-15[A]

FIFO: Cost per EUP **C2**

Refer to the information in QS 16-10. Calculate the Assembly department's cost per equivalent unit of production for materials and for conversion for November. Use the FIFO method.

QS 16-16[A]

FIFO: Assigning costs to output **C2**

Refer to the information in QS 16-10. Assign costs to the Assembly department's output—specifically, the units transferred out to the Painting department and the units that remain in work in process in the Assembly department at month-end. Use the FIFO method.

QS 16-17[A]

FIFO: Journal entry to transfer costs **P4**

Refer to the information in QS 16-10. Prepare the November 30 journal entry to record the transfer of costs from the Assembly department to the Painting department. Use the FIFO method.

QS 16-18

Weighted average: Computing equivalent units and cost per EUP (direct materials)

P1

Zia Co. makes flowerpots from recycled plastic in two departments, Molding and Packaging. Zia uses the weighted average method, and units completed in the Molding department are transferred to the Packaging department. Production unit information for the Molding department follows.

Molding—Direct Materials	Units	Percent Complete
Beginning work in process inventory	2,000	70%
Units started this period	18,000	
Ending work in process inventory	3,000	80%

Production cost information for the Molding department for the same period follows.

Beginning work in process inventory (direct materials)	$ 1,200
Direct materials added this period	27,900

Compute the Molding department's (*a*) units completed and transferred out, (*b*) equivalent units of production for direct materials, and (*c*) cost per equivalent unit of production for direct materials.

QS 16-19

Weighted average: Assigning costs to output

P1

Refer to information in QS 16-18. Using the weighted average method, assign direct materials costs to the Molding department's output—specifically, the units transferred out to the Packaging department and the units that remain in work in process in the Molding department at month-end.

QS 16-20

Transfer of costs; ending WIP balances **P4**

Azule Co. manufactures in two sequential processes, Cutting and Binding. The two processes report the information below for a recent month.

Determine the ending balances in the Work in Process Inventory accounts for Cutting and for Binding.

	Cutting	Binding
Beginning work in process inventory	$ 3,445	$ 6,426
Costs added this period		
Direct materials	8,240	6,356
Conversion	11,100	18,575

Transferred from Cutting to Binding	$15,685
Transferred from Binding to finished goods	30,000

QS 16-21[A]

FIFO: Computing equivalent units and cost per EUP

C2

BOGO Inc. has two sequential processing departments, Roasting and Mixing. BOGO uses the FIFO method. Production unit information for the Roasting department follows.

Roasting—Direct Materials	Units	Percent Complete
Beginning work in process inventory	2,000	70%
Units started and completed	15,000	
Ending work in process inventory	3,000	80%

Production cost information for the Roasting department for the same period follows.

Beginning work in process inventory (direct materials)	$ 2,170
Direct materials added this period	27,900

Compute the Roasting department's (*a*) equivalent units of production for direct materials and (*b*) cost per equivalent unit of production for direct materials.

QS 16-22[A]

FIFO: Assigning costs to output **C2**

Refer to the information in QS 16-21. Using the FIFO method, assign direct materials costs to the Roasting department's output—specifically, to the units completed and transferred out to the Mixing department and to the units that remain in work in process in the Roasting department at month-end.

QS 16-23

Recording costs of materials **P3**

Hotwax makes surfboard wax in two sequential processes. This period, Hotwax purchased $62,000 of raw materials on credit. Its Mixing department requisitioned $50,000 of direct materials for use in production. Prepare journal entries to record the (*a*) purchase of raw materials and (*b*) requisition of direct materials.

QS 16-24

Recording costs of labor

P3

Prepare journal entries to record the following production activities for Hotwax.

a. Incurred $75,000 of direct labor in its Mixing department and $50,000 of direct labor in its Shaping department. *Hint:* Credit Factory Wages Payable.

b. Incurred indirect labor of $10,000. *Hint:* Credit Factory Wages Payable.

QS 16-25

Recording costs of factory overhead

P3

Prepare journal entries to record the following production activities for Hotwax.

a. Requisitioned $9,000 of indirect materials for use in production of surfboard wax.

b. Incurred $156,000 in actual other overhead costs (paid in cash).

c. Applied overhead at the rate of 140% of direct labor costs. Direct labor costs were $75,000 in the Mixing department and $50,000 in the Shaping department.

QS 16-26

Recording transfer of costs to finished goods **P4**

Hotwax completed the production of goods costing $275,000 and transferred them to finished goods. Prepare the journal entry to record the transfer of units from the Shaping department to Finished Goods Inventory.

QS 16-27

Computing cost per unit and gross profit **P4**

Cool Scoops makes ice cream in two processes, Mixing and Packaging. During April, its first month of business, the packaging department transferred 50,000 units and $175,000 of production costs to finished goods. The company completed and sold 48,000 units at a price of $5 per unit in April.

a. What is the cost to produce one unit of ice cream during April?

b. What is the total gross profit on ice cream sales for April?

QS 16-28

Hybrid costing

A1

Trident Bikes uses a hybrid costing system and reports the following for its motorcycle assembly process.

	Per Bike
Direct materials	$12,000
Conversion	8,000
Assembly process costs	$20,000
Customer choices—Option packages	
Mega; Ultra	$4,000; $6,000

a. Compute the cost per unit for the Mega option.

b. If the company has a target markup of 20% above cost, compute the selling price per unit for the Mega option.

QS 16-29

Process yield

A1

For the current period, an ice cream producer added raw materials to production that should have produced 50,000 gallons of ice cream. Actual production was 47,000 gallons of (nondefective) ice cream. Compute the yield for this production process. Express the answer in percent.

EXERCISES

Exercise 16-1

Process vs. job order operations **C1**

For each of the following products and services, indicate whether it is more likely produced in a process operation or in a job order operation.

1. Beach towels
2. Bolts and nuts
3. Lawn chairs
4. Headphones
5. Custom patio
6. Door hardware
7. Financial statement analysis
8. Paint cans
9. Custom home

Exercise 16-2

Process vs. job order operations

C1

Identify each of the following production features as applying more to job order operations, to process operations, or to *both* job order and process operations.

1. Cost object is a process.
2. Measures unit costs at period-end.
3. Transfers costs between multiple Work in Process Inventory accounts.

4. Uses indirect costs.
5. Uses only one Work in Process Inventory account.
6. Uses materials, labor, and overhead costs.

Exercise 16-3

Terminology in process costing

C1

Match each of the following items *A* through *G* with the best numbered description of its purpose.

A. Factory Overhead account

B. Production cost report

C. Equivalent units of production

D. Work in Process Inventory accounts

E. Raw Materials Inventory account

F. Materials requisition

G. Finished Goods Inventory account

1. Notifies the materials manager to send materials to a production department.
2. Holds indirect costs until assigned to production.
3. Holds production costs until products are transferred from production to finished goods (or another department).
4. Standardizes partially completed units into equivalent completed units.
5. Holds costs of finished products until sold to customers.
6. Describes the activity and output of a production department for a period.
7. Holds costs of materials until they are used in production or as factory overhead.

Exercise 16-4

Weighted average: Computing equivalent units

P1

The first production department in a process manufacturing system reports the following unit data.

Beginning work in process inventory . . .	24,000 units
Units started and completed	56,000 units
Units completed and transferred out . . .	80,000 units
Ending work in process inventory	16,000 units

Compute this production department's equivalent units of production for direct materials under each of the following three separate assumptions using the weighted average method.

a. All direct materials are added to products when processing begins.

b. Beginning inventory is 40% complete as to direct materials costs. Ending inventory is 75% complete as to direct materials costs.

c. Beginning inventory is 60% complete as to direct materials costs. Ending inventory is 30% complete as to direct materials costs.

Exercise 16-5[A]

FIFO: Computing equivalent units **C2**

Refer to the information in Exercise 16-4 and compute the department's equivalent units of production for direct materials for each of the three separate assumptions *a, b*, and *c* using the FIFO method.

Exercise 16-6

Weighted average: Cost per EUP and costs assigned to output

P1

Fields Company has two manufacturing departments, Forming and Painting. The company uses the weighted average method and it reports the following unit data for the Forming department. Units completed in the Forming department are transferred to the Painting department.

	Units	Direct Materials Percent Complete	Conversion Percent Complete
Beginning work in process inventory	25,000	60%	40%
Units started this period	300,000		
Completed and transferred out	295,000		
Ending work in process inventory	30,000	80%	30%

Production cost information for the Forming department follows.

Beginning work in process		
Direct materials	$ 44,800	
Conversion	15,300	$ 60,100
Costs added this period		
Direct materials	1,231,200	
Conversion	896,700	2,127,900
Total costs to account for		$2,188,000

a. Calculate the equivalent units of production for both direct materials and conversion for the Forming department.

b. Calculate the costs per equivalent unit of production for both direct materials and conversion for the Forming department.

c. Using the weighted average method, assign costs to the Forming department's output—specifically, its units transferred to Painting and its ending work in process inventory.

Exercise 16-7[A]

FIFO: Cost per EUP

C2

Refer to the information in Exercise 16-6. Assume that Fields uses the FIFO method of process costing.

a. Calculate the number of units started and completed this period for the Forming department.

b. Calculate the equivalent units of production for both direct materials and conversion for the Forming department.

c. Calculate the costs per equivalent unit of production for both direct materials and conversion for the Forming department.

Exercise 16-8

Weighted average: Computing equivalent units of production

P1

The first production department of Stone Inc. reports the following for April. Compute the number of equivalent units of production for both direct materials and conversion for April using the weighted average method.

		Direct Materials	Conversion
	Units	Percent Complete	Percent Complete
Beginning work in process inventory	60,000	60%	40%
Units started this period	322,000		
Completed and transferred out	300,000		
Ending work in process inventory	82,000	80%	30%

Exercise 16-9

Weighted average: Cost per equivalent unit; costs assigned to output and inventory

P1

The production department described in Exercise 16-8 reports the cost information below.

Beginning work in process inventory		
Direct materials	$118,472	
Conversion	48,594	$ 167,066
Costs added this period		
Direct materials	850,368	
Conversion	649,296	1,499,664
Total costs to account for		$1,666,730

a. Compute cost per equivalent unit for both direct materials and conversion.

b. Using the weighted average method, assign April's costs to the department's output—specifically, its units transferred to the next department *and* its ending work in process inventory.

Exercise 16-10[A]

FIFO: Computing equivalent units of production **C2**

Refer to the information in Exercise 16-8. (*a*) Compute the number of units started and completed this period for the first production department. (*b*) Compute the number of equivalent units of production for both direct materials and conversion for the first production department for April using the FIFO method.

Exercise 16-11[A]

FIFO: Costs assigned to output **C2**

Refer to the information in Exercise 16-9. (*a*) Calculate the costs per equivalent unit of production for both direct materials and conversion for the department. (*b*) Assign costs to the department's output—specifically, to the units transferred out and to the units that remain in work in process at period-end. Use the FIFO method.

Exercise 16-12

Weighted average: Cost per equivalent unit; costs assigned to products **P1**

Hi-T Company uses the weighted average method of process costing. Information for the company's first production process follows. All direct materials are added at the beginning of this process, and conversion costs are added uniformly throughout the process.

		Direct Materials	Conversion
	Units	Percent Complete	Percent Complete
Beginning work in process inventory	2,000	100%	80%
Completed and transferred out	23,000		
Ending work in process inventory	7,000	100%	40%

Beginning work in process		
Direct materials	$ 45,000	
Conversion	56,320	$101,320
Costs added this period		
Direct materials	375,000	
Conversion	341,000	716,000
Total costs to account for		$817,320

a. Compute the equivalent units of production for both direct materials and conversion.

b. Compute the cost per equivalent unit for both direct materials and conversion.

c. Assign costs to the department's output—specifically, to the units transferred out *and* to the units in ending work in process inventory.

Exercise 16-13

Weighted average: Costs assigned to output **P1**

Midway Metal produces wire baskets in two departments, Bending and Painting. Information for the Bending department follows. The 2,000 units in beginning work in process inventory had direct materials costs of $2,400 and conversion costs of $1,600. The weighted-average method is used.

Bending Department	Units	Direct Materials Percent Complete	Conversion Percent Complete
Beginning work in process inventory	2,000	100%	20%
Units started this period	6,000		
Completed and transferred out	7,000		
Ending work in process inventory	1,000	100%	60%

Work in Process Inventory—Bending ($)			
Beginning	4,000	?	Transferred out
Direct materials	7,200		
Conversion	17,400		
Ending	?		

a. Compute equivalent units of production for both direct materials and conversion.

b. Compute cost per equivalent unit of production for both direct materials and conversion.

c. Assign costs to the department's output—specifically, to the units transferred out *and* to the units in ending work in process inventory.

Exercise 16-14

Weighted average: Production cost report **P2**

The following data reports on the July production activities of the Molding department at Ash Company. Prepare the Molding department's production cost report using the weighted average method.

Beginning work in process		
Direct materials	$ 18,550	
Conversion	2,280	$ 20,830
Costs added this period		
Direct materials	357,500	
Conversion	188,670	546,170
Total costs to account for		$567,000

	Units	Direct Materials Percent Complete	Conversion Percent Complete
Beginning work in process inventory	2,000	100%	20%
Units started this period	32,500		
Completed and transferred out	32,000		
Ending work in process inventory	2,500	100%	60%

Exercise 16-15[A]

FIFO: Production cost report **C2**

Refer to the information in Exercise 16-14. Prepare a production cost report using the FIFO method.

Exercise 16-16

Weighted average: Production cost report **P2**

Elliott Company produces large quantities of a standardized product. The following information is available for its first production department for March. Prepare a production cost report for this department using the weighted average method.

	Units	Direct Materials Percent Complete	Conversion Percent Complete
Beginning work in process inventory	2,000		
Units started this period	20,000		
Completed and transferred out	17,000		
Ending work in process inventory	5,000	100%	35%

Beginning work in process inventory		
Direct materials	$ 2,500	
Conversion	6,360	$ 8,860
Costs added this period		
Direct materials	168,000	
Conversion	479,640	647,640
Total costs to account for		$656,500

Check Cost per equivalent unit: conversion, $25.92

Exercise 16-17

Weighted average: Production cost report **P2**

Oslo Company produces large quantities of a standardized product. The following information is available for the first production department for May. Prepare a production cost report for this process using the weighted average method.

	Units	Direct Materials Percent Complete	Conversion Percent Complete
Beginning work in process inventory	4,000		
Units started this period	12,000		
Completed and transferred out	13,000		
Ending work in process inventory	3,000	100%	25%

Beginning work in process inventory		
Direct materials	$ 2,880	
Conversion	5,358	$ 8,238
Costs added this period		
Direct materials	197,120	
Conversion	234,992	432,112
Total costs to account for		$440,350

Check Cost per equivalent unit: materials, $12.50

Exercise 16-18

Recording costs of materials

P3

Prepare journal entries to record the following production activities.

1. Purchased $80,000 of raw materials on credit.
2. Used $42,000 of direct materials in the Roasting department.
3. Used $22,500 of indirect materials in production.

Exercise 16-19

Recording costs of labor

P3

Prepare journal entries to record the following production activities.

1. Incurred $42,000 of direct labor in the Roasting department and $33,000 of direct labor in the Blending department. Credit Factory Wages Payable.
2. Incurred $20,000 of indirect labor in production. Credit Factory Wages Payable.

Exercise 16-20

Recording overhead costs

P3

Prepare journal entries to record the following production activities.

1. Paid other actual overhead costs of $40,000 in cash.
2. Applied overhead at 110% of direct labor costs. Direct labor costs were $42,000 in the Roasting department and $33,000 in the Blending department.

Exercise 16-21

Computing and applying predetermined overhead rate **P3**

Blue Sky Soda estimates total factory overhead costs of $4,200,000 and total direct labor costs of $2,800,000 for its first year of operations. During January, the company used $80,000 of direct labor cost in its Blending department and $60,000 of direct labor cost in its Bottling department.

1. Compute the predetermined overhead rate as a percentage of direct labor cost.
2. Prepare the journal entry to apply factory overhead to the Blending and Bottling departments.

Exercise 16-22

Recording production costs

P3 P4

Sharpe Co. makes organic salsa in two production departments, Cooking and Bottling. Direct materials costs are added at the beginning of each process, and conversion costs are added evenly throughout each process. The company reports the following for a recent month.

	Cooking	Bottling
Beginning work in process inventory	$ 0	$5,500
Activity during the month		
Direct materials	$18,000	$8,200
Direct labor	12,000	6,800
Overhead applied	15,000	8,500

Costs transferred from Cooking to Bottling	$42,000
Costs transferred from Bottling to finished goods	67,000

1. Prepare journal entries to record (*a*) direct materials used, (*b*) direct labor, and (*c*) overhead applied. page 655
2. Prepare journal entries to record the costs transferred from (*a*) Cooking to Bottling and (*b*) Bottling to Finished Goods.
3. Use T-accounts to compute (*a*) the ending balance of Work in Process Inventory—Cooking and (*b*) the ending balance of Work in Process Inventory—Bottling.

Exercise 16-23

Recording production costs

P3 P4

Re-Tire produces bagged mulch from recycled tires. Production involves shredding tires and packaging the pieces in the Bagging department. All direct materials enter in the Shredding process. A predetermined overhead rate of 175% of direct labor costs is used in both departments. The following describes production operations for October.

Direct materials used (Shredding)	$ 522,000
Direct labor used (Shredding)	26,000
Direct labor used (Bagging)	104,000
Costs transferred from Shredding to Bagging	595,000
Costs transferred from Bagging to Finished Goods	580,000

Sales (on credit) for the month total $950,000 and cost of goods sold for the month is $540,000. Prepare journal entries dated October 31 to record October production activities for (1) direct materials usage, (2) direct labor usage, (3) overhead applied, (4) costs transfer from Shredding to Bagging, (5) costs transfer from Bagging to finished goods, (6) credit sales, and (7) cost of goods sold.

Check (3) Cr. Factory Overhead, $227,500

Exercise 16-24

Entries for transfer of goods across departments

P4

Pro-Weave manufactures stadium blankets by passing the products through a Weaving department and then a Sewing department. The following information is available regarding its June inventories.

	Beginning Inventory	Ending Inventory
Raw materials inventory	$ 120,000	$ 185,000
Work in process inventory—Weaving	300,000	330,000
Work in process inventory—Sewing	570,000	700,000
Finished goods inventory	1,266,000	1,206,000

The following additional information describes the company's manufacturing activities for June.

Raw materials purchases (on credit)	$500,000	Labor used	
Other actual overhead cost (paid in cash)	156,000	Direct—Weaving	$1,200,000
Materials used		Direct—Sewing	360,000
Direct—Weaving	$240,000	Indirect	1,224,000
Direct—Sewing	75,000	Overhead rates as a percent of direct labor	
Indirect	120,000	Weaving	80%
		Sewing	150%
		Sales (on credit)	$4,000,000

Required

1. Compute the (*a*) cost of products transferred from Weaving to Sewing, (*b*) cost of products transferred from Sewing to finished goods, and (*c*) cost of goods sold. *Hint:* Compute the total production costs in each department and then subtract the ending inventory to get the amount transferred out of each department.
2. Prepare journal entries dated June 30 to record (*a*) goods transferred from Weaving to Sewing, (*b*) goods transferred from Sewing to finished goods, (*c*) sale of finished goods, and (*d*) cost of goods sold.

Check (1*c*) Cost of goods sold, $3,275,000

Exercise 16-25

Recording product costs

P3

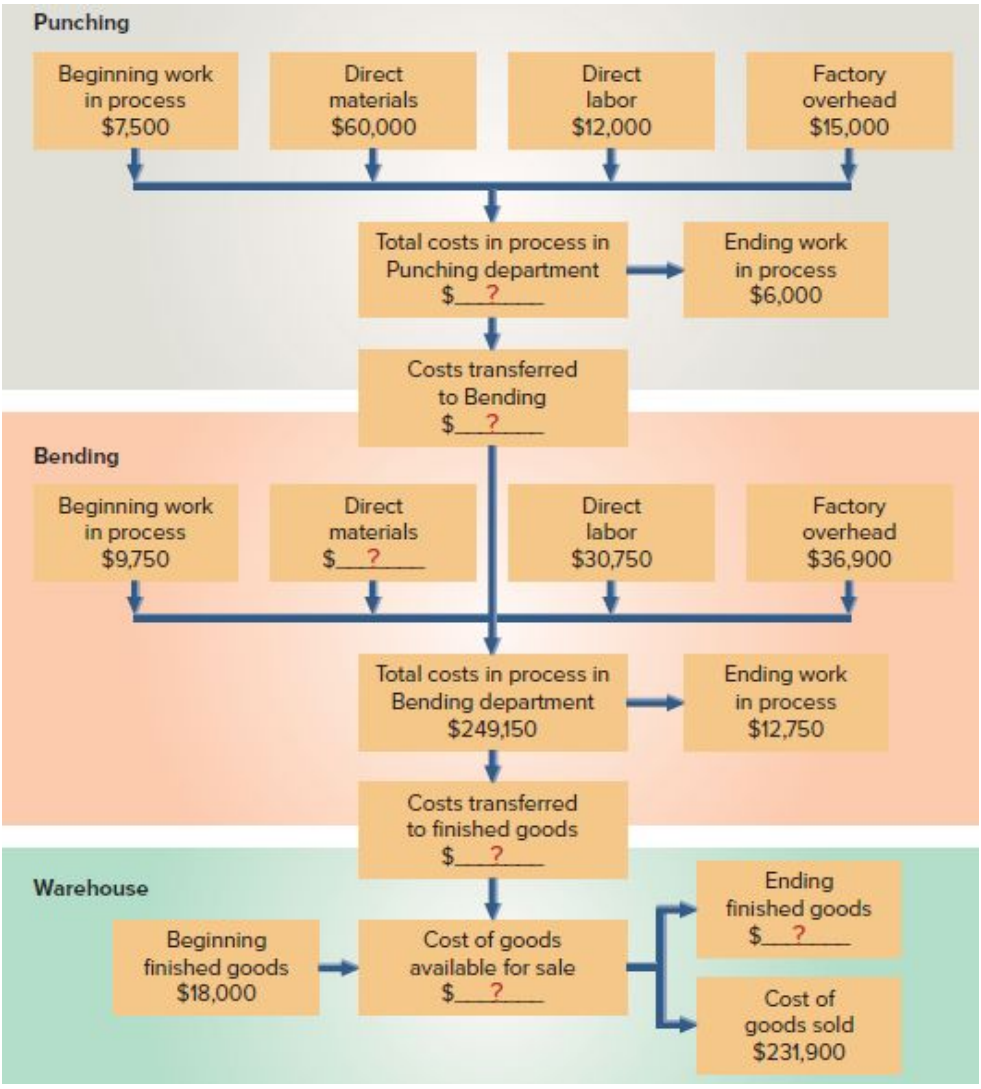
Refer to the information in Exercise 16-24. Prepare journal entries dated June 30 to record (*a*) raw materials purchases, (*b*) direct materials used, (*c*) indirect materials used, (*d*) direct labor used, (*e*) indirect labor used, (*f*) other actual overhead costs, and (*g*) overhead applied.

Exercise 16-26

Production cost flows

P3 P4

The flowchart below shows the August production activity of the Punching and Bending departments of Wire Box Company. Use the amounts shown on the flowchart to compute the missing numbers identified by question marks.



Exercise 16-27

Recording cost of completed goods

P4

Prepare journal entries to record the following production activities.

1. Transferred completed goods from the Assembly department to finished goods inventory. The goods cost $135,600.
2. Sold $315,000 of goods on credit. Their cost is $175,000.

Exercise 16-28

Computing and analyzing cost per unit

P4

Pro Power makes a protein powder in several processes. Packaging, the last department in the company's production process, reports the following.

	Current month	Prior month
Costs transferred to finished goods	$168,000	$165,750
Units transferred to finished goods	21,000	19,500
Units sold	20,000	19,200

1. Compute the cost per completed unit for both the current month and the prior month.
2. Does the change in the cost per completed unit indicate better or worse control of costs in the current month?

Exercise 16-29[A]

FIFO: Computing equivalent units

C2

RSTN Co. produces its product in two sequential processing departments. During October, the first process finished and transferred 150,000 units of its product to the second process. Of these units, 30,000 were in process at the beginning of the month and 120,000 were started and completed during the month. At month-end, 20,000 units were in process.

Compute the number of equivalent units of production for direct materials for the first process for October under each of the following three separate assumptions using the FIFO method.

1. All direct materials are added to products when processing begins.
2. Beginning work in process inventory is 30% complete for direct materials cost. Ending inventory is 80% complete for direct materials cost.
3. Beginning work in process inventory is 60% complete for direct materials cost. Ending inventory is 20% complete for direct materials cost.

Exercise 16-30

Hybrid costing and yield

A1

College Life produces sweatshirts for college organizations and uses hybrid costing. It reports the following for its fabrication process. Customers choose screen-printed or embroidered logos.

	Per Unit
Direct materials	$12
Conversion	6
Fabrication process costs	$18
Customer choices—Logo types	
Screen-printed; Embroidered	$2; $10

a. Compute the cost per unit for both the screen-printed and embroidered sweatshirts.

b. If the company has a target markup of 30% above cost, compute the selling price for each type of sweatshirt.

c. For the current period, the company added direct materials into production that should have produced 5,000 sweatshirts. Actual production was 4,900 (nondefective) sweatshirts. Compute the yield for this period. Express the answer in percent.

connect

PROBLEM SET A

Problem 16-1A

Weighted average: Cost per equivalent unit; costs assigned to products **P1**

Victory Company uses weighted average process costing. The company has two production processes. Conversion cost is added evenly throughout each process. Direct materials are added at the beginning of the first process. Additional information for the first process follows.

		Direct Materials	Conversion
	Units	Percent Complete	Percent Complete
Beginning work in process inventory	60,000	100%	80%
Units started this period	820,000		
Units completed and transferred out	700,000		
Ending work in process inventory	180,000	100%	30%

Beginning work in process inventory		
Direct materials	$ 420,000	
Conversion	139,000	$ 559,000
Costs added this period		
Direct materials	2,220,000	
Conversion	3,254,000	5,474,000
Total costs to account for		$6,033,000

Required

1. Compute equivalent units of production for both direct materials and conversion.
2. Compute cost per equivalent unit of production for both direct materials and conversion.
3. Assign costs to the department's output—specifically, to the units transferred out and to the units in ending work in process inventory.

Check (2) Conversion cost per equivalent unit, $4.50

Problem 16-2A

Weighted average: Production cost report

P2 P4

Fast Co. produces its product through two processing departments: Cutting and Assembly. Information for the Cutting department follows.

	Units	Direct Materials Percent Complete	Conversion Percent Complete
Beginning work in process inventory	30,000		
Units started this period	140,000		
Units completed and transferred out	150,000		
Ending work in process inventory	20,000	100%	80%

Beginning work in process inventory		
Direct materials	$ 17,100	
Conversion	67,200	$ 84,300
Costs added this period		
Direct materials	144,400	
Conversion	862,400	1,006,800
Total costs to account for		$1,091,100

Required

1. Prepare the Cutting department's production cost report for October using the weighted average method.
2. Prepare the October 31 journal entry to transfer the cost of completed units from Cutting to Assembly.

Check (1) Costs transferred out, $982,500

Problem 16-3A

Weighted average: Production cost report

P2 P4

Tamar Co. manufactures a single product in two departments: Forming and Assembly. Information for the Forming process for May follows.

	Units	Direct Materials Percent Complete	Conversion Percent Complete
Beginning work in process inventory	3,000	100%	40%
Units started this period	21,600		
Units completed and transferred out	22,200		
Ending work in process inventory	2,400	100%	80%

Beginning work in process inventory		
Direct materials	$ 19,800	
Conversion	221,940	$ 241,740
Costs added this period		
Direct materials	496,800	
Conversion	2,165,940	2,662,740
Total costs to account for		$2,904,480

Required

1. Prepare the Forming department's production cost report for May using the weighted average method.
2. Prepare the May 31 journal entry to transfer the cost of units from Forming to Assembly.

Problem 16-4A[A]

FIFO: Production cost report

C2 P4

Refer to the data in Problem 16-3A. Assume that Tamar uses the FIFO method of process costing. The units started and completed for May total 19,200.

Required

1. Prepare the Forming department's production cost report for May using FIFO.
2. Prepare the May 31 journal entry to transfer the cost of units from Forming to Assembly.

Problem 16-5A

Production cost flow and measurement; journal entries

P3 P4

Sierra Company manufactures soccer balls in two sequential processes: Cutting and Stitching. All direct materials enter production at the beginning of the cutting process. The following information is available regarding its May inventories.

	Beginning Inventory	Ending Inventory
Raw materials inventory	$ 6,000	$ 3,250
Work in process inventory—Cutting	43,500	51,500
Work in process inventory—Stitching	63,300	60,500
Finished goods inventory	20,100	8,250

The following additional information describes the company's page 659 production activities for May.

Direct Materials		**Factory Overhead (actual costs)**	
Raw materials purchased on credit	$25,000	Indirect materials used	$ 6,000
Direct materials used—Cutting	21,750	Indirect labor used	55,000
Direct materials used—Stitching	0	Other overhead costs	46,505
Direct Labor		**Factory Overhead Rates**	
Direct labor—Cutting	$15,600	Cutting	150% of direct materials used
Direct labor—Stitching	62,400	Stitching	120% of direct labor used
		Sales	$256,000

Required

1. Compute the amount of (*a*) production costs transferred from Cutting to Stitching, (*b*) production costs transferred from Stitching to finished goods, and (*c*) cost of goods sold. *Hint:* Compute the total production costs in each department and then subtract the ending inventory to get the amount transferred out of each department.
2. Prepare May 31 journal entries to record the following May activities.
   - **a.** Raw materials purchases
   - **b.** Direct materials used
   - **c.** Indirect materials used
   - **d.** Direct labor used
   - **e.** Indirect labor used
   - **f.** Other overhead costs (paid in cash)
   - **g.** Overhead applied
   - **h.** Goods transferred from Cutting to Stitching
   - **i.** Goods transferred from Stitching to finished goods
   - **j.** Sales
   - **k.** Cost of goods sold

Check (1*c*) Cost of goods sold, $213,905

Problem 16-6A[A]

FIFO: Cost per equivalent unit; costs assigned to products **C2**

QualCo manufactures a single product in two departments: Cutting and Assembly. Information for the Cutting department for May follows.

		Direct Materials	Conversion
	Units	Percent Complete	Percent Complete
Beginning work in process inventory . .	37,500	60%	40%
Units started and completed	150,000		
Units completed and transferred out. . .	187,500		
Ending work in process inventory	51,250	60%	20%

Beginning work in process		
Direct materials	$ 74,250	
Conversion	28,500	$ 102,750
Costs added this period		
Direct materials	505,035	
Conversion	398,395	903,430
Total costs to account for . . .		$1,006,180

1. Compute equivalent units of production for both direct materials and conversion.
2. Compute cost per equivalent unit of production for both direct materials and conversion.
3. Assign costs to the department's output—specifically, to the units transferred out and to the units that remain in work in process at period-end.

Check (1) EUP for materials, 195,750

Problem 16-7A[A]

FIFO: Cost per equivalent unit; costs assigned to products **C2**

Dengo Co. makes a trail mix in two departments: Roasting and Blending. Direct materials are added at the beginning of each process, and conversion costs are added evenly throughout each process. The company uses the FIFO method of process costing. October data for the Roasting department follow.

		Direct Materials	Conversion
	Units	Percent Complete	Percent Complete
Beginning work in process inventory . .	3,000	100%	40%
Units started and completed	19,200		
Units completed and transferred out. . .	22,200		
Ending work in process inventory	2,400	100%	80%

Beginning work in process . .		$ 120,870
Costs added this period		
Direct materials	$ 248,400	
Conversion	1,082,970	1,331,370
Total costs to account for . . .		$1,452,240

Required

1. Compute equivalent units of production for both direct materials and conversion.
2. Compute cost per equivalent unit of production for both direct materials and conversion.
3. Assign costs to the department's output—specifically, to the units transferred out and to the units that remain in work in process at period-end.

PROBLEM SET B

Problem 16-1B

Weighted average: Cost per equivalent unit; costs assigned to products **P1**

Abraham Company uses weighted average process costing to account for its production costs. The company has two production processes. Conversion is added evenly throughout each process. Direct materials are added at the beginning of the first process. Additional information for the first process follows.

	Units	Direct Materials Percent Complete	Conversion Percent Complete
Beginning work in process inventory	2,000	100%	85%
Units started this period	86,000		
Units completed and transferred out	80,000		
Ending work in process inventory	8,000	100%	25%

Beginning work in process inventory		
Direct materials	$ 58,000	
Conversion	86,400	$ 144,400
Costs added this period		
Direct materials	712,000	
Conversion	1,980,000	2,692,000
Total costs to account for		$2,836,400

Check (2) Conversion cost per equivalent unit, $25.20

Required

1. Compute the equivalent units of production for both direct materials and conversion.
2. Compute cost per equivalent unit of production for both direct materials and conversion.
3. Assign costs to the department's output—specifically, to the units transferred out and to the units in ending work in process inventory.

Analysis Component

4. Assume that an error is made in determining the percent complete for units in ending inventory in the first process. Instead of being 25% complete for conversion, they are actually 75% complete. Write a one-half-page memo to the plant manager describing how this error affects this period's financial statements.

Problem 16-2B

Weighted average: Production cost report

P2 P4

Brun Company produces its product through two processing departments: Mixing and Baking. Information for the Mixing department follows.

		Direct Materials	Conversion
	Units	Percent Complete	Percent Complete
Beginning work in process inventory	7,500		
Units started this period	104,500		
Units completed and transferred out	100,000		
Ending work in process inventory	12,000	100%	25%

Beginning work in process inventory		
Direct materials	$ 6,800	
Conversion	14,500	$ 21,300
Costs added this period		
Direct materials	116,400	
Conversion	1,067,000	1,183,400
Total costs to account for		$1,204,700

Check (1) Cost transferred out, $1,160,000

Required

1. Prepare the Mixing department's production cost report for November using the weighted average method.
2. Prepare the November 30 journal entry to transfer the cost of completed units from Mixing to Baking.

Problem 16-3B

Weighted average: Production cost report **P2 P4**

Switch Co. manufactures a single product in two departments: Cutting and Assembly. Information for the Cutting process for January follows.

		Direct Materials	Conversion
	Units	Percent Complete	Percent Complete
Beginning work in process inventory	10,000	75%	60%
Units started this period	250,000		
Units completed and transferred out	220,000		
Ending work in process inventory	40,000	50%	30%

Beginning work in process inventory		
Direct materials	$ 7,500	
Conversion	49,840	$ 57,340
Costs added this period		
Direct materials	112,500	
Conversion	616,000	728,500
Total costs to account for		$785,840

Required

1. Prepare the Cutting department's production cost report for January using the weighted average method.
2. Prepare the January 31 journal entry to transfer the cost of units from Cutting to Assembly.

Check (2) Cost transferred out, $741,400

Problem 16-4B[A]

FIFO: Production cost report

C2 P4

Refer to the information in Problem 16-3B. Assume that Switch uses the FIFO method of process costing. The units started and completed for January total 210,000.

Required

1. Prepare the Cutting department's production cost report for January using FIFO. Round cost per EUP to three decimals.
2. Prepare the January 31 journal entry to transfer the cost of units from Cutting to Assembly.

Check (2) Cost transferred out, $743,554

Problem 16-5B

Production cost flow and measurement; journal entries

P3 P4

Ho Chee makes ice cream in two sequential processes: Mixing and Blending. Direct materials enter production at the beginning of each process. The following information is available regarding its March inventories.

	Beginning Inventory	Ending Inventory
Raw materials inventory	$ 72,000	$ 24,800
Work in process inventory—Mixing	156,000	250,000
Work in process inventory—Blending	160,000	198,000
Finished goods inventory	80,200	60,250

The following additional information describes the company's production activities for March.

Direct Materials		**Factory Overhead (actual costs)**	
Raw materials purchased on credit	$212,000	Indirect materials used	$24,800
Direct materials used—Mixing	174,000	Indirect labor used	69,500
Direct materials used—Blending	44,000	Other overhead costs	64,608
Direct Labor		**Factory Overhead Rates**	
Direct labor—Mixing	$ 52,500	Mixing	75% of direct materials used
Direct labor—Blending	74,680	Blending	60% of direct labor used
		Sales	$490,000

Check (1*c*) Cost of goods sold, $408,438

Required

1. Compute the amount of (*a*) production costs transferred from Mixing to Blending, (*b*) production costs transferred from Blending to finished goods, and (*c*) cost of goods sold. *Hint:* Compute the total production costs in each department and then subtract the ending inventory to get the amount transferred out of each department.
2. Prepare March 31 journal entries to record the following March activities.
   - **a.** Raw materials purchases
   - **b.** Direct materials used
   - **c.** Indirect materials used
   - **d.** Direct labor used
   - **e.** Indirect labor used
   - **f.** Other overhead costs (paid in cash)
   - **g.** Overhead applied
   - **h.** Goods transferred from Mixing to Blending
   - **i.** Goods transferred from Blending to finished goods
   - **j.** Sales
   - **k.** Cost of goods sold

Problem 16-6B[A]

FIFO: Cost per equivalent unit; costs assigned to products **C2**

Harson Co. manufactures a single product in two departments: Forming and Assembly. Information for the Forming department for May follows.

	Units	Direct Materials Percent Complete	Conversion Percent Complete
Beginning work in process inventory...	62,500	40%	80%
Units started and completed	175,000		
Units completed and transferred out...	237,500		
Ending work in process inventory	76,250	80%	20%

Beginning work in process		
Direct materials	$ 60,000	
Conversion	112,500	$ 172,500
Costs added this period		
Direct materials	683,750	
Conversion	446,050	1,129,800
Total costs to account for...		$1,302,300

Check (1) EUP for materials, 273,500

1. Compute equivalent units of production for both direct materials and conversion.
2. Compute cost per equivalent unit of production for both direct materials and conversion.
3. Assign costs to the department's output—specifically, to the units transferred out and to the units that remain in work in process at period-end.

Problem 16-7B[A]

FIFO: Cost per equivalent unit; costs assigned to products **C2**

Belda Co. makes organic juice in two departments: Cutting and Blending. Direct materials are added at the beginning of each process, and conversion costs are added evenly throughout each process. The company uses the FIFO method of process costing. Data for March for the Cutting department follows.

	Units	Direct Materials Percent Complete	Conversion Percent Complete
Beginning work in process inventory...	10,000	75%	60%
Units started and completed	210,000		
Units completed and transferred out...	220,000		
Ending work in process inventory	40,000	50%	30%

Beginning work in process..		$ 114,520
Costs added this period		
Direct materials	$ 223,200	
Conversion	1,233,960	1,457,160
Total costs to account for...		$1,571,680

Required

1. Compute equivalent units of production for both direct materials and conversion.

2. Compute cost per equivalent unit of production for both direct materials and conversion.
3. Assign costs to the department's output—specifically, to the units transferred out and to the units that remain in work in process at period-end.

connect

SERIAL PROBLEM

Business Solutions **P1**

Alexander Image/Shutterstock

This serial problem began in Chapter 1 and continues through most of the book. If previous chapter segments were not completed, the serial problem can begin at this point.

SP 16 Based on customer interest in February, Santana expands her computer workstation furniture business to include mass production of standardized desks and chairs. She uses the weighted average method of process costing for these products. Desks are made in three processes: Cutting, Finishing, and Packaging. Information below is for the Cutting process for desks for February.

Cutting process—Desks	Units
Beginning work in process inventory	0
Units started this period	60
Units completed and transferred to Finishing	40
Ending work in process inventory (100% complete for direct materials, 80% complete for conversion)	20
Costs added this month	**Cost**
Direct materials	$24,000
Conversion	4,200

Required

1. Compute equivalent units of production for both direct materials and conversion for February.
2. Compute cost per equivalent unit for both direct materials and conversion for February.
3. Assign costs to units transferred out to Finishing and to units in ending work in process inventory.

page 663

COMPREHENSIVE PROBLEM

Major League Bat Company

Weighted average: Review of Chapters 14 and 16

CP 16 Major League Bat Company manufactures baseball bats. In addition to its work in process inventories, the company maintains inventories of raw materials and finished goods. It uses raw materials as direct materials in production and as indirect materials. Its factory payroll costs include direct labor for production and indirect labor. All materials are added at the beginning of the process, and conversion costs are applied uniformly throughout the production process.

Required

You are to maintain records and produce measures of inventories to reflect the July events of this company. Set up the following general ledger accounts and enter the June 30 balances: Raw Materials Inventory, $25,000; Work in Process Inventory, $8,135 ($2,660 of direct materials and $5,475 of conversion); Finished Goods Inventory, $110,000; Sales, $0; Cost of Goods Sold, $0; Factory Wages Payable, $0; and Factory Overhead, $0.

Check (1*e*) Cr. Factory Overhead, $101,125

(2) EUP for conversion, 14,200

1. Prepare journal entries to record the following July transactions and events.
   a. Purchased raw materials for $125,000 cash.
   b. Used raw materials as follows: direct materials, $52,440, and indirect materials, $10,000.

c. Recorded factory wages payable costs as follows: direct labor, $202,250, and indirect labor, $25,000.

d. Incurred other actual factory overhead costs of $66,125 paid in cash.

e. Applied factory overhead to production at 50% of direct labor costs.

2. Information about the July work in process (WIP) inventory follows. Use this information with that from part 1 to prepare a production cost report, assuming the weighted average method is used.

Units		Beginning WIP Inventory		Ending WIP Inventory	
Beginning WIP inventory . .	5,000 units	Direct materials—Percent complete . .	100%	Direct materials—Percent complete . .	100%
Started	14,000 units	Conversion—Percent complete.	75%	Conversion—Percent complete.	40%
Units transferred out	11,000 units				
Ending WIP inventory.	8,000 units				

3. Using the results from part 2 and the available information, make computations and prepare journal entries to record the following:

f. Total costs transferred to finished goods for July.

g. Sale of finished goods costing $265,700 for $625,000 in cash.

(3*f*) $271,150

4. Post entries from parts 1 and 3 to the ledger accounts set up at the beginning of the problem.

5. Compute the amount of gross profit from the sales in July.

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA 16-1 Quick Study, Computing equivalent units, **P1**—similar to QS 16-5 & QS 16-8.

Tableau DA 16-2 Exercise, Computing cost per equivalent unit and assigning costs to output, **P1**—similar to Exercise 16-6.

Tableau DA 16-3 Mini-case, Preparing and using a production cost report, **P2**—similar to Exercise 16-16 & Exercise 16-17.

GENERAL LEDGER

General Ledger (GL) Assignments expose students to general ledger software similar to that in practice. **GL** is part of **Connect**, and **GL** assignments are auto-gradable and have algorithmic options. For the following **GL** assignment, prepare summary journal entries to record transactions. Compute cost of goods sold and gross profit.

GL 16-1 Based on Problem 16-5A

Accounting Analysis

COMPANY ANALYSIS

A1

AA 16-1 **Apple** allows customers to select different cases for the watches it produces and sells. Assume the following data for the newest Apple Watch.

APPLE

	Cost per Watch
Assembly process costs	
Direct materials, excluding case	$ 85
Conversion	165

	Cost per Watch
Custom choices	
Aluminum case	$ 50
Titanium case	200

1. Compute cost per unit for an Apple watch with either an (*a*) aluminum case or (*b*) titanium case.
2. In setting price, assume Apple marks up total cost per unit by 30%. Compute the selling price per unit for an Apple watch with either an (*a*) aluminum case or (*b*) titanium case.

COMPARATIVE ANALYSIS

A1

AA 16-2 **Google**'s Fitbit division makes fitness trackers. Assume the following data from Google.

GOOGLE

	Cost per Tracker
Assembly process costs	
Direct materials	$80
Conversion	60

	Cost per Tracker
Custom option	
Company logo	$30

1. Compute cost per unit for (*a*) a noncustom (standard) fitness tracker and (*b*) a custom tracker with a company logo.
2. Assume Google marks up its fitness trackers by 40%. Compute the selling price per unit for each type of fitness tracker.
3. Assume Google wants its standard fitness tracker to compete with the entry level **Apple** Watch. Assume the entry level Apple Watch sells for $200 per unit. Is Google's selling price for its noncustom (standard) fitness tracker lower than $200 per unit for the Apple Watch?

EXTENDEDANALYSIS

A1

AA 16-3 **Apple** and **Samsung** make smartwatches. Assume the following data for each company for a recent week.

SAMSUNG

APPLE

	Apple Current week	Samsung Current week	Samsung Prior week
Number of nondefective watches actually made	396,000	29,400	27,160
Number of watches that could have been made from direct materials put into production	400,000	30,000	28,000

1. Compute yield for the current week for both Apple and Samsung. Which company's process manufacturing system is more efficient?
2. Compute yield for the prior week for Samsung. Did Samsung's process manufacturing system become more efficient or less efficient for the current week?

Discussion Questions

1. What is the main factor for a company in choosing between job order costing and process costing systems? For each type of costing system, list two types of companies that would likely use that system.
2. The focus in a job order costing system is the job or batch. Identify the main focus in process costing.
3. Can services be provided through process operations? Support your answer with an example.
4. Which costing system, job order or process, typically uses more Work in Process Inventory accounts?
5. Identify the control document for materials flow when a materials requisition slip is not used.
6. Define equivalent units of production (EUP). Why is it necessary to use EUP in process costing?
7. What are the two main inventory methods used in computing equivalent units of production? Which method combines production activity across two periods in computing equivalent units? Which is generally considered more precise?
8. List four ways managers can use process cost information.
9. Explain how labor costs flow through a company's process cost system. page 665
10. Do process costing systems use multiple Factory Overhead accounts?
11. Is it possible to have under- or overapplied overhead costs in a process costing system? Explain.
12. Explain why equivalent units of production for conversion can be the same as, and why they can be different from, equivalent units for direct materials.
13. List the four steps in accounting for production activity in a reporting period (for process operations).
14. How does a process manufacturer compute the cost of a completed unit?

15. Are there situations where **Google** can use process costing? Identify at least one and explain it.

GOOGLE

16. **Samsung** produces digital televisions with a multiple-process production line. Identify and list some of its likely production processing steps and departments.

SAMSUNG

17. **General Mills** needs a steady supply of ingredients for processing. What are some risks the company faces regarding its ingredients?

18. How could a production cost report be used to determine if a program to reduce water usage is successful?

19. Explain a hybrid costing system. Identify a product or service operation that might be suited to a hybrid costing system.

Beyond the Numbers

ETHICS CHALLENGE

C1

BTN 16-1 Many accounting professionals are skilled in financial analysis, but less are skilled in manufacturing. This is especially true for process manufacturing environments. To provide professional accounting and financial services, one must understand the industry, product, and processes. We have an ethical responsibility to develop this understanding before offering services to clients in these areas.

Required

Write a one-half-page action plan, in memorandum format, discussing how we would obtain an understanding of key business processes of a company that hires us to provide financial services. The memorandum should specify an industry, a product, and one selected process and should draw on at least one reference, such as a professional journal or industry magazine.

COMMUNICATING IN PRACTICE

C1

BTN 16-2 Many companies use technology to help them improve processes. One example of such a tool is robotic process automation. Access https://www2.deloitte.com/us/en/pages/operations/articles/a-guide-to-robotic-process-automation-and-intelligent-automation.html and read the information displayed.

Required

What processes are robotic process automation (RPA) tools most useful for? Explain how RPA tools work and list their proposed benefits.

TEAMWORK IN ACTION

C1 P3 P4

BTN 16-3 The purpose of this team activity is to ensure that each team member understands process operations and the related accounting entries. Find the activities and flows identified in Exhibit 16.12 with numbers ① through ⑩. Pick a member of the team to start by describing activity number ① in this exhibit, then verbalizing the related journal entry, and describing how the amounts in the entry are computed. The other members of the team are to agree or disagree; discussion is to continue until all members express understanding. Rotate to the next numbered activity and next team member until all activities and entries have been discussed. If at any point a team member is uncertain about an answer, the team member may pass and get back in the rotation when he or she can contribute to the team's discussion.

ENTREPRENEURIAL DECISION

A1

BTN 16-4 This chapter's opener featured Suzy Batlle and her company **Azucar Ice Cream Company**.

Required

1. Suzy tries to buy raw materials just-in-time for their use in production. How does holding raw materials inventories increase costs? If the items are not used in production, how can they impact profits? Explain.

2. How can companies like Suzy's use *yield* to improve their production processes?
3. Suppose Azucar Ice Cream decides to allow customers to make their own unique ice cream flavors. Why might the company then use a hybrid costing system?

17 Activity-Based Costing and Analysis

Chapter Preview

PLANTWIDE RATE METHOD

P1 Applying plantwide method

Overhead allocated

NTK 17-1

DEPARTMENTAL RATE METHOD

P2 Applying departmental method

Overhead allocated

NTK 17-2

ACTIVITY-BASED COSTING (ABC)

P3 Applying activity-based costing

C1 Types of activities

NTK 17-3

ABC FOR SERVICES AND CUSTOMER ANALYSIS

P4 Activities for service providers

Applying ABC to services

A1 Customer profitability

NTK 17-4

Learning Objectives

CONCEPTUAL

C1 Describe the four types of activities that cause overhead costs.

ANALYTICAL

A1 Allocate selling, general and administrative expenses to products and assess profitability.

PROCEDURAL

P1 Allocate overhead costs using the plantwide overhead rate method.

P2 Allocate overhead costs using the departmental overhead rate method.

P3 Allocate overhead costs using activity-based costing.

P4 Allocate overhead costs to service companies using activity-based costing.

Brewing Profits

"Follow your interests"—**Joe Grimm**

BROOKLYN, NY—Captivated by a college class on fermentation, Joe and Lauren Grimm began making beer in their basement. "Initially, it was just an outlet for our creativity," recalls Lauren. Soon however, the duo immersed themselves in learning about different beers and launched their company, **Grimm Artisanal Ales** (**GrimmAles.com**).

Joe and Lauren began as *contract brewers*, renting production equipment from existing breweries. Soon they bought their own production facility. With it came increased overhead costs for things like brewery maintenance, supervision, and cleanup.

"It's pretty crazy," explains Joe, "suddenly there is a lot more to handle. We now have employees and infrastructure." Joe and Lauren know that how they control and allocate overhead costs are crucial for product pricing and product mix decisions.

When they first began and had few product lines, a *single plantwide rate* was sufficient. Unlike many brewers who focus on a flagship beer, Joe and Lauren prefer to experiment with many different varieties. As their business grew to offer more diverse product lines, more detailed overhead costing techniques were required.

Activity-based costing can be useful when different product lines use different amounts of the activities that drive overhead costs. "We constantly refine and improve our processes," admits Lauren. Their focus on improving activities leads to a focus on activity-based costing to control costs.

Having already produced over 80 different beers, the Grimms keep experimenting. Satisfied customers and a *Young Entrepreneurs of the Year* award from the U.S. Small Business Administration are witness to their success. "Believe!" insists Lauren. "When we started, only Joe and I believed."

BRIAN HARKIN/The New York Times/Redux Pictures

Sources: *Grimm Artisanal Ales website*¸ January 2021; *Brooklyn Paper*, May 2018; *BKBeerReview.com blog*, August 2018; *GrubStreet.com*, June 2018

Overhead Cost Allocation Methods

Manager decisions involving product pricing, product mix, and cost control depend on accurate product cost information. Because direct materials and direct labor can often be reliably traced to units of output, allocating these costs to products is clear. Overhead costs, however, cannot be traced to units of product. Overhead costs are allocated to products using one of three methods: (1) the plantwide overhead rate method, (2) the departmental overhead rate method, or (3) the activity-based costing method.

Exhibit 17.1 summarizes key features of the three overhead allocation methods.

- *Plantwide overhead rate method* and *Departmental overhead rate method* use volume-based measures like direct labor hours or machine hours to allocate overhead costs. The plantwide method uses a single rate for allocating overhead costs, and the departmental rate method uses at least two rates.
- *Activity-based costing* focuses on activities and their costs. Activity-based costing typically uses more overhead allocation rates than the plantwide and departmental methods.

EXHIBIT 17.1

Overhead Cost Allocation Methods

Allocation Method	Number of Overhead Rates	Overhead Allocation Rates Based on
Plantwide rate.	One rate	Volume-based measures like direct labor hours or machine hours
Departmental rate	Two or more rates	Volume-based measures like direct labor hours or machine hours
Activity-based costing . . .	Many rates	Activities that drive costs, like number of batches of product produced

PLANTWIDE OVERHEAD RATE METHOD

page 668

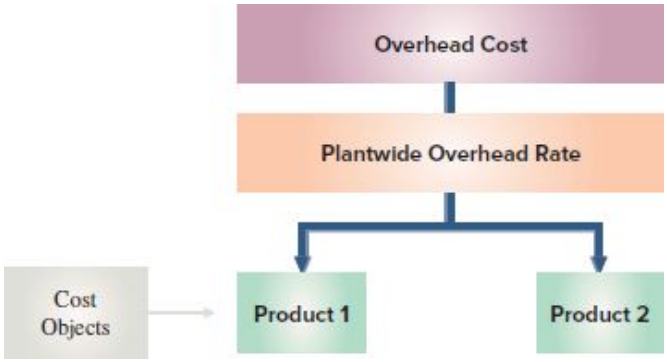
P1

Allocate overhead costs using the plantwide overhead rate method.

The *plantwide overhead rate method* uses one overhead rate to allocate overhead costs. The target of the cost assignment, or **cost object**, is the unit of product—see Exhibit 17.2. The rate is determined using a volume-related measure such as direct labor hours or machine hours.

EXHIBIT 17.2

Plantwide Overhead Rate Method



Applying Plantwide Overhead Rate Method

Under the plantwide overhead rate method, total budgeted overhead costs are divided by the allocation base, such as total budgeted direct labor hours, to get the plantwide overhead rate. This rate is used to allocate overhead costs to *products* based on the actual amount of allocation base used.

Sergey Ryzhov/123RF

To illustrate, consider data from KartCo, a go-kart manufacturer that produces both standard and custom go-karts for amusement parks. The standard go-kart is a basic model sold primarily to amusement parks that service county and state fairs. Custom go-karts are produced for theme parks that need unique go-karts to fit their themes. KartCo allocates overhead using direct labor hours and reports the following **budgeted** overhead cost and direct labor hours for this year.

Budgeted overhead cost	$4,800,000
Budgeted direct labor hours	100,000 hours

Actual Usage The actual direct labor hours used for the two go-kart models are in Exhibit 17.3.

EXHIBIT 17.3

Actual Direct Labor Hours

Model	Number of Units	Direct Labor Hours per Unit	Direct Labor Hours
Standard go-kart	5,000	15	75,000
Custom go-kart	1,000	25	25,000
Total			100,000

Plantwide Overhead Rate The single plantwide overhead rate is computed as follows.

$$\text{Plant wide overhead rate} = \frac{\text{Budgeted overhead cost}}{\text{Budgeted allocation base}} = \frac{\$4{,}800{,}000}{100{,}000 \text{ DLH}} = \$48 \text{ per DLH}$$

Overhead Allocated This plantwide rate is then used to allocate overhead cost based on the actual direct labor hours used to produce each unit as follows.

$$\text{Overhead allocated} = \text{Plantwide overhead rate} \times \text{DLH used}$$

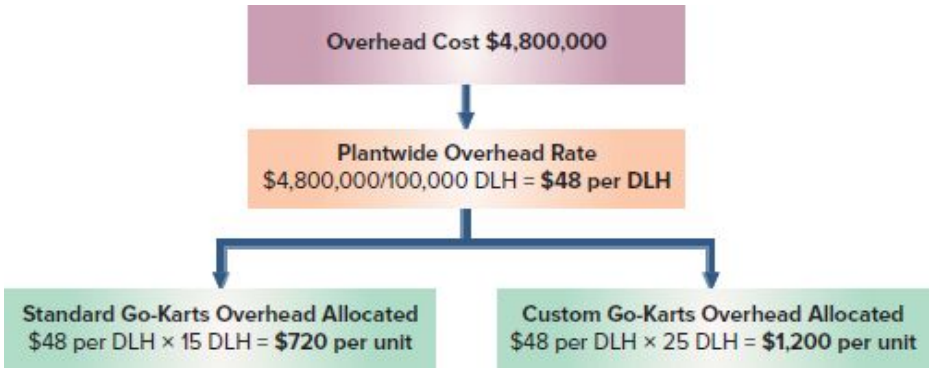
For KartCo, overhead cost is allocated to its two models as follows (on a per unit basis).

Model	Plantwide Overhead Rate	Direct Labor Hours per Unit	Overhead Allocated
Standard go-kart	$48 per DLH	× 15 DLH per unit	= $720 per unit
Custom go-kart	$48 per DLH	× 25 DLH per unit	= $1,200 per unit

Exhibit 17.4 summarizes overhead allocation for KartCo using the plantwide method. page 669

EXHIBIT 17.4

Plantwide Method—KartCo



Product Cost We use the per unit overhead cost to compute the product cost per unit as follows. Direct materials and direct labor costs per unit are taken from cost records.

Model	Product Cost per Unit using the Plantwide Rate Method						
	Direct Materials	+	Direct Labor	+	Overhead	=	Product Cost per Unit
Standard go-kart	$400	+	$350	+	$ 720	=	$1,470
Custom go-kart	600	+	500	+	1,200	=	2,300

NEED-TO-KNOW 17-1

Plantwide Rate Method

P1

A manufacturer budgets $900,000 of overhead cost and 25,000 direct labor hours.

1. What is the plantwide overhead rate based on direct labor hours?
2. Using the plantwide overhead rate, how much overhead is allocated to a job that uses 10 direct labor hours?

Solution

1. Plantwide overhead rate $= \frac{\$900{,}000}{25{,}000 \text{ DLH}} = \$36$ per direct labor hour
2. Overhead allocated to job $= 10 \text{ DLH} \times \$36 \text{ per DLH} = \$360$

Do More: QS 17-1, QS 17-2, QS 17-3, QS 17-4, E 17-1, E 17-2, E 17-3

DEPARTMENTAL OVERHEAD RATE METHOD

P2

Allocate overhead costs using the departmental overhead rate method.

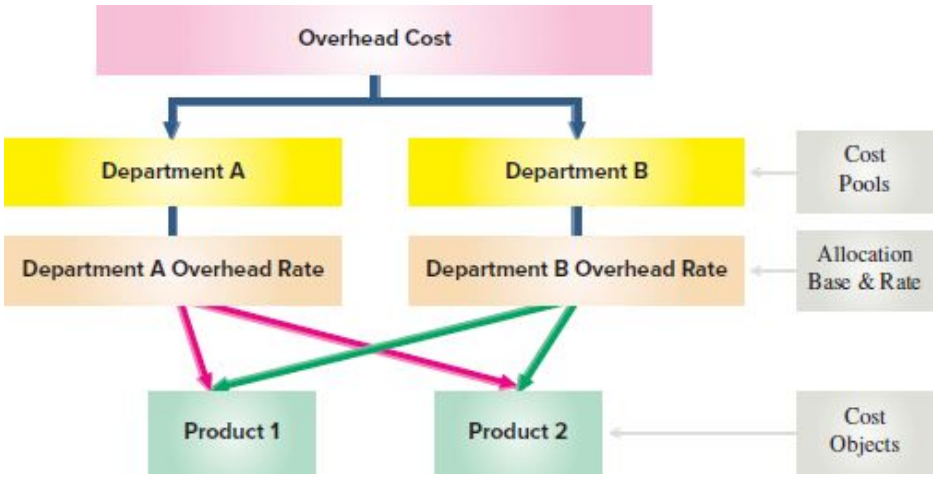
Many companies have several departments that use different amounts of overhead. Multiple overhead rates can result in better overhead cost allocations and improve management decisions.

The *departmental overhead rate method* uses a different overhead rate for each department. We use a three-step process (see Exhibit 17.5 showing two departments and two products).

1. Assign budgeted overhead cost to department *cost pools*.
2. Select an allocation base and compute an overhead allocation rate for each department.
3. Allocate overhead costs to cost objects.

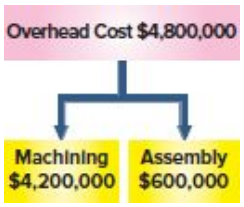
EXHIBIT 17.5

Departmental Overhead Rate Method



Point: A cost pool is a grouping of costs, usually grouped by department or activity. page 670

Each department has its own overhead rate and its own allocation base. An Assembly department might use direct labor hours to allocate its overhead cost, and a Machining department might use machine hours.



Applying Departmental Overhead Rate Method KartCo has two production departments: Machining and Assembly.

1 KartCo assigns its $4,800,000 budgeted overhead cost to its two production departments: $4,200,000 of overhead is traceable to Machining and $600,000 is traceable to Assembly.

2 Each department determines an allocation base. Machining uses machine hours (MH) and Assembly uses direct labor hours (DLH). Machining budgets 70,000 MH and Assembly budgets 100,000 DLH. Actual production information for Machining and Assembly follows.

	Number of Units	Machining Department		Assembly Department	
		Hours per Unit	Total Hours	Hours per Unit	Total Hours
Standard go-kart . . .	5,000	10 MH per unit	50,000 MH	15 DLH per unit	75,000 DLH
Custom go-kart	1,000	20 MH per unit	20,000 MH	25 DLH per unit	25,000 DLH
Totals			70,000 MH		100,000 DLH

Departmental Overhead Rate Each department computes an overhead rate as follows.

$$\text{Departmental overhead rate} = \frac{\text{Budgeted departmental overhead cost}}{\text{Budgeted departmental allocation base}}$$

KartCo's departmental overhead rates are computed as follows.

$$\text{Machining department overhead rate} = \frac{\$4{,}200{,}000}{70{,}000 \text{ MH}} = \$60 \text{ per MH}$$

$$\text{Assembly department overhead rate} = \frac{\$600{,}000}{100{,}000 \text{ DLH}} = \$6 \text{ per DLH}$$

3 **Overhead Allocated** Step three allocates overhead cost to each product using departmental overhead rates along with the actual allocation bases used. Because each standard go-kart uses 10 MH from the Machining department and 15 DLH from the Assembly department, the overhead cost allocated to each standard go-kart is $600 from the Machining department (10 MH × $60 per MH) and $90 from the Assembly department (15 DLH × $6 per DLH). The same procedure is applied for its custom go-kart. Exhibit 17.6 summarizes KartCo's overhead allocation per go-kart using the departmental method.

EXHIBIT 17.6

Overhead Allocation Using Departmental Overhead Rates

		Standard Go-Kart		Custom Go-Kart	
Department	Departmental Overhead Rate	Hours per Unit	Overhead Allocated	Hours per Unit	Overhead Allocated
Machining . . .	$60 per MH	10 MH per unit	$ 600	20 MH per unit	$ 1,200
Assembly. . . .	$6 per DLH	15 DLH per unit	90	25 DLH per unit	150
Totals.			**$690**		**$1,350**

Product Cost Using the per unit overhead cost from the departmental overhead rate method yields the following total product cost per unit for each model. Direct materials and direct labor costs per unit are taken from cost records.

	Product Cost per Unit using Departmental Rate Method						
	Direct Materials	+	Direct Labor	+	Overhead	=	Product Cost per Unit
Standard go-kart. . .	$400	+	$350	+	$ 690	=	$1,440
Custom go-kart . . .	600	+	500	+	1,350	=	2,450

Plantwide versus Departmental Overhead Rate Methods page 671 Exhibit 17.7 compares the allocated overhead costs per unit for standard and custom go-karts under the plantwide overhead rate and the departmental overhead rate methods.

EXHIBIT 17.7

Overhead Cost per Unit for Plantwide vs Departmental Rates

	Overhead Cost per Unit	
Overhead Allocation Method	Standard Go-Kart	Custom Go-Kart
Plantwide rate method.	$720	$1,200
Departmental rate method	690	1,350

The overhead cost allocated to each standard go-kart *decreased* from $720 under the plantwide overhead rate method to $690 under the departmental overhead rate method, whereas overhead cost allocated to each custom go-kart *increased* from $1,200 to $1,350. These differences occur because the custom go-kart requires more hours in the Machining department (20 MH) than the standard go-kart requires (10 MH). Compared to the plantwide overhead rate method, the departmental overhead rate method arguably results in more accurate overhead allocations.

Carl Lyttle/The Image Bank/Getty Images

Assessing Plantwide and Departmental Overhead Rate Methods Both the plantwide and departmental overhead rate methods have three strengths: (1) They use readily available information like direct labor hours or machine hours. (2) They are easy to implement. (3) They comply with

GAAP and can be used for external reporting. Both have a weakness: Overhead cost is often too complex to be explained by factors like direct labor hours or machine hours.

Plantwide Overhead Rate Method The usefulness of the single plantwide overhead rate depends on two assumptions: (1) overhead costs change with the allocation base and (2) all products use overhead cost in the same proportions. For companies with many different products or those with products that use overhead cost in different ways, the assumptions of the single plantwide rate are not reasonable. When overhead cost bears little relation to the allocation base, allocating overhead cost using a single plantwide overhead rate can distort product cost and lead to poor managerial decisions.

Departmental Overhead Rate Method The departmental overhead rate method assumes that (1) different products are similar in volume, complexity, and batch size, and (2) departmental overhead costs are proportional to the department allocation base. When products differ in batch size and complexity, they usually consume different amounts of overhead cost. This can distort product costs. Because the departmental overhead rate method allocates overhead cost based on measures closely related to production volume, it fails to accurately assign many overhead costs, like warehouse depreciation or factory insurance, that are not driven by production volume.

Decision Ethics

Department Manager Three department managers hire a consulting firm for advice on increasing departmental performance. The consulting firm spends 50% of its efforts on department A and 25% on each of the other two departments. The manager for department A suggests that the three departments equally share the consulting fee. As a manager of one of the other two departments, do you believe equal sharing is fair? ■ *Answer:* If one department consumes more services than another, we attempt to share the bill in proportion to consumption. Equally dividing the bill among the number of departments is fair if each consumed equal services. This same notion applies in allocating costs to products and services.

NEED-TO-KNOW 17-2

Departmental Rate Method

P2

A manufacturer reports the following budgeted data for its two production departments.

Budgeted Data	Machining	Assembly
Overhead costs	$600,000	$300,000
Machine hours (MH)	20,000	0
Direct labor hours (DLH)	10,000	5,000

1. What are the departmental overhead rates if the Machining department allocates overhead based on machine hours and the Assembly department allocates overhead based on direct labor hours?
2. Using the departmental overhead rates, how much overhead should be allocated to a job that uses 16 machine hours in the Machining department and 5 direct labor hours in the Assembly department?

Solution

page 672

1. $$\text{Machining department rate} = \frac{\$600{,}000}{20{,}000\ \text{MH}} = \$30\ \text{per machine hour}$$
$$\text{Assembly department rate} = \frac{\$300{,}000}{5{,}000\ \text{DLH}} = \$60\ \text{per direct labor hour}$$

2. Overhead allocated to job

Department	Departmental Overhead Rate	Hours Used	Overhead Allocated
Machining	$30 per machine hour	16 MH	$480
Assembly	$60 per direct labor hour	5 DLH	$300
Total			$780

Do More: QS 17-7, QS 17-8, E 17-6, E 17-7

ACTIVITY-BASED COSTING

P3

Allocate overhead costs using activity-based costing.

Activity-based costing (ABC) assigns overhead cost by focusing on *activities*. Unlike the plantwide rate method, ABC uses more than a single rate, and unlike the departmental rate method, ABC focuses on activities rather than departments.

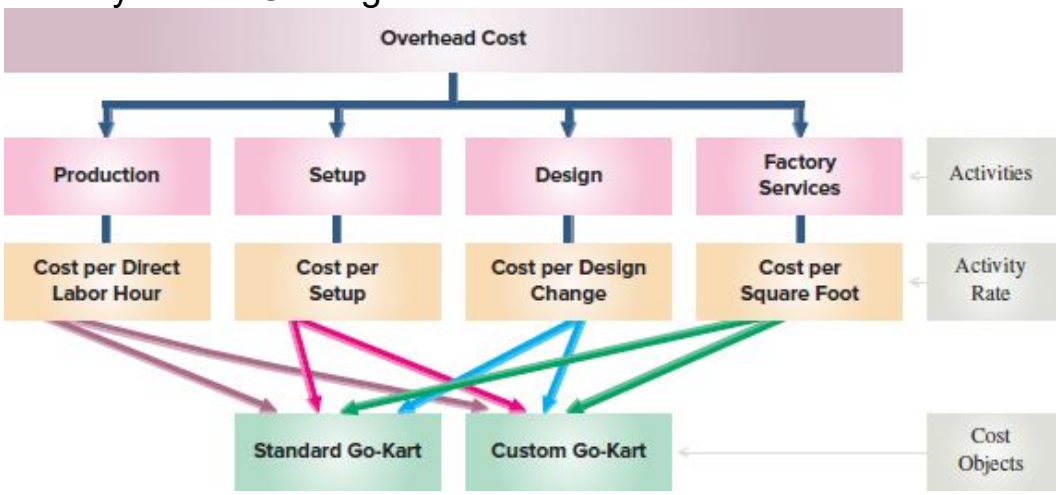
The basic principle underlying activity-based costing is that an **activity**, which is a task, operation, or procedure, is what causes overhead cost to be incurred. Examples of activities are production setups, machine usage, fabrication, design, assembly, and inspections. Instead of allocating overhead to departments, ABC allocates overhead to activities.

Activity-based costing follows three steps—see Exhibit 17.8.

1. Identify activities and assign budgeted costs to activity cost pools.
2. Compute an overhead activity rate for each activity cost pool.
3. Allocate overhead costs to cost objects (products).

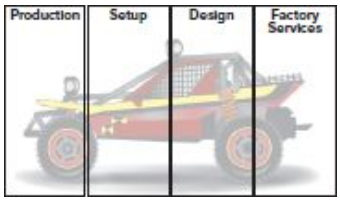
EXHIBIT 17.8

Activity-Based Costing



Applying Activity-Based Costing

Step 1: Identify Activities and Their Budgeted Overhead Cost Step 1 identifies individual activities, which are grouped into *cost pools*. An **activity cost pool** is a group of costs that are related to the same activity. An **activity cost driver**, or *cost driver*, is a factor that causes the cost of an activity to go up or down. For example, factory maintenance, cleaning, and utilities can be grouped into a "factory services" activity cost pool because they are related to square feet of space.



KartCo budgets total overhead cost of $4,800,000. Management assigns its overhead cost to four activity cost pools: production, setup, design, and factory services. To assign costs to activity cost pools, management looks for costs that are caused by similar activities.

The table below shows that $600,000 of overhead cost is assigned to the production cost pool; $2,000,000 to the setup cost pool; $1,200,000 to the design cost pool; and $1,000,000 to the factory services cost pool. page 673

Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage
Production	$ 600,000	Direct labor hours	100,000 direct labor hours
Setup	2,000,000	Setups	200 setups
Design	1,200,000	Design changes	10 changes
Factory services	1,000,000	Square feet	20,000 square feet
Total	$4,800,000		

Step 2: Compute Overhead Activity Rate for Each Activity Step 2 computes an **activity rate** for each cost pool.

Overhead Activity Rate Each activity rate is computed as follows.

$$\text{Activity rate} = \frac{\text{Budgeted activity cost}}{\text{Budgeted activity usage}}$$

Activity rates for KartCo are computed and shown in Exhibit 17.9.

EXHIBIT 17.9

Computing Activity Rates

Activity	Budgeted Cost	÷ Budgeted Activity Usage	= Activity Rate
Production	$ 600,000	÷ 100,000 direct labor hours	= $6 per direct labor hour
Setup	2,000,000	÷ 200 setups	= $10,000 per setup
Design	1,200,000	÷ 10 design changes	= $120,000 per change
Factory services	1,000,000	÷ 20,000 square feet	= $50 per square foot

Step 3: Allocate Overhead Cost to Cost Objects Step 3 allocates overhead cost to products. KartCo collects the following information for this purpose.

	Actual Activity Usage		
Activity Cost Driver	Standard Model	Custom Model	Total
Direct labor hours	75,000	25,000	100,000
Setups	40	160	200
Design changes	0	10	10
Square feet	12,000	8,000	20,000

We multiply a product's actual activity usage by the activity rate as follows to get the overhead cost allocated to each activity.

$$\text{Allocated cost} = \text{Actual activity usage} \times \text{Activity rate}$$

Overhead Allocated For each product, the allocated costs are added together and divided by the number of units to compute the overhead cost per unit as shown in Exhibit 17.10. The company produced 5,000 standard go-karts and 1,000 custom go-karts.

EXHIBIT 17.10

Overhead Cost Allocation Using Activity-Based Costing

	Standard Go-Kart				Custom Go-Kart			
Activity	Activity Usage	× Activity Rate	=	Allocated Cost	Activity Usage	× Activity Rate	=	Allocated Cost
Production	75,000 DLH	× $6 per DLH	=	$ 450,000	25,000 DLH	× $6 per DLH	=	$ 150,000
Setup	40 setups	× $10,000 per setup	=	400,000	160 setups	× $10,000 per setup	=	1,600,000
Design	0 changes	× $120,000 per change	=	0	10 changes	× $120,000 per change	=	1,200,000
Factory services	12,000 sq. ft.	× $50 per square foot	=	600,000	8,000 sq. ft.	× $50 per square foot	=	400,000
Total allocated cost				$1,450,000				$3,350,000
Units produced				÷ 5,000				÷ 1,000
Overhead cost per unit				= $290				= $3,350

Standard go-karts used 75,000 direct labor hours, so we allocate $450,000 (75,000 × $6 per DLH) of production costs to that product. Custom go-karts used 25,000 direct labor hours, so we allocate $150,000 (25,000 DLH × $6 per DLH) of production costs to that product.

We similarly allocate setup, design, and factory services costs to each model of go-kart. KartCo assigned no design costs to standard go-karts because standard go-karts are sold with no design changes.

The result is $1,450,000 of overhead cost allocated to standard go-karts and $3,350,000 allocated to custom go-karts. While the total cost

allocated of $4,800,000 is the same as under the other methods, the amounts allocated to the two product lines differ.

Overhead cost per unit is computed by dividing total overhead cost allocated to each product by the number of units produced. KartCo's overhead cost per unit is $290 for its standard go-kart and $3,350 for its custom go-kart.

page 674

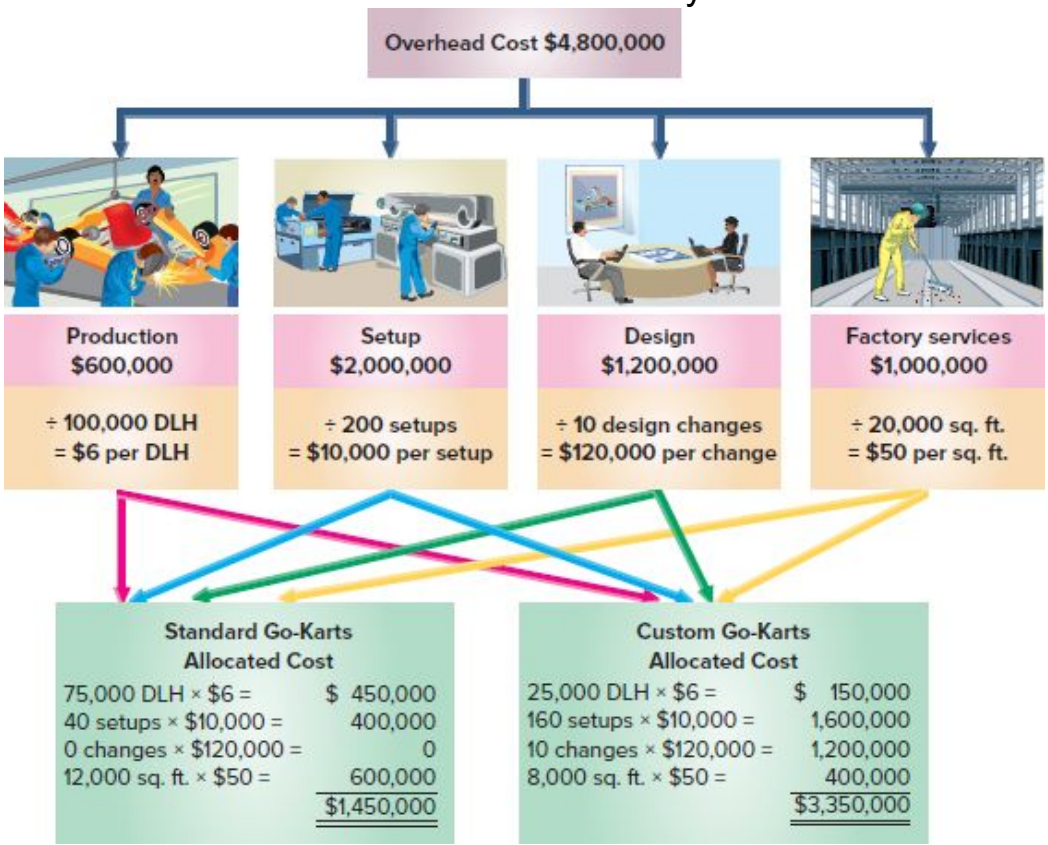
Product Cost The total product cost per unit for KartCo follows. Direct materials and direct labor cost per unit are taken from its cost records.

	Product Cost per Unit using Activity-Based Costing						
	Direct Materials	+	Direct Labor	+	Overhead	=	Product Cost per Unit
Standard go-kart.....	$400	+	$350	+	$ 290	=	$1,040
Custom go-kart.....	600	+	500	+	3,350	=	4,450

Exhibit 17.11 summarizes overhead cost allocations using activity-based costing.

EXHIBIT 17.11

Overhead Allocated to Go-Karts Summary



Comparing Overhead Cost Allocation Methods Exhibit 17.12 summarizes KartCo's overhead allocation per go-kart under the three different methods. Overhead cost allocated to custom go-karts is much higher under ABC than under the other methods. This is because the custom model uses more of the activities that drive overhead costs. ABC emphasizes *activities* and their costs, and arguably better reflects how overhead cost is used in making products. The plantwide and departmental methods do not capture the products' different use of activities, and can distort overhead cost allocations. *With the plantwide and departmental methods, low-volume complex products are often undercosted, and high-volume simpler products are often overcosted*.

page 675

EXHIBIT 17.12

Comparison of Overhead Cost per Unit by Allocation Method

	Overhead Cost per Go-Kart	
Allocation Method	**Standard Go-Kart**	**Custom Go-Kart**
Plantwide rate method	$720	$1,200
Departmental rate method . . .	690	1,350
Activity-based costing	290	3,350

Comparing Overhead Allocation Methods for Business Decisions Following are *total product costs per unit* for standard and custom go-karts for the three different overhead allocation methods. As we would expect, product cost per unit is lower for the standard go-kart compared with the custom go-kart. The cost difference between standard and custom go-karts is largest using activity-based costing. More accurate overhead allocation leads to better product pricing and product mix decisions.

	Product Cost per Unit	
Allocation Method	**Standard Go-Kart**	**Custom Go-Kart**
Plantwide rate method	$1,470	$2,300
Departmental rate method . . .	1,440	2,450
Activity-based costing	1,040	4,450

Standard Go-Karts What are the implications if standard go-karts sell for $1,200 per unit? Using the plantwide or departmental methods, KartCo would not make standard go-karts as their product cost per unit ($1,470 or $1,440) would exceed the selling price. Using activity-based costing, however, the standard go-kart's $1,040 product cost per unit is below the $1,200 price per unit.

Custom Go-Karts If the selling price of custom go-karts is $3,500 per unit, the plantwide and departmental methods both show that it exceeds the product cost per unit. Using activity-based costing, however, its $4,450 product cost per unit exceeds the price.

Point: For this analysis and assignments assume the number of units produced equals the number of units sold.

The table below shows *gross profit per unit* (selling price − product price) for the plantwide and ABC methods.

	Plantwide Rate Method			Activity-Based Costing		
Per Unit	Selling Price	Product Cost	Gross Profit	Selling Price	Product Cost	Gross Profit
Standard go-kart . . .	$1,200	$1,470	$(270)	$1,200	$1,040	$160
Custom go-kart	3,500	2,300	1,200	3,500	4,450	(950)

NEED-TO-KNOW 17-3

Activity-Based Costing

P3

A manufacturer makes two types of snowmobiles, Basic and Deluxe, and reports the following data. The company budgets production of 6,000 Basic snowmobiles and 2,000 Deluxe snowmobiles.

				Activity Usage	
Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage	Basic	Deluxe
Machine setup	$ 150,000	Setups	500 setups	200 setups	300 setups
Materials handling	250,000	Parts	100,000 parts	60,000 parts	40,000 parts
Machine depreciation . . .	720,000	Machine hours (MH)	9,000 MH	6,000 MH	3,000 MH
Total.	$1,120,000				

1. Compute an overhead activity rate for each activity using activity-based costing (ABC).
2. Compute the overhead cost per unit for each of the two product lines using ABC.

Solution

1.

Activity	Budgeted Cost	÷ Budgeted Activity Usage	= Activity Rate
Machine setup	$150,000	÷ 500 setups	= $300 per setup
Materials handling	250,000	÷ 100,000 parts	= $2.50 per part
Machine depreciation	720,000	÷ 9,000 machine hours	= $80 per machine hour

2.

	Basic Snowmobile				Deluxe Snowmobile			
Activity	Activity Usage	× Activity Rate	=	Allocated Cost	Activity Usage	× Activity Rate	=	Allocated Cost
Machine setup	200 setups	× $300 per setup	=	$ 60,000	300 setups	× $300 per setup	=	$ 90,000
Materials handling	60,000 parts	× $2.50 per part	=	150,000	40,000 parts	× $2.50 per part	=	100,000
Machine depreciation	6,000 MH	× $80 per machine hour	=	480,000	3,000 MH	× $80 per machine hour	=	240,000
Total allocated cost				$690,000				$430,000
Units produced				÷ 6,000				÷ 2,000
Overhead cost per unit				= $115				= $215

Do More: QS 17-11, QS 17-12, QS 17-13, E 17-13, E 17-14, E 17-15

Activity Levels and Cost Management

C1

Describe the four types of activities that cause overhead costs.

Activities causing overhead cost can be separated into four levels: (1) **unit level activities**, (2) **batch level activities**, (3) **product level activities**, and (4) **facility level activities**. These four activities are described as follows.

Activity Levels

Unit level activities are performed on each unit. For example, the Production department needs electricity to power the machinery to produce each unit. Unit level costs tend to change with the number of units produced.

Batch level activities are performed only on each batch of units. For example, machine setup is needed only for each batch regardless of the number of units in that batch. Batch level costs do not vary with the number of units, but instead vary with the number of batches.

Product level activities are performed on each product line and are not affected by either the numbers of units or batches. For example, product design is needed only for each product line. Product level costs do not vary with the number of units or batches produced.

Facility level activities sustain facility capacity as a whole and are not caused by any specific product. For example, rent and factory maintenance costs are incurred no matter what is being produced. Facility level costs do not vary with the number of units, batches, or product lines produced.

Production

Setup

Design

Factory Services

For KartCo, the production pool reflects unit level costs, the page 677 setup pool reflects batch level costs, the design pool reflects product level costs, and factory services reflect facility level costs. Exhibit 17.13 shows additional examples of activities and activity drivers commonly found with each of the four activity levels.

EXHIBIT 17.13

Examples of Activities by Activity Level

Activity Level	Examples of Activity	Activity Driver
Unit level	Cutting parts	Machine hours
	Assembling components	Direct labor hours
Batch level	Setting up machines	Number of setups
	Receiving shipments	Number of shipments
	Sampling product quality	Number of batches
	Recycling hazardous waste	Tons recycled
Product level	Design	Change requests
	Controlling inventory	Parts per product
Facility level	Cleaning factory	Square feet
	Providing electricity	Kilowatt hours
	Reducing greenhouse gas emissions	Tons of CO_2

Understanding the four levels of overhead cost can help control costs. **Activity-based management (ABM)** is an outgrowth of ABC that uses the link between activities and costs for better management. Activity-based management can help distinguish **value-added activities**, which add value to a product, from *non-value-added activities*, which do not.

KartCo's value-added activities are production and design changes. Its non-value-added activities are setups and factory services. ABM aids cost control by reducing how much of an activity is performed.

Assessing Activity-Based Costing

Advantages of Activity-Based Costing

More Effective Overhead Cost Control ABC can be used to identify activities that can benefit from process improvement by focusing on activities. For KartCo, identifying large design costs allows managers to work to improve this process.

Better Production and Pricing Decisions ABC can provide more accurate overhead cost allocation. More accurate costs allow managers to focus production activities on more profitable products and to more accurately set selling prices.

Paul Gilham/Getty Images

Disadvantages of Activity-Based Costing

Costly to Implement and Maintain ABC systems are costly. ABC requires a thorough analysis of cost activities and cost drivers, which can be expensive.

Product Cost Distortion Even with ABC, product costs can be distorted. Two sources of cost distortion are (1) when costs cannot be readily classified into activity cost pools and (2) when cost drivers do not have a strong cause–effect relation with costs.

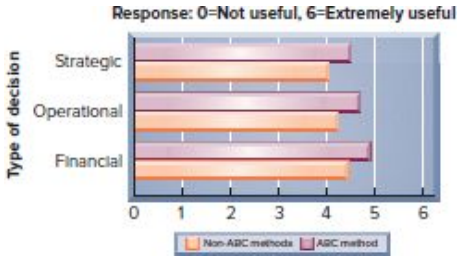
page 678

Not Compliant with GAAP Activity-based costing cannot be used for external financial reporting purposes under GAAP.

Decision Insight

ABCs of Decisions Business managers must make long-term strategic decisions, day-to-day operating decisions, and decisions on the type of financing the business needs. Survey evidence suggests that managers find ABC more useful in making strategic, operating, and financing decisions than non-ABC methods. Managers using ABC also felt better able to apply activity-based

management. ■ *Source:* Stratton, W. O., Denis Desroches, R. A. Lawson and T. Hatch. *"Activity-Based Costing: Is It Still Relevant?"* Management Accounting Quarterly 10, no 3. Institute of Management Accountants.



ABC FOR SERVICE PROVIDERS

P4

Allocate overhead costs to service companies using activity-based costing.

Activities for Service Providers

ABC applies to service providers. Shipping companies like **FedEx** and **UPS** use ABC to track activities and costs involved with delivering packages. **Southwest Airlines** uses ABC to allocate costs to its passenger and ticketing cost pools. Laboratories performing medical tests, accounting and law offices, and advertising agencies are other examples of service firms that benefit from ABC.

In applying ABC, service companies classify costs by activity levels. Exhibit 17.14 shows typical activities within the four activity levels (unit, batch, service, and facility) for three service providers.

EXHIBIT 17.14

Examples of Activities for Service Providers

Activity Level	Sports Arena	Hotel	Online Education
			
Unit Level	Sell a ticket to a fan	Check in a guest	Register a student
Batch Level	Hire vendors and security for a game	Prepare buffet, receive supply shipments	Deliver an online course
Service Level	Schedule a season of games	Schedule personnel	Create a new course
Facility Level	Clean the arena, provide utilities, update the website	Clean rooms, maintain pool	Maintain course sites, control course data

Gallo Images/Getty Images; Jade LLC/Blend Images LLC; Prasit Rodphan/Shutterstock

Applying Activity-Based Costing to a Service Provider

We apply activity-based costing to Garcia Company, a forensic accounting firm that provides two types of services: litigation support for lawsuits alleging financial statement fraud, and fraud investigations of local government entities. Garcia follows the three-step ABC process to allocate overhead costs to these service lines.

Step 1: Identify Activities and Their Budgeted Overhead Cost page 679
The following activities, budgeted costs, activity cost drivers, and budgeted activity usage were identified.

Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage
Clerical support	$90,000	Documents prepared	300 documents
Facility services	48,000	Billable hours	2,400 billable hours
Client consultations. . . .	36,000	Court dates	12 court dates

Step 2: Compute Overhead Activity Rate for Each Activity For each activity, the following activity rate is computed for each activity cost pool.

Activity	Budgeted Cost	÷ Budgeted Activity Usage	= Activity Rate
Clerical support	$90,000	÷ 300 documents	= $300 per document
Facility services	48,000	÷ 2,400 billable hours	= $20 per billable hour
Client consultations.	36,000	÷ 12 court dates	= $3,000 per court date

Step 3: Allocate Overhead Cost to Cost Objects We use information on activity usage to allocated overhead cost. The company's activity usage on 39 litigation cases and 95 fraud cases follows.

	Activity Usage		
Activity Cost Driver	Litigation Support	Fraud Investigation	Total
Documents.	225	75	300
Billable hours.	975	1,425	2,400
Court dates	10	2	12

We then allocate overhead cost to each service line, and compute overhead cost per case, as follows.

	Litigation Support				Fraud Investigation			
Activity	Activity Usage	× Activity Rate	=	Allocated Cost	Activity Usage	× Activity Rate	=	Allocated Cost
Clerical support	225 documents	× $300 per document	=	$67,500	75 documents	× $300 per document	=	$ 22,500
Facility services	975 billable hrs	× $20 per billable hour	=	19,500	1,425 billable hrs	× $20 per billable hour	=	28,500
Client consultations.	10 court dates	× $3,000 per court date	=	30,000	2 court dates	× $3,000 per court date	=	6,000
Total allocated cost.				**$117,000**				**$57,000**
Units produced (cases)				÷ 39				÷ 95
Overhead cost per case . . .				**= $3,000**				**= $600**

Analytics Insight

Global Costing For many years, delivery company **DHL Express** used different cost allocation methods across the over 200 countries in which it operates. The resulting cost information was not useful and did not reconcile to the company's financial results. The company re-focused on collecting and analyzing good-quality data, and developed one worldwide cost allocation method. Today, DHL can compute accurate cost and profit per shipment. ■

NEED-TO-KNOW 17-4

ABC for Service Providers

P4

Data Pro provides accounting services. The company reports the information below. The forensic accounting department has 8 employees, occupies 1,000 square feet of office space, and completed 20 jobs. (1) Compute the activity rate for each activity. (2) Allocate overhead to each activity and compute cost per unit (job) for the forensic accounting department.

Activity	Budgeted Cost	Budgeted Activity Usage
Clerical support	$ 50,000	20 employees
Building	100,000	2,500 square feet
Supplies	20,000	50 completed jobs

Solution

1.

Activity	Budgeted Cost	÷ Budgeted Activity Usage	= Activity Rate
Clerical support	$ 50,000	÷ 20 employees	= $2,500 per employee
Building	100,000	÷ 2,500 square feet	= $40 per square foot
Supplies	20,000	÷ 50 completed jobs	= $400 per completed job

2.

	Forensic Accounting Department			
Activity	Activity Usage	× Activity Rate	=	Allocated Cost
Clerical support	8 employees	× $2,500 per employee	=	$ 20,000
Building	1,000 square feet	× $40 per square foot	=	40,000
Supplies	20 completed jobs	× $400 per completed job	=	8,000
Total allocated cost				$68,000
Units produced (jobs)				÷ 20
Overhead cost per unit (job)				$ 3,400

Do More: Do More: QS 17-17, QS 17-18, E 17-22, E 17-23, E 17-24

CORPORATE SOCIAL RESPONSIBILITY

Analyzing activities leads many companies to **supply chain management**, which involves the coordination and control of goods, services, and information as they move from suppliers to consumers. **Accenture** estimates that supply chains account for 50%–70% of total expenses and greenhouse gas emissions for most manufacturing companies. More effective supply chains can benefit the bottom line and the environment.

Walmart, in conjunction with The Sustainability Consortium^{TM}, developed an index to assess its suppliers' policies and programs related to sustainability. Companies with high scores on the index are identified as Sustainability Leaders on Walmart's website, enabling customers to readily identify and perhaps buy from companies committed to sustainable practices. Walmart, in conjunction with its suppliers, is meeting its goal of eliminating greenhouse gases from its supply chain.

Joe and Lauren Grimm, owners of **Grimm Artisanal Ales**, this chapter's feature company, try to buy local ingredients whenever possible and focus special attention on byproduct disposal. "We have to think about how we

dispose of grain," explains Joe, recognizing the environmental impact of beer production. The company also impacts the people aspect of the triple bottom line by keeping production local and hiring from the Brooklyn area.

BRIAN HARKIN/The New York Times/Redux Pictures

Decision Analysis — Customer Profitability

A1

Allocate selling, general, and administrative expenses to products and assess profitability.

Activity-based costing can be used to allocate selling, general, and administrative costs to products and determine the profitability of individual customers. As an example, let's return to KartCo and assume that costs of providing customer support (such as delivery, installation, and warranty work) are related to the distance a technician must travel to provide services. Assume that, as a result of applying activity-based costing, KartCo plans to sell its standard go-kart for $1,200 per unit. KartCo budgets $250,000 per year for customer support. It allocates customer support costs based on 100,000 budgeted miles traveled by customer support technicians. The customer support activity rate follows.

$$\text{Customer support activity rate} = \frac{\text{Budgeted customer support cost}}{\text{Budgeted technician miles}} = \frac{\$250{,}000}{100{,}000 \text{ miles}} = \$2.50 \text{ per mile}$$

KartCo can add the costs of customer support to the costs of goods sold for an order to get the order's income. A **customer profitability report** for one of its customers, Six Flags, follows. KartCo sold 10

standard go-karts to Six Flags and a technician drove 200 miles to provide customer support.

Customer Profitability Report—Six Flags		
Sales (10 go-karts × $1,200)		$12,000
Cost of goods sold		
Direct materials (10 go-karts × $400 per go-kart)	$4,000	
Direct labor (10 go-karts × $350 per go-kart)	3,500	
Overhead (10 go-karts × $290 per go-kart, Exhibit 17.10)	2,900	10,400
Gross profit		1,600
Customer service costs (200 miles × $2.50 per mile)		500
Customer income		$ 1,100

Income of $1,100 is generated from Six Flags. ABC encourages management to consider all resources used to serve a customer, not just manufacturing costs that are the focus of traditional costing methods. Customer support costs can also be allocated to product lines, for example to KartCo's standard and custom models, to determine their profitability.

NEED-TO-KNOW 17-5

COMPREHENSIVE

Overhead Allocation

VesPro manufactures motorized scooters in both standard and custom models. The standard scooter is a basic model with no custom options. The custom model is produced for college towns that want scooters with unique logos and color schemes. VesPro budgets $300,000 of overhead cost and 4,000 machine hours (MH) for the year. VesPro reports the following actual production information.

	Number of Units	Machine Hours per Unit	Total Machine Hours
Standard scooter	1,000	3 MH per unit	3,000 MH
Custom scooter	250	4 MH per unit	1,000 MH
Total			4,000 MH

VesPro is considering the departmental rate method and traces $240,000 of overhead cost to its Assembly department and $60,000 to its Finishing department. The company budgets 4,000 machine hours in the Assembly department and budgets 1,250 direct labor hours (DLH) in

the Finishing department. Actual production information for the two departments follows.

		Assembly Department		Finishing Department	
	Number of Units	Hours per Unit	Total Hours	Hours per Unit	Total Hours
Standard scooter	1,000	3 MH per unit	3,000 MH	0.5 DLH per unit	500 DLH
Custom scooter	250	4 MH per unit	1,000 MH	3.0 DLH per unit	750 DLH
Total			4,000 MH		1,250 DLH

VesPro is also considering activity-based costing and collects page 682 information in the following two tables.

Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage
Factory services	$260,000	Square feet	20,000 square feet
Setup	16,000	Setups	20 setups
Design	24,000	Design changes	10 design changes

	Actual Activity Usage		
Activity Cost Driver	Standard	Custom	Total
Square feet	12,000	8,000	20,000
Setups	5	15	20
Design changes	0	10	10

Required

1. Compute overhead cost per unit for each type of scooter using a plantwide overhead rate based on machine hours.
2. Compute overhead cost per unit for each type of scooter using departmental overhead rates based on machine hours for the Assembly department and direct labor hours for the Finishing department.
3. Compute overhead cost per unit for each type of scooter using activity-based costing.
4. Prepare a summary table that reports the overhead cost per unit for both scooter types under each alternative allocation method from parts 1, 2, and 3.
5. VesPro reports the following additional information. Assuming the company uses activity-based costing, (a) compute product cost per

unit and (b) compute gross profit per unit (selling price per unit minus product cost per unit).

	Standard Scooter	Custom Scooter
Selling price per unit	$3,300	$3,700
Direct materials cost per unit	2,000	2,200
Direct labor cost per unit	1,000	1,200

SOLUTION

1. Plantwide rate method

$$\text{Plantwide overhead rate} = \frac{\text{Budgeted overhead cost}}{\text{Budgeted machine hours}} = \frac{\$300{,}000}{4{,}000\ \text{MH}} = \$75 \text{ per machine hour}$$

Overhead Cost per Unit Allocation	
Standard scooter: $75 per machine hour × 3 machine hours per unit =	**$225 per unit**
Custom scooter: $75 per machine hour × 4 machine hours per unit =	**$300 per unit**

2. Departmental method

$$\text{Assembly department overhead rate} = \frac{\$240{,}000}{4{,}000\ \text{MH}} = \$60 \text{ per machine hour}$$

$$\text{Finishing department overhead rate} = \frac{\$60{,}000}{1{,}250\ \text{DLH}} = \$48 \text{ per direct labor hour}$$

Overhead cost per unit allocation to the two products.

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		Standard Scooter		Custom Scooter	
Department	Departmental Overhead Rate	Hours per Unit	Overhead Allocated	Hours per Unit	Overhead Allocated
Assembly	$60 per MH	3 MH per unit	$180	4 MH per unit	$240
Finishing	$48 per DLH	0.5 DLH per unit	24	3 DLH per unit	144
Totals			**$204**		**$384**

3. Activity-based costing

Activity	Budgeted Cost	Budgeted Activity Usage	Activity Rate
Factory services	$260,000	20,000 square feet	$13 per square foot
Setup	16,000	20 setups	$800 per setup
Design	24,000	10 design changes	$2,400 per design change

	Standard Scooter			Custom Scooter		
Activity	Activity Usage	Activity Rate	Allocated Cost	Activity Usage	Activity Rate	Allocated Cost
Factory services	12,000 sq. ft.	$13 per square foot	$156,000	8,000 square feet	$13 per square foot	$104,000
Setup	5 setups	$800 per setup	4,000	15 setups	$800 per setup	12,000
Design	0 changes	$2,400 per design change	0	10 changes	$2,400 per design change	24,000
Total allocated cost			$160,000			$140,000
Units produced			÷ 1,000			÷ 250
Overhead cost per unit			= $160			= $560

4. **Comparing overhead cost per unit by allocation method** We see that ABC shifts overhead cost from the high-volume standard model to the low-volume custom model. This is because the custom model uses more of the activities that drive overhead cost. The plantwide and departmental rate methods overcosted the standard model and undercosted the custom model.

	Overhead Cost per Scooter	
Allocation Method	Standard Scooter	Custom Scooter
Plantwide rate method	$225	$300
Departmental rate method	204	384
Activity-based costing	160	560

5. Product cost per unit for each model using activity-based costing.

Per Unit	Direct Materials	+	Direct Labor	+	Overhead	=	Product Cost per Unit
Standard scooter	$2,000	+	$1,000	+	$160	=	$3,160
Custom scooter	2,200	+	1,200	+	560	=	3,960

Gross profit per unit for each model.

Per Unit	Selling Price	−	Product Cost	=	Gross Profit
Standard scooter	$3,300	−	$3,160	=	$140
Custom scooter	3,700	−	3,960	=	(260)

Summary: Cheat Sheet

PLANTWIDE RATE METHOD

Plantwide rate method: Uses one overhead rate.

Computing plantwide overhead rate:

$$\text{Plantwide overhead rate} = \frac{\text{Budgeted overhead cost}}{\text{Budgeted allocation base}} = \frac{\$4{,}800{,}000}{100{,}000\ \text{DLH}} = \$48\ \text{per DLH}$$

Allocating overhead using plantwide rate:

$$\text{Allocated cost per unit} = \text{Plantwide overhead rate} \times \text{DLH used}$$

Allocated Overhead Cost
Standard go-kart: $48 per DLH × 15 DLH per unit = **$720 per unit**
Custom go-kart: $48 per DLH × 25 DLH per unit = **$1,200 per unit**

DEPARTMENTAL RATE METHOD

Departmental rate method: Uses a different overhead rate for each department.

Computing departmental overhead rate:

$$\text{Departmental overhead rate} = \frac{\text{Budgeted departmental overhead cost}}{\text{Budgeted departmental allocation base}}$$

$$\text{Machining department overhead rate} = \frac{\$4{,}200{,}000}{70{,}000\ \text{MH}} = \$60\ \text{per MH}$$

$$\text{Assembly department overhead rate} = \frac{\$600{,}000}{100{,}000\ \text{DLH}} = \$6\ \text{per DLH}$$

Allocating overhead using departmental rate:

		Standard Go-Kart		Custom Go-Kart	
Department	Departmental Overhead Rate	Hours per Unit	Overhead Allocated	Hours per Unit	Overhead Allocated
Machining . . .	$60 per MH	10 MH per unit	$600	20 MH per unit	$1,200
Assembly. . . .	$6 per DLH	15 DLH per unit	90	25 DLH per unit	150
Totals.			$690		$1,350

ACTIVITY-BASED COSTING

Activity cost pool: Group of costs related to same activity.

Activity cost driver: Activity that causes costs to go up or down.

Three Steps to Activity-Based Costing:

1. Identify activities and their budgeted overhead cost.
2. Compute an overhead activity rate for each activity.

$$\text{Activity rate} = \frac{\text{Budgeted activity cost}}{\text{Budgeted activity usage}}$$

Activity	Budgeted Cost	÷ Budgeted Activity Usage	= Activity Rate
Production	$ 600,000	÷ 100,000 direct labor hours	= $6 per direct labor hour
Setup	2,000,000	÷ 200 setups	= $10,000 per setup
Design	1,200,000	÷ 10 design changes	= $120,000 per change
Factory services	1,000,000	÷ 20,000 square feet	= $50 per square foot

3. Allocate overhead cost to cost objects (products).

$$\text{Allocated cost} = \text{Actual activity usage} \times \text{Activity rate}$$

	Standard Go-Kart				Custom Go-Kart			
Activity	Activity Usage	× Activity Rate	=	Allocated Cost	Activity Usage	× Activity Rate	=	Allocated Cost
Production	75,000 DLH	× $6 per DLH	=	$ 450,000	25,000 DLH	× $6 per DLH	=	$ 150,000
Setup	40 setups	× $10,000 per setup	=	400,000	160 setups	× $10,000 per setup	=	1,600,000
Design	0 changes	× $120,000 per change	=	0	10 changes	× $120,000 per change	=	1,200,000
Factory services	12,000 sq. ft.	× $50 per square foot	=	600,000	8,000 sq. ft.	× $50 per square foot	=	400,000
Total allocated cost				$1,450,000				$3,350,000
Units produced				÷ 5,000				÷ 1,000
Overhead cost per unit				= $290				= $3,350

Key Terms

Activity (672)

Activity-based costing (ABC) (672)

Activity-based management (ABM) (677)

Activity cost driver (673)

Activity cost pool (673)

Activity rate (673)

Batch level activities (676)

Cost object (668)

Facility level activities (676)

Product level activities (676)

Supply chain management (680)

Unit level activities (676)

Value-added activities (677)

Multiple Choice Quiz

1. A company makes two products: A and B. It uses activity-based costing and prepares the following analysis showing budgeted overhead cost and activity usage for each of its three activities.

Activity (cost driver)	Budgeted Overhead	Budgeted Activity Usage
Assembly (MH)	$ 80,000	1,000 MH
Finishing (DLH)	58,400	1,600 DLH
Factory services (sq. ft.)	360,000	6,000 sq. ft.

The company used 800 machine hours, 600 direct labor hours, and 5,400 square feet to produce 16,396 units of Product B. The overhead cost per unit of Product B using activity-based costing is page 685

a. $2.02.

b. $5.00.

c. $25.00.

d. $22.40.

2. A company uses activity-based costing. Budgeted overhead cost and activity usage follows.

Activity	Budgeted Overhead	Budgeted Activity Usage
Activity 1	$19,800	1,100 DLH
Activity 2	16,000	40 setups
Activity 3	14,000	700 MH

The overhead activity rate for Activity 3 is

a. $4.00 per MH.

c. $18.00 per MH.

b. $8.59 per MH.

d. $20.00 per MH.

3. Compared to the plantwide rate method, activity-based costing usually shifts costs from

a. Low-volume to high-volume products.

b. High-volume to low-volume products.

c. Complex to simple products.

d. Customized to standardized products.

4. Which of the following statements is true?

a. An activity-based costing system is generally easy to implement and maintain.

b. Activity-based management eliminates waste by allocating costs to products that waste resources.

c. Activity-based costing uses a single rate to allocate overhead.

d. Activity rates in activity-based costing are computed by dividing budgeted costs by the activity measure for each activity.

5. All of the following are examples of batch level activities except

a. Sampling product quality.

b. Setting up machines.

c. Receiving shipments.

d. Employee recreational facilities.

ANSWERS TO MULTIPLE CHOICE QUIZ

1. c; The activity rate for each activity follows.

Activity	Budgeted Cost	Budgeted Activity Usage	Activity Rate
Assembly	$ 80,000	1,000 MH	$80.00 per MH
Finishing	58,400	1,600 DLH	$36.50 per DLH
Factory services	360,000	6,000 sq. ft.	$60.00 per sq. ft.

Product B's overhead cost per unit follows.

Activity	Activity Usage	×	Activity Rate	=	Allocated Cost
Assembly	800 MH	×	$80.00 per MH	=	$ 64,000
Finishing	600 DLH	×	$36.50 per DLH	=	21,900
Factory services	5,400 sq. ft.	×	$60.00 per sq. ft.	=	324,000
Total allocated cost					$409,900
Units produced					÷ 16,396
Overhead cost per unit					= $25

2. d; The activity rate for Activity 3 follows.

Budgeted cost	÷	Budgeted activity	=	Activity rate
$14,000	÷	700 MH	=	$20 per MH

3. b; Under the plantwide rate method, overhead is allocated using a volume-based measure like direct labor hours. This often results in more overhead cost allocated to high-volume products. Activity-based costing allocates overhead based on use of activities that drive overhead cost. This results in more overhead allocated to lower-volume, more complex products that use more activities.

4. d;

5. d; Batch level activities are activities that are performed each time a batch of goods is handled or processed, regardless of how many units are in a batch. Employee recreational facilities relate to the organization as a whole rather than to specific batches and, as such, are not considered to be batch level. The other activities are performed each time a batch of goods is handled or processed, and, as such, are batch level activities.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

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QUICK STUDY

QS 17-1

Computing plantwide overhead rate **P1**

Shaw Co. budgets total overhead cost of $1,800,000. The company allocates overhead cost based on 100,000 budgeted direct labor hours. Compute the single plantwide overhead rate.

QS 17-2

Allocating overhead—plantwide rate **P1**

Neal Co. allocates overhead cost using a single plantwide overhead rate of $20 per direct labor hour. Each product unit uses three direct labor hours. Compute the overhead cost per unit.

QS 17-3

Allocating overhead—plantwide rate

P1

A manufacturer uses machine hours to allocate overhead cost to products. Budgeted information for the current year follows. (*a*) Compute the plantwide overhead rate based on machine hours. (*b*) How much overhead cost is allocated to Job A2, which uses 4 machine hours?

Budgeted overhead cost	$54,400
Budgeted machine hours	640 machine hours

QS 17-4

Computing plantwide overhead rate

P1

Chan Company identified the following budgeted data for this year. The company manufactures two types of scooters: standard and fast.

Activity	Budgeted Overhead Cost	Budgeted Activity
Handling materials	$625,000	100,000 parts
Quality inspection	90,000	1,500 inspections
Purchasing	25,000	1,000 orders
Total	$740,000	

1. Compute a single plantwide overhead rate assuming that the company allocates overhead cost based on 10,000 budgeted direct labor hours.
2. The standard model uses 5 direct labor hours per unit, and the fast model uses 10 direct labor hours per unit. Compute overhead cost per unit for each model.

QS 17-5

Computing overhead rates using ABC **P3**

Refer to the information in QS 17-4. Compute an overhead activity rate for each activity assuming the company uses activity-based costing.

QS 17-6

Computing plantwide overhead rate

P1

Rafner Manufacturing has the following budgeted data for its two production departments.

Budgeted Data	Assembly	Finishing
Overhead cost	$1,200,000	$800,000
Direct labor hours	12,000 direct labor hours	20,000 direct labor hours
Machine hours	4,000 machine hours	16,000 machine hours

1. What is the company's single plantwide overhead rate based on direct labor hours?
2. What is the company's single plantwide overhead rate based on machine hours?

QS 17-7

Computing departmental overhead rates **P2**

Refer to the information in QS 17-6. What is the Assembly department overhead rate using direct labor hours? What is the Finishing department overhead rate using machine hours?

QS 17-8

Allocating overhead with departmental rates **P2**

Refer to the information in QS 17-6 and QS 17-7. Allocate overhead to a job that uses 80 direct labor hours in the Assembly department and uses 30 machine hours in the Finishing department.

QS 17-9

Cost drivers for activity-based costing **P3**

A manufacturer reports two activities: cutting for production and product shipments. Determine whether each of the following cost drivers relates to the cutting activity or to the shipment activity.

1. Shipment orders
2. Direct labor hours for cutting
3. Cutting machine hours
4. Shipments received

QS 17-10

Computing activity rates for activity-based costing

P3

A company sells two types of products: standard and deluxe. It prepares the following analysis showing budgeted cost and cost driver activity for each of its three activities. Compute an activity rate for each activity using activity-based costing.

			Budgeted Activity Usage		
Activity	Budgeted Cost	Activity Cost Driver	Standard	Deluxe	Total
Factory services	$87,000	Square feet	3,000	2,800	5,800
Setup.	10,000	Setups	300	200	500
Quality control	93,000	Units inspected	2,500	5,250	7,750

QS 17-11

Computing activity rates for activity-based costing

P3

A manufacturer uses activity-based costing to assign overhead cost to products. Budgeted cost information for its activities follows. Compute an activity rate for each activity.

Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage
Purchasing	$135,000	Purchase orders	4,500 purchase orders
Factory services	32,000	Square feet	5,000 square feet
Setup.	65,000	Setups	50 setups

QS 17-12

Allocating overhead cost using activity-based costing

P3

Rand Co. computed the following activity rates using activity-based costing.

Activity	Activity Rate
Setup	$1,000 per setup
Materials handling	$50 per materials requisition
Inspection	$2 per unit inspected

The company's deluxe model used the following activities to produce 1,000 units. Compute the overhead cost per unit for the deluxe model using activity-based costing.

Activity	Actual Activity Usage
Setup	3 setups
Materials handling	25 materials requisitions
Inspection	1,000 units inspected

QS 17-13

Computing activity rate and allocating cost

P3

Chen Co. uses activity-based costing. It budgets $825,000 of overhead cost to sustainably dispose of 3,300 tons of hazardous waste.

a. Compute the activity rate for hazardous waste disposal based on tons of hazardous waste.

b. The company disposed of 5 tons of hazardous waste in completing Job 125. Allocate overhead cost to hazardous waste disposal as part of Job 125 using activity-based costing.

QS 17-14

Activity-based costing and overhead cost allocation

P3

Mia Co. uses activity-based costing and reports the following for this year. (*a*) Compute an activity rate for each activity using activity-based costing. (*b*) Allocate overhead costs to a job that uses 20 machine hours and 15 direct labor hours.

Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage
Cutting.	$14,000	Machine hours (MH)	2,000 machine hours
Assembly.	60,000	Direct labor hours (DLH)	6,000 direct labor hours
Total.	$74,000		

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QS 17-15

Classify activities

C1

Classify each of the following activities as unit level, batch level, product level, or facility level for a manufacturer of organic juices.

1. Cutting fruit
2. Developing new types of juice
3. Blending fruit into juice
4. Receiving fruit shipments
5. Cleaning blending machines
6. Water usage

QS 17-16

Classify activities

C1

Classify each of the following activities as unit level, batch level, product level, or facility level for a manufacturer of trail mix.

1. Roasting peanuts
4. Providing utilities for factory
2. Cleaning roasting machines
5. Calibrating mixing machines

3. Sampling product quality
6. Electricity usage

QS 17-17

Activity-based costing for services

P4

Data Insights provides accounting services. The company computed the following activity rates using activity-based costing. The forensic accounting department has 10 employees, occupies 1,500 square feet, and completed 40 jobs. Compute overhead cost per job for the forensic accounting department.

Activity	Activity Rate
Clerical support	$600 per employee
Building	$50 per sq. foot
Supplies	$80 per job

QS 17-18

Allocating costs using ABC for a service company

P4

Qinto Company sells two types of products: basic and deluxe. The company provides technical support for its products at a budgeted overhead cost of $250,000 per year. The company allocates technical support cost based on 10,000 budgeted technical support calls per year.

1. Compute the activity rate for technical support using activity-based costing.
2. During January, Qinto received 650 calls on its deluxe model and 150 calls on its basic model. Allocate technical support costs to each model.

QS 17-19

Customer profitability report

A1

Prepare a customer profitability report using the information below.

Sales	$10,000	Overhead	$2,600
Direct materials	4,100	Customer support costs	500
Direct labor	1,300		

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EXERCISES

Exercise 17-1

Using plantwide overhead rate to allocate overhead

P1

Shakti Co. budgets overhead cost of $72,000 for the year. The company reports the following for its standard and deluxe models.

Cost per Unit	Standard	Deluxe
Direct materials	$12	$23
Direct labor	18	27

1. Compute a single plantwide overhead rate assuming the company allocates overhead cost based on 6,000 direct labor hours.
2. The standard model uses 2 direct labor hours per unit and the deluxe model uses 3 direct labor hours per unit. Compute overhead cost per unit for each model.
3. Compute the total product cost per unit for both models.

Exercise 17-2

Computing plantwide overhead rate

P1

Hydro Sports budgets overhead cost of $420,000 for the year. The company manufactures two types of jet skis: standard and deluxe. Budgeted direct labor hours per unit are 8 for the standard model and 12 for the deluxe model. The company budgets production of 100 units of the standard model and 100 units of the deluxe model for the year.

1. Compute the total number of budgeted direct labor hours for the year.

2. Compute the plantwide overhead rate using budgeted direct labor hours.
3. Compute overhead cost per unit for each model using the plantwide overhead rate. Actual direct labor hours per unit are 8 for the standard model and 12 for the deluxe model.

Exercise 17-3

Computing plantwide overhead rate

P1

Dade Metals manufactures patio furniture. The company budgets overhead cost of $400,000 for the year. It also budgets 20,000 machine hours and 5,000 direct labor hours.

1. Compute the plantwide overhead rate, assuming the company allocates overhead based on (a) machine hours and (b) direct labor hours.
2. Job 121 uses 100 machine hours and 50 direct labor hours. Allocate overhead to Job 121 assuming overhead is allocated based on (a) machine hours—use answer from part 1a, and (b) direct labor hours—use answer from part 1b.

Exercise 17-4

Plantwide rate for a service

P1

Health Co-op is an outpatient surgical clinic. It budgets $540,000 of overhead cost for the year. The two main surgical units and their data follow.

Service	Budgeted Surgeries
General surgery	400
Orthopedic surgery	200

1. Compute a single plantwide rate, assuming the company allocates overhead cost based on 600 budgeted surgeries.
2. In May of this year, the company performed 20 general surgeries and 14 orthopedic surgeries. Allocate overhead to each of the two types of

surgeries for May using the single plantwide overhead rate.

Exercise 17-5

Product mix and plantwide rate versus activity-based costing

P1 P3

Wess Co. has limited capacity and can produce either its standard product or its deluxe product. Additional information follows.

Per Unit	Standard	Deluxe
Selling price	$60	$90
Direct materials	30	35
Direct labor	20	25

1. Using a single plantwide rate, the company computes overhead cost per unit of $15 for the standard model and $20 for the deluxe model. Which model should the company produce? *Hint:* Compute product cost per unit and compare that with selling price to get gross profit per unit.
2. Using activity-based costing, the company computes overhead cost per unit of $5 for the standard model and $40 for the deluxe model. Which model should the company produce? *Hint:* Compute product cost per unit and compare that with selling price per unit to get gross profit per unit.

Exercise 17-6

Computing departmental overhead rates

P2

Hydro Sports budgets overhead cost of $420,000 for the year; of this amount, $240,000 is traceable to the Assembly department and $180,000 is traceable to the Finishing department. The company manufactures two types of jet skis: standard and deluxe. Budgeted direct labor hours for the standard model are 7 in Assembly and 1 in Finishing. Budgeted direct labor hours for the deluxe model are 9 in Assembly and 3 in Finishing. The company budgets production of 100 units of the standard model and 100 units of the deluxe model for the year.

1. Compute each department's total number of budgeted direct labor hours for the year.
2. Compute departmental overhead rates for each department using direct labor hours for that department.
3. Compute overhead cost per unit for each model using departmental overhead rates. Actual direct labor hours for the standard model are 7 in Assembly and 1 in Finishing. Actual direct labor hours for the deluxe model are 9 in Assembly and 3 in Finishing.

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Exercise 17-7

Plantwide overhead rate

P1

Textra produces parts for a machine manufacturer. Parts go through two departments, Molding and Trimming. The company budgets overhead cost of $240,000 in the Molding department and $200,000 in the Trimming department. The company budgets 16,000 machine hours (MH) in Molding and 25,000 direct labor hours (DLH) in Trimming. Actual production information follows.

		Molding Department		Trimming Department	
	Number of Units	Hours per Unit	Total Hours	Hours per Unit	Total Hours
Part Z	3,000	2.0 MH per unit	6,000 MH	3 DLH per unit	9,000 DLH
Part X	4,000	2.5 MH per unit	10,000 MH	4 DLH per unit	16,000 DLH
Totals			16,000 MH		25,000 DLH

Required

1. Compute the plantwide overhead rate using direct labor hours as the allocation base.
2. Determine the overhead cost per unit for each part using the plantwide rate.

Exercise 17-8

Departmental overhead rates

P2

Refer to the information in Exercise 17-7.

Required

1. Compute a departmental overhead rate for the Molding department based on machine hours and a departmental overhead rate for the Trimming department based on direct labor hours.
2. Determine the overhead cost per unit for each part using the departmental rates.

Exercise 17-9

Allocating overhead using plantwide rate and departmental rates

P1 P2

Laval produces lighting fixtures. Budgeted information for its two production departments follows. The departments use machine hours (MH) and direct labor hours (DLH).

	Fabricating	Assembly
Overhead cost	$300,000	$200,000
Direct labor hours	75,000 DLH	125,000 DLH
Machine hours	80,000 MH	62,500 MH

Laval reports the following for one of its products, a desk lamp.

		Fabricating Department		Assembly Department	
	Number of Units	Direct Labor Hours per Unit	Machine Hours per Unit	Direct Labor Hours per Unit	Machine Hours per Unit
Desk lamp	4,000	4 DLH per unit	3 MH per unit	2 DLH per unit	0.5 MH per unit

Required

1. Determine the plantwide overhead rate using 200,000 direct labor hours as the allocation base.
2. Determine the overhead cost per unit for the desk lamp using the plantwide overhead rate.
3. Compute departmental overhead rates based on machine hours in the Fabricating department and direct labor hours in the Assembly department.

4. Determine the overhead cost per unit for the desk lamp using the departmental overhead rates.

Exercise 17-10

Using departmental overhead rates and computing gross profit

P2

Real Cool produces air conditioners in two departments: Assembly and Finishing. Budgeted information follows.

Department	Budgeted Cost	Allocation Base	Budgeted Usage
Assembly	$300,000	Machine hours	6,000 machine hours
Finishing	21,000	Direct labor hours	3,000 direct labor hours

Additional production information for two models of its air conditioners follows. page 691

Per unit	Model A	Model T
Selling price	$400	$420
Direct materials	100	90
Direct labor	150	160

	Model A	Model T
Units produced	400	500
Assembly machine hours per unit	2 MH	3.5 MH
Finishing direct labor hours per unit	3 DLH	4 DLH

1. Compute departmental overhead rates and determine overhead cost per unit for each model. Use machine hours to allocate budgeted Assembly costs and use direct labor hours to allocate budgeted Finishing costs.
2. Compute the total product cost per unit for each model.
3. For each model, compute the gross profit per unit (selling price per unit minus product cost per unit).

Exercise 17-11

Computing product cost per unit using plantwide method and activity-based costing

P1 P3

Consider the following data for two products of Vigano Manufacturing.

Activity	Budgeted Cost	Activity Driver
Machine setup	$ 10,000	20 machine setups
Parts handling	8,000	16,000 parts
Quality inspections	12,000	100 inspections
Total budgeted overhead	$ 30,000	

Unit Information	Product A	Product B
Units produced	1,000 units	200 units
Direct materials cost	$20 per unit	$30 per unit
Direct labor cost	$40 per unit	$50 per unit
Direct labor hours	2.0 per unit	2.5 per unit

1. Using a plantwide overhead rate based on 2,500 direct labor hours, compute the total product cost per unit for each product.
2. Consider the following additional information about these two products. If activity-based costing is used to allocate overhead cost, (*a*) compute overhead activity rates, (*b*) allocate overhead cost to Product A and Product B and compute overhead cost per unit for each, and (*c*) compute product cost per unit for each.

Actual Activity Usage	Product A	Product B
Setups	8 setups	12 setups
Parts	10,000 parts	6,000 parts
Inspections	40 inspections	60 inspections

Exercise 17-12

Cost drivers for activity-based costing

P3

A manufacturer reports three activities: assembling components into products; product design; and sales order processing. Determine whether each of the following cost drivers relates to assembly, design, or order processing.

1. Number of sales orders processed
2. Direct labor hours to assemble components
3. Number of design changes
4. Number of components assembled
5. Number of design hours
6. Number of shipments made

Exercise 17-13

Cost drivers for activity-based costing

P3

Snow Cat manufactures snowmobiles and uses activity-based costing to allocate overhead cost. To produce snowmobiles, the company uses four activities. It sets up machines to produce batches of components. Assembly line employees assemble products. Completed snowmobiles are inspected for quality. Maintenance workers clean the factory after production finishes at the end of each day.

1. If $30,000 of Setup is used as an activity cost pool, which of the following would be used as a cost driver?
    - **a.** Square feet
    - **b.** Number of setups
    - **c.** Design modifications
    - **d.** Number of employees hired
2. If $200,000 of Assembly is used as an activity cost pool, which of the following would be used as a cost driver?
    - **a.** Direct labor hours
    - **b.** Square feet
    - **c.** Design modifications
    - **d.** Number of inspections
3. If $40,000 of Inspection is used as an activity cost pool, which of the following would be used as a cost driver?
    - **a.** Engineering hours
    - **b.** Tons recycled
    - **c.** Number of orders
    - **d.** Number of inspections
4. If $10,000 of Maintenance is used as an activity cost pool, which of the following would be used as a cost driver?
    - **a.** Engineering hours
    - **b.** Design modifications
    - **c.** Square feet

d. Number of orders

Exercise 17-14

Allocating overhead cost to jobs using activity-based costing

P3

Pro-Craft Co. computed the following activity rates to allocate overhead cost for the year.

Activity	Activity Rate
Materials handling	$50 per materials requisition
Quality inspection.	$40 per inspection
Utilities	$5 per machine hour

During January, the company produced the following two jobs. Allocate overhead cost to each job using the activity rates.

	Activity Usage	
Activity Cost Driver	Job A	Job B
Materials requisitions.	5	3
Inspections	8	4
Machine hours	300	200

Exercise 17-15

Computing activity rates, overhead allocation, and cost per unit

P3

Lucern Co. reports the following for its overhead cost for the year.

Activity	Budgeted Cost	Budgeted Activity Usage
Engineering support.	$24,500	70 design changes
Electricity.	34,000	3,400 machine hours
Setup.	52,500	350 setups

1. Compute the activity rate for each activity using activity-based costing.
2. The company's Pro model used these activities to produce 1,200 units during the year: 2 design changes, 140 machine hours, and 12 setups.

Allocate overhead cost to the Pro model and compute its overhead cost per unit using activity-based costing.

Exercise 17-16

Allocating overhead costs and computing overhead cost per unit using activity-based costing

P3

Trax Co. manufactures 75 stationary bikes and 100 rowing machines with three activities. Activity rates to produce these products follow.

Activity	Activity Rate
Assembly	$20 per direct labor hour
Purchasing	$10 per purchase order
Inspection	$25 per inspection

Activity usage for each product follows. Compute the overhead cost per unit for the stationary bikes and the rowing machines.

	Activity Usage	
Activity Cost Driver	Stationary Bikes	Rowing Machines
Direct labor hours	300	500
Purchase orders	12	18
Inspections	15	20

Exercise 17-17

Using activity-based costing to allocate overhead, compute product cost and gross profit

P3

Ice Cool produces two different models of air conditioners. The activities, costs, and cost drivers associated with the production processes follow.

Process	Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage
Assembly	Machining	$279,000	Machine hours (MH)	6,000
	Setups	24,000	Setups	120
		$303,000		
Finishing	Inspection	$210,000	Inspections	700
Support	Purchasing	$135,000	Purchase orders	450

Additional production information concerning its two models follows.

Units and Activities	Model X	Model Z
Units produced	1,724	3,463
Machine hours	1,800	4,200
Setups	40	80
Inspections	400	300
Purchase orders	300	150

Per Unit	Model X	Model Z
Selling price per unit	$420	$400
Direct materials cost per unit . . .	100	90
Direct labor cost per unit	150	160

1. Compute the activity rate for each activity using activity-based costing.
2. Using activity-based costing, compute the overhead cost per unit for each model.
3. Compute the total product cost per unit for each model.
4. For each model, compute the gross profit per unit (selling price per unit minus product cost per unit).

Exercise 17-18

Computing overhead rates using activity-based costing

P3

A manufacturer identified the following activities, costs, and activity drivers. Compute the activity rate for each activity using activity-based costing.

Activity	Budgeted Costs	Budgeted Activity Usage
Handling materials . . .	$625,000	100,000 parts
Inspecting product . . .	900,000	1,500 inspections
Processing orders. . . .	105,000	700 orders
Paying suppliers	175,000	5,000 invoices
Insuring factory.	300,000	40,000 square feet

Exercise 17-19

Activity-based costing to compute activity rates, overhead cost per unit, and product cost per unit

P3

Northwest Company produces two types of glass shelving: rounded edge and squared edge. The company reports the following cost data.

	Rounded Edge	Squared Edge	Total
Direct materials	$31,200	$ 44,800	$ 76,000
Direct labor	12,200	23,800	36,000
Overhead (using plantwide rate)	36,600	71,400	108,000
Total product cost	$80,000	$140,000	$220,000
Units produced	10,000	14,000	
Product cost per unit	$ 8	$ 10	

Northwest's controller wants to apply activity-based costing to page 694 allocate the $108,000 of overhead cost to the two products to see whether product cost per unit would change markedly from that above. The company's budgeted activity usage equals its actual activity usage for the period. The following additional information is collected.

			Activity Usage		
Activity	Budgeted Cost	Activity Cost Driver	Rounded Edge	Squared Edge	Total
Purchasing	$ 5,400	Purchase orders	109 orders	431 orders	540 orders
Depreciation of machinery	56,600	Machine hours	500 hours	1,500 hours	2,000 hours
Setup	46,000	Setups	40 setups	210 setups	250 setups
Total	$108,000				

Required

1. Compute the activity rate for each activity using activity-based costing.
2. Compute overhead cost per unit for each of the two products using activity-based costing.
3. Determine product cost per unit for each of the two products using activity-based costing.

Exercise 17-20

Activity-based costing for overhead cost allocation

P3

Craft Co. reports the following partial activity-based costing information for its Deluxe model. Complete the table by entering amounts for the missing items *a* through *e*.

Activity	Activity Usage	Activity Rate	Allocated Cost
Assembly	1,200 direct labor hours	$10 per direct labor hour	$ *c*
Factory services	1,000 square feet	$ *b* per square foot	14,000
Setup	*a* setups	$200 per setup	4,000
Total allocated cost			$ *d*
Units produced			3,000
Overhead cost per unit			$ *e*

Exercise 17-21

Classifying activities

C1

Classify each of the following activities as unit level, batch level, product level, or facility level to indicate how each is incurred with respect to production.

1. Paying real estate taxes on thefactory building
2. Attaching labels to collars of shirts
3. Redesigning a bicycle seat
4. Cleaning the Assembly department
5. Polishing gold wedding rings
6. Mixing bread dough in a commercial bakery
7. Sampling cookies to determine quality
8. Recycling hazardous waste
9. Reducing greenhouse gas emissions

Exercise 17-22

Classifying activities for a service provider

P4

Following are activities in providing medical services at Healthsmart Clinic. Classify each activity as unit level, batch level, service level, or facility level.

1. Registering patients
2. Cleaning beds
3. Stocking examination rooms
4. Washing linens
5. Ordering medical equipment
6. Heating the clinic
7. Providing security services
8. Filling prescriptions

Exercise 17-23

Activity-based costing for a service provider

P4

Singh and Danzin is an architectural firm that provides services for residential construction projects. The following overhead cost data are from the current period.

Activity	Budgeted Costs	Budgeted Activity Usage
Client consultation	$270,000	1,500 contact hours
Drawings.	115,000	2,000 design hours

1. Compute an activity rate for each activity using activity-based costing.
2. Allocate overhead cost to a job that requires 45 contact hours and 340 design hours.

Exercise 17-24

Activity-based costing for a service provider

P4

Silver Law Firm provides litigation and mediation services. The company reports the following overhead cost data for the year. It worked on 70

litigation cases and 80 mediation cases during this period.

Activity	Budgeted Cost	Budgeted Activity Usage
Clerical support	$63,000	360 documents
Facility services	18,600	2,400 billable hours
Client consultations	90,000	36 court dates

Activity usage for each service follows.

	Activity Usage		
Activity Cost Driver	Litigation	Mediation	Total
Documents	192	168	360
Billable hours	800	1,600	2,400
Court dates	30	6	36

Required

1. Compute an activity rate for each activity using activity-based costing.
2. Compute overhead cost per unit (case) for both litigation and mediation using activity-based costing.

Exercise 17-25

Allocating cost and customer profitability

A1

Janix Company reports the following information for two large customers for the year.

	Western College	Eastern Technical
Sales	$100,000	$80,000
Cost of goods sold	70,000	55,000
Gross profit	$ 30,000	$25,000

Using activity-based costing, the company computes a customer service activity rate of $125 per customer service call. For the year, the company reports 80 customer service calls for Western College and 20 customer service calls for Eastern Technical.

Required

1. Allocate customer service call costs to each customer and compute income for each customer.

2. After including customer service costs, which customer produces the highest income?

Exercise 17-26

Activity-based costing and customer profitability

A1

Neal Co. manufactures computer workstations. The company's three activities and their overhead cost drivers follow.

Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage
Fabrication	$80,000	Machine hours	1,600 machine hours
Assembly	96,000	Direct labor hours	2,000 direct labor hours
Inspection	72,000	Units inspected	6,000 units

Job 101's actual activity usage along with a partial customer profitability report follow.

	Machine Hours	Direct Labor Hours	Units
Job 101	25 MH	30 DLH	10

Profitability Report—Job 101		
Sales		$8,500
Cost of goods sold		
Direct materials	$1,940	
Direct labor	750	
Overhead	?	?
Gross profit		?
Customer service costs		500
Customer income		?

Required

1. Compute activity rates using activity-based costing.
2. Use the results from part 1 to allocate overhead cost to Job 101.
3. Complete the profitability report for Job 101.

connect

PROBLEM SET A

Problem 17-1A

Comparing plantwide rate method and activity-based costing

P1 P3

Craftmore Machining reports the following budgeted overhead cost and related data for this year.

Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage
Assembly	$390,000	Direct labor hours (DLH)	13,000
Product design	60,000	Engineering hours (EH)	1,000
Electricity	20,000	Machine hours (MH)	10,000
Setup	50,000	Setups	400
Total	$520,000		

Required

1. Compute a single plantwide overhead rate assuming the company allocates overhead cost based on 13,000 direct labor hours.
2. Job 31 used 200 direct labor hours and Job 42 used 480 direct labor hours. Allocate overhead cost to each job using the single plantwide overhead rate from part 1.
3. Compute an activity rate for each activity using activity-based costing.
4. Allocate overhead costs to the following jobs using activity-based costing.

	Activity Usage	
Activity Cost Driver	Job 31	Job 42
Direct labor hours (DLH)	200	480
Engineering hours (EH)	26	32
Machine hours (MH)	50	60
Setups	4	6

Problem 17-2A

Using plantwide overhead rate to allocate overhead cost, and compute overhead cost per unit and gross profit per unit

P1

Tent Master produces Pup tents and Pop-up tents. The company budgets $252,000 of overhead cost and 42,000 direct labor hours. Additional information follows.

Per Unit	Selling Price	Direct Materials	Direct Labor
Pup tent	$78	$20	$45
Pop-up tent.....	73	25	30

Required

1. Compute a single plantwide overhead rate assuming the company allocates overhead cost based on 42,000 direct labor hours.
2. Pup tents use 3 direct labor hours (DLH) per unit and Pop-up tents use 2 direct labor hours per unit. Compute the overhead cost per unit for each product.
3. Compute the product cost per unit for each product.
4. For each product, compute the gross profit per unit (selling price per unit minus the product cost per unit).

Problem 17-3A

Using activity-based costing to allocate overhead cost, and compute overhead cost per unit and gross profit per unit

P3

Refer to the information in Problem 17-2A. Additional information on overhead cost follows.

Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage
Assembly.....	$168,000	Direct labor hours (DLH)	42,000
Electricity.....	24,000	Machine hours (MH)	10,000
Materials purchasing	60,000	Purchase orders (PO)	400
Total.....	$252,000		

Required

1. Compute an activity rate for each activity using activity-based costing.
2. The following actual activity usage produced 10,000 Pup tents and 6,000 Pop-up tents. Allocate overhead cost to Pup tents and to Pop-up tents and compute overhead cost per unit for each product.

Activity Cost Driver	Activity Usage	
	Pup tents	Pop-up tents
Direct labor hours (DLH)	30,000	12,000
Machine hours (MH)	4,000	6,000
Purchase orders (PO)	150	250

3. Compute product cost per unit for Pup tents and for Pop-up tents.
4. For each product, compute the gross profit per unit (selling price per unit minus the product cost per unit).

Problem 17-4A

Using departmental overhead rate method to compute overhead cost per unit, product cost per unit, and gross profit per unit

P2

Bike-O-Rama produces two bike models: Voltage and EasyRider. Departmental overhead data follow.

Department	Budgeted Cost	Allocation Base	Budgeted Usage
Fabricating	$100,000	Machine hours (MH)	8,000 MH
Assembly	75,000	Direct labor hours (DLH)	1,500 DLH

Required

page 698

1. Compute departmental overhead rates using (a) machine hours to allocate budgeted Fabricating costs and (b) direct labor hours to allocate budgeted Assembly costs.
2. The company reports the following actual production usage data. Compute the overhead cost per unit for each model.

	Voltage	EasyRider
Machine hours per unit	2.0 MH	3.0 MH
Direct labor hours per unit	1.5 DLH	0.5 DLH

3. The company reports additional information below. For each model, compute the product cost per unit.

Per Unit	Selling Price	Direct Materials	Direct Labor
Voltage	$260	$90	$45
EasyRider	150	80	15

4. For each model, compute gross profit per unit (selling price per unit minus product cost per unit).

Problem 17-5A

Activity-based costing for a service company

P4

Optimal Health is an outpatient surgical clinic. The clinic's three activities, their overhead cost, and their cost drivers follow.

Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage
Supplies	$200,000	Surgical hours (SH)	1,000
Patient services	37,500	Number of patients	500
Building cost	300,000	Square feet	2,000

The two main surgical units and their actual activity usage follow.

	Actual Activity Usage		
Service	Surgical Hours	Patients	Square Feet
General surgery	250	400	720
Orthopedic surgery	750	100	1,280

Required

1. Compute activity rates using activity-based costing.
2. Allocate overhead cost to the general surgery and to the orthopedic surgery units. Compute overhead cost per patient for each surgery unit.

PROBLEM SET B

Problem 17-1B

Comparing plantwide rate method and activity-based costing

P1 P3

BuiltRite Machining reports the following budgeted overhead cost and related data for the year.

Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage
Assembly	$500,000	Machine hours (MH)	12,500
Product design	30,000	Engineering hours (EH)	600
Factory services	20,000	Direct labor hours (DLH)	1,250
Inspection	50,000	Inspections	500
Total	$600,000		

Required

page 699

1. Compute a single plantwide overhead rate assuming the company allocates overhead cost based on 12,500 machine hours.
2. Job 55 used 150 machine hours and Job 66 used 220 machine hours. Allocate overhead cost to each job using the single plantwide overhead rate from part 1.
3. Compute an activity overhead rate for each activity using activity-based costing.
4. Allocate overhead costs to the following jobs using activity-based costing.

	Activity Usage	
Activity Cost Driver	Job 55	Job 66
Machine hours (MH)	150	220
Engineering hours (EH)	15	8
Direct labor hours (DLH)	12	24
Inspections	8	8

Problem 17-2B

Using plantwide overhead rate to allocate overhead cost, and compute overhead cost per unit and gross profit per unit

P1

Sara's Salsa produces salsa in two types: Extra Fine for restaurants and Family Style for home use. The company budgets $280,000 of overhead cost and 40,000 direct labor hours. Additional information follows.

Per Unit (case)	Selling Price	Direct Materials	Direct Labor
Extra Fine	$64	$18	$30
Family Style	53	16	25

Required

1. Compute a single plantwide overhead rate assuming the company allocates overhead cost based on 40,000 direct labor hours.
2. Extra Fine uses 2 direct labor hours per unit and Family Style uses 1.5 direct labor hours per unit. Compute the overhead cost per unit for each product.
3. Compute the product cost per unit for each product.
4. For each product, compute the gross profit per unit (selling price per unit minus the product cost per unit).

Problem 17-3B

Using activity-based costing to allocate overhead cost, and compute overhead cost per unit and gross profit per unit

P3

Refer to the information in Problem 17-2B. Additional information on overhead cost follows.

Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage
Mixing	$160,000	Direct labor hours (DLH)	40,000
Electricity	22,000	Machine hours (MH)	10,000
Inspection	98,000	Inspections	490
Total	$280,000		

Required

1. Compute an activity rate for each activity using activity-based costing.
2. The following actual activity usage produced 12,000 units of Extra Fine and 8,000 units of Family Style. Allocate overhead cost to Extra Fine and to Family Style and compute overhead cost per unit for each product using activity-based costing.

Activity Cost Driver	Activity Usage	
	Extra Fine	Family Style
Direct labor hours (DLH)	28,000	12,000
Machine hours (MH)	6,000	4,000
Inspections	274	216

3. Compute product cost per unit for Extra Fine and for Family Style.
4. For each product, compute the gross profit per unit (selling price per unit minus the product cost per unit).

Problem 17-4B

Using departmental overhead rate method to compute overhead cost per unit, product cost per unit, and gross profit per unit

P2

Del Sol produces two workout machines: ProPower and Crunch. Departmental overhead data follow.

Department	Budgeted Cost	Allocation Base	Budgeted Usage
Fabricating. . . .	$120,000	Machine hours (MH)	4,000 MH
Assembly	72,000	Direct labor hours (DLH)	6,000 DLH

Required

1. Compute departmental overhead rates using (a) machine hours to allocate budgeted Fabricating costs and (b) direct labor hours to allocate budgeted Assembly costs.
2. The company reports the following actual production usage data. Compute the overhead cost per unit for each model.

	ProPower	Crunch
Machine hours per unit.	3.0 MH	2.0 MH
Direct labor hours per unit	1.5 DLH	1.0 DLH

3. The company reports additional information below. For each product, compute the product cost per unit.

Per Unit	Selling Price	Direct Materials	Direct Labor
ProPower	$160	$25	$30
Crunch	150	35	20

4. For each product, compute gross profit per unit (selling price per unit minus product cost per unit).

Problem 17-5B

Activity-based costing for a service company

P4

Perez Co. provides forensic accounting services. The company's three activities, their overhead cost, and their cost drivers follow.

Activity	Budgeted Cost	Activity Cost Driver	Budgeted Activity Usage
Clerical support . . .	$80,000	Documents prepared	2,000 documents
Facility services . . .	64,000	Cases	200 cases
Building cost	96,000	Square feet	6,000 square feet

The company's two service lines and their actual activity usage follow.

	Actual Activity Usage		
Service	Documents	Cases	Square Feet
Litigation support	1,500	120	4,275
Fraud investigation	500	80	1,725

Required

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1. Compute activity rates using activity-based costing.
2. Allocate overhead cost to Litigation support and Fraud investigation. Compute overhead cost per case for each service line.

SERIAL PROBLEM

Business Solutions

P3

Alexander Image/Shutterstock

This serial problem began in Chapter 1 and continues through most of the book. If previous chapter segments were not completed, the serial problem can begin at this point.

SP 17 After reading an article about activity-based costing in a trade journal for the furniture industry, Santana Rey decides to analyze overhead cost at **Business Solutions**. In a recent month, Santana found that setup costs, inspection costs, and utility costs made up most of the company's overhead. Additional information about overhead follows.

Activity	Budgeted Cost	Budgeted Activity Usage
Setup	$20,000	25 setups
Inspection	7,500	5,000 parts inspected
Utilities	10,000	5,000 machine hours (MH)
Total	$37,500	

The following data pertain to Job 615.

Direct materials	$2,500	Setups	2 setups
Direct labor	$3,500	Parts inspected	400 parts inspected
Overhead	$ ___	Machine hours	600 machine hours

Required

1. Classify each of the three overhead activities as unit level, batch level, product level, or facility level.
2. Assume Business Solutions allocates overhead cost using a plantwide rate based on 5,000 machine hours. Compute total product cost of Job 615.

3. Assume Business Solutions uses activity-based costing. (*a*) Compute overhead activity rates. (*b*) Allocate overhead cost to Job 615. (*c*) Compute total product cost of Job 615.

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in Connect. All are auto-gradable.

Tableau DA 17-1 Quick Study, Computing plantwide overhead rates, P1 --similar to QS 17-6.

Tableau DA 17-2 Exercise, Computing departmental overhead rates, P2 --similar to QS 17-7.

Tableau DA 17-3 Mini-Case, Computing and assigning overhead costs using ABC, P3 --similar to QS 17-4 and QS 17-5.

Accounting Analysis

COMPANY ANALYSIS

A1

APPLE

AA 17-1 Assume **Apple** uses activity-based costing to allocate customer support costs to products. For a MacBook Pro model, assume Apple budgets annual customer support costs of $850,000. Also assume Apple budgets 10,000 customer support calls per year for that model. Assumed product cost data for the MacBook Pro model follow.

Product Cost	Per unit
Direct materials	$490
Direct labor	60
Overhead	265
Total product cost	$815

Required

1. Compute the activity rate for the customer support cost.

2. Prepare a customer profitability report for an order from a local college for 500 MacBook Pros. Each unit sells for $1,199. Apple budgets 500 support calls for this order.

COMPARATIVE ANALYSIS

A1

APPLE
GOOGLE

AA 17-2 Assume **Google** and **Apple** use activity-based costing to allocate customer support costs to products. For a similar laptop model, assume the companies report the following information.

Product Cost per Unit	Apple	Google
Direct materials	$490	$470
Direct labor	60	50
Overhead	265	260
Total product cost	$815	$780

Customer Support	Apple	Google
Annual costs	$850,000	$1,400,000
Annual number of calls	10,000	10,000

Required

1. Compute the activity rate for the customer support cost for both Apple and Google.
2. Prepare a customer profitability report for both Apple and Google for an order from a local college for 500 laptops. Each unit sells for $1,199. Both companies budget 500 support calls for this order.
3. Which company, Apple or Google, would earn the most income from this customer?

EXTENDED ANALYSIS

A1

Samsung

AA 17-3 Assume **Samsung** uses activity-based costing to allocate customer support costs to products. For two of its laptop models, assume the company reports the data below. The Galaxy Book S sells for $1,000 per unit and the Galaxy Book Flex sells for $900 per unit.

Product Cost per Unit	Galaxy Book S	Galaxy Book Flex
Direct materials	$520	$390
Direct labor	60	50
Overhead	120	140
Total product cost	$700	$580

Customer Support	Galaxy Book S	Galaxy Book Flex
Annual costs	$650,000	$950,000
Annual number of calls	10,000	10,000

Required

1. Compute the activity rate for the customer support cost for each laptop model.
2. Prepare a customer profitability report for each laptop model for (a) an order for 500 S models from a local college and (b) an order for 500 Flex models from a local hospital. The company budgets 500 support calls for both orders.
3. Which order, for Galaxy Book S or Galaxy Book Flex, earns the most income?

Discussion Questions

1. Why are overhead costs allocated to products and not traced to products as direct materials and direct labor are?
2. What are three common methods of assigning overhead costs to a product?
3. Why are direct labor hours and machine hours commonly used as the bases for overhead allocation?
4. What are the advantages of using a plantwide overhead rate?
5. How are overhead costs allocated to products with the plantwide rate method?
6. What is a cost object?
7. Explain why a plantwide overhead rate can distort the cost of a particular product.
8. Why are departmental overhead rates more accurate for product costing than a plantwide overhead rate?

9. Which overhead allocation methods can be used for external reporting?
10. Why is overhead allocation under ABC usually more accurate than either the plantwide rate method or the departmental rate method?
11. What is an activity cost driver?
12. What is the first step in applying activity-based costing?
13. What are the four activity levels associated with activity-based costing? Define each.
14. What are value-added activities?
15. "Activity-based costing is only useful for manufacturing companies." Is this a true statement? Explain.

Beyond the Numbers

page 703

ETHICS CHALLENGE

C1

BTN 17-1 In conducting interviews and observing factory operations to implement an activity-based costing system, you determine that several activities are unnecessary. For example, warehouse personnel were inspecting purchased components as they were received at the loading dock. Later that day, the components were inspected again on the shop floor before being installed in the final product. Both of these activities caused costs to be incurred but were not adding value to the product. If you include this observation in your report, one or more employees who perform inspections will likely lose their jobs.

Required

1. As a plant employee, what is your responsibility to report your findings to superiors?
2. What is your responsibility to the employees whose jobs will likely be lost because of your report?
3. What facts should you consider before making your decision to report or not?

COMMUNICATING IN PRACTICE

P3

BTN 17-2 The chief executive officer (CEO) of your company recently returned from a meeting where activity-based costing was discussed. Though her background is not in accounting, she has worked for the company for 15 years and is thoroughly familiar with its operations. Her impression of ABC was that it was just another way of dividing up total overhead cost and that the total would still be the same "no matter how you sliced it."

Required

Write a memorandum to the CEO, no more than one page, explaining how ABC is different from traditional volume-based costing methods. Also identify its advantages and disadvantages vis-à-vis traditional methods. Be sure it is written to be understandable to someone who is not an accountant.

TEAMWORK IN ACTION

C1

BTN 17-3 Observe the operations at your favorite fast-food restaurant.

Required

1. How many people does it take to fill a typical order of a sandwich, beverage, and one side order?
2. Describe the activities involved in its food service process.
3. What costs are related to each activity identified in requirement 2?

ENTREPRENEURIAL DECISION

C1

BTN 17-4 **Grimm Artisanal Ales** brews many varieties of beer. Company founders Joe and Lauren Grimm know that financial success depends on cost control as well as revenue generation.

Required

1. If Grimm Artisanal Ales wanted to expand its product line to include whiskey, what activities would it need to perform that are not required for its current product lines?

2. Related to part 1, should the additional overhead costs related to new product lines be shared by existing product lines? Explain your reasoning.

18 Cost Behavior and Cost-Volume-Profit Analysis

Chapter Preview

IDENTIFYING COST BEHAVIOR

C1 Fixed costs

Variable costs

Mixed costs

Step-wise costs

NTK 18-1

MEASURINGCOSTBEHAVIOR

P1 Scatter diagrams

High-low method

Regression

Comparing cost estimation methods

NTK 18-2

CONTRIBUTION MARGIN AND BREAK-EVEN

A1 Contribution margin

P2 Break-even

Cost-volume-profit chart

Changing estimates

NTK 18-3

APPLYING COST-VOLUME-PROFIT ANALYSIS

C2 Margin of safety

Expected income

Target income

Strategizing

P3 Sales mix

A2 Operating leverage

NTK 18-4, 18-5

Learning Objectives

CONCEPTUAL

C1 Describe different types of cost behavior in relation to production and sales volume.

C2 Describe several applications of cost-volume-profit analysis.

ANALYTICAL

A1 Compute the contribution margin and describe what it reveals about a company's cost structure.

A2 Analyze changes in sales using the degree of operating leverage.

PROCEDURAL

P1 Estimate costs using the scatter diagram, high-low method, and regression.

P2 Compute the break-even point for a single-product company.

P3 Compute the break-even point for a multiproduct company.

P4 *Appendix 18B*—Compute unit cost and income under both absorption and variable costing.

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Sweet Success

"Kick sugar, keep candy"—**TARA BOSCH**

VANCOUVER, CA—Concerned with the health effects of sugar, Tara Bosch set out to make a sugar-free version of her favorite candy, gummy worms. "Gummy candy is 99% sugar," explains Tara. "So I had to start from scratch." Armed with a heavy-duty gummy bear mold and a strong belief she would succeed, Tara started her business, **SmartSweets** (SmartSweets.com).

"I had no idea what I was doing," Tara admits. "I spent months researching and trying recipes." After over 200 iterations, Tara developed a tasty prototype and obtained debt financing for her first manufacturing run. She won over her first retail customer through "cold-calling and persistence."

In addition to product development, financing, and distribution, Tara had to measure and control the costs of using high-quality ingredients and a specialized manufacturing process. Understanding fixed and variable costs, and how to control them, to achieve break-even and make profits were critical for her start-up.

Tara focused on analyzing the relations between costs, volume, and profit—called *CVP analysis*. Tara also uses data analytics in assessing the effectiveness of her company's digital marketing programs. "We track key metrics like AOV (average order value) and net new subscribers," exclaims Tara.

SmartSweets continues to show enormous growth. Tara's vision is "to be the global leader in innovative candy products that kick sugar."

SmartSweets

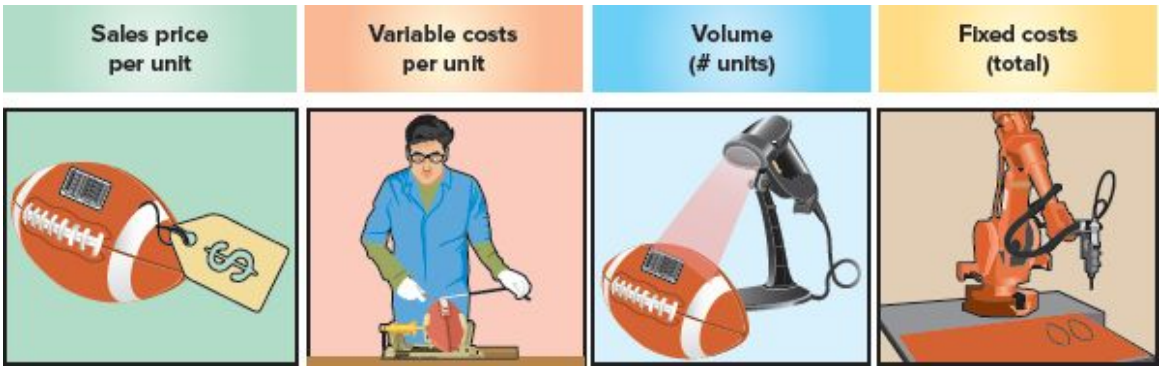
Sources: *SmartSweets website*, January 2021; *CNBC.com*, August 8, 2019; *Forbes.com*, May 29, 2017

IDENTIFYING COST BEHAVIOR

C1

Describe different types of cost behavior in relation to production and sales volume.

Planning a company's future activities is crucial to successful management. Managers use **cost-volume-profit (CVP) analysis** to predict how changes in costs and sales levels affect profit. CVP analysis looks at how income (profit) is affected by the following four factors.



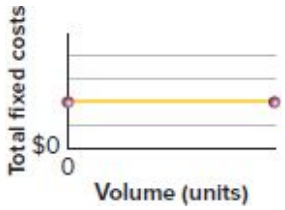
Managers work with these four factors to answer questions such as:

- How many units must we sell to break even?
- What sales volume is needed to earn a target income?
- How much will income change if we buy a new machine to reduce labor costs?
- What is the change in income if selling prices decline and sales volume increases?
- How will income change if we change the sales mix of our products or services?

This chapter explains CVP analysis. We first review cost classifications and then show methods for measuring and analyzing costs.

Fixed Costs

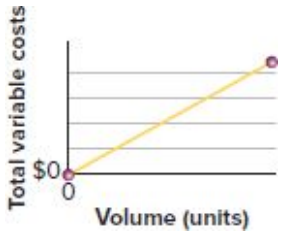
Fixed costs do not change when the volume of activity changes (within a relevant range). For example, $32,000 in monthly rent paid for a factory building remains the same whether the factory operates eight hours or twenty-four hours per day. This means that rent cost is the same each month at any level of output from zero to the plant's monthly productive capacity.



Though the *total* amount of fixed cost does not change as volume changes, fixed cost *per unit* of output decreases as volume increases. If 200 units are produced when monthly rent is $32,000, the average rent cost per unit is $160 ($32,000/200 units). When production increases to 1,000 units per month, the average rent cost per unit decreases to $32 ($32,000/1,000 units).

Variable Costs

Variable costs change in proportion to changes in volume of activity. Direct materials cost is one example of a variable cost. If each unit produced uses $20 of direct materials, then when 10 units are made, the total direct materials costs are $200 ($20 × 10). While the *total* amount of variable cost changes with the level of production, variable cost *per unit* stays the same as volume changes.

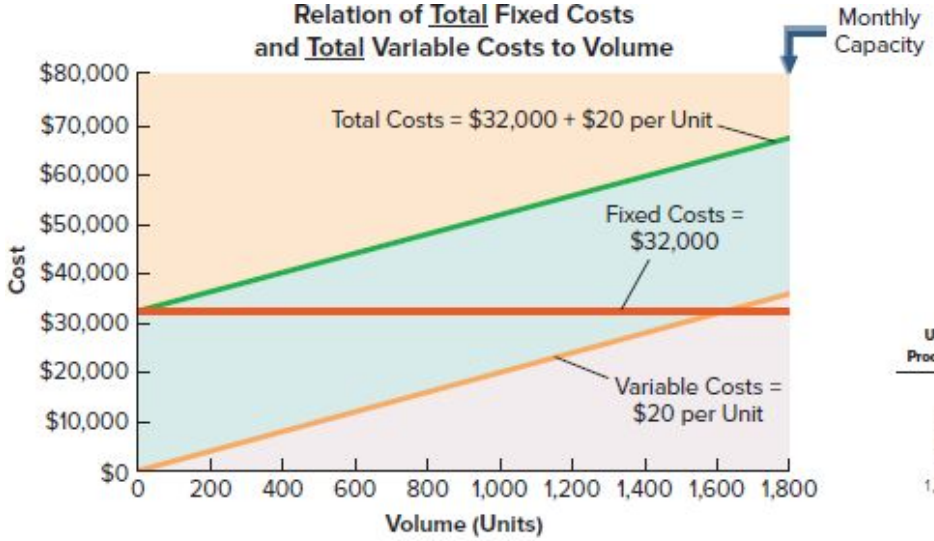


Graphing Fixed and Variable Costs

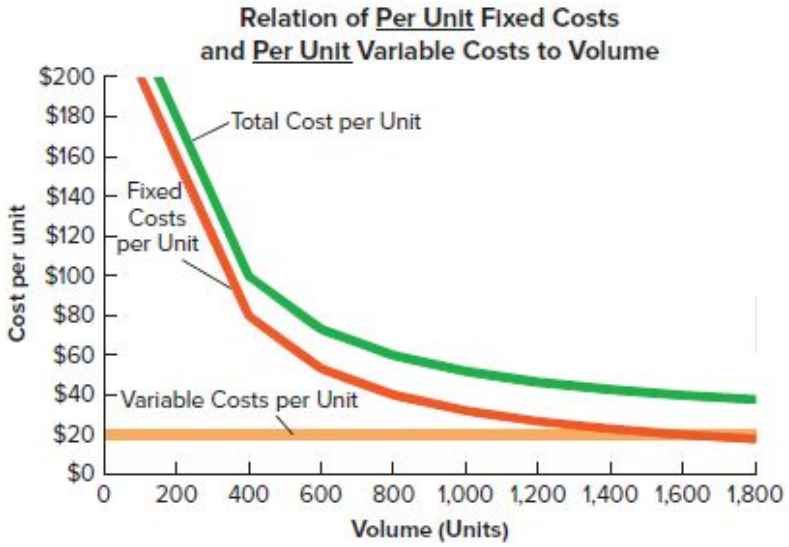
The upper graph in Exhibit 18.1 shows the relation between total fixed costs and volume, and the relation between total variable costs and volume. Total fixed costs of $32,000 remain the same at all page 707 production levels up to the company's monthly capacity of 1,800 units. Total variable costs increase by $20 per unit for each additional unit produced.

EXHIBIT 18.1

Relations of Total and Per Unit Costs to Volume



Units Produced	Total Fixed Costs	Total Variable Costs
0	$32,000	$ 0
200	32,000	4,000
400	32,000	8,000
⋮	⋮	⋮
1,800	32,000	36,000



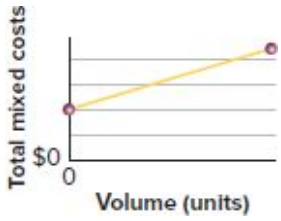
Units Produced	Per Unit Fixed Costs	Per Unit Variable Costs
1	$32,000	$20
200	160	20
400	80	20
⋮	⋮	⋮
1,800	17.78	20

Point: Fixed costs stay constant in total but decrease per unit as more units are produced. Variable costs vary in total but are constant per unit as production changes.

The lower graph in Exhibit 18.1 shows that fixed costs *per unit* decrease as production increases. This drop in per unit costs as production increases is called *economies of scale*. This lower graph also shows that variable costs per unit stay the same as production levels change.

Mixed Costs

Mixed costs include both fixed and variable cost components. For example, compensation for sales representatives often includes a fixed monthly salary and a variable commission based on sales. Utilities costs such as electricity, water, and natural gas include a fixed service fee plus an amount that varies with usage. Like a fixed cost, a mixed cost is greater than zero when volume is zero; like a variable cost, it increases steadily in proportion to increases in volume.



Graphing Mixed Costs The green total cost line in the top graph in Exhibit 18.1 starts on the vertical axis at the $32,000 fixed cost point. At the zero volume level, total cost equals the fixed costs. As the volume of activity increases, the total cost line increases at an amount equal to the variable cost per unit. This total cost line is a “mixed cost.”

Step-wise Costs

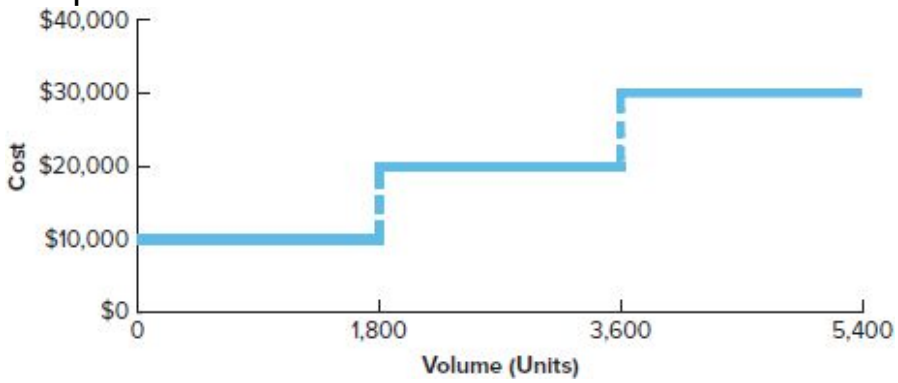
A **step-wise cost**, or *stair-step cost*, has a step pattern in costs. Salaries of production supervisors are fixed within a *relevant range* of the current production volume. The **relevant range of operations** is the normal operating range for a business. For Rydell, a football manufacturer, this is one production shift, which can produce up to 1,800 units per month. However, if production volume greatly increases such as with the addition of another shift, more supervisors must be hired. This means that total cost for supervisor salaries steps up by a lump sum.

Graphing Step-Wise Costs Step-wise behavior is graphed in Exhibit 18.2. For Rydell, each shift can produce up to 1,800 units, and requires one supervisor at a salary of $10,000 per month. Each added shift can produce up to 1,800 units and requires additional supervisor

help at $10,000 per month. See how the step-wise cost line is flat within each relevant range.

EXHIBIT 18.2

Step-wise Costs



Examples of Costs Exhibit 18.3 lists examples of fixed, variable, mixed, and step-wise costs for a manufacturer of footballs.

EXHIBIT 18.3

Cost Examples

Fixed Costs	Variable Costs	Mixed Costs	Step-wise Costs
• Rent	• Direct materials	• Sales rep (salary plus commission)	• Add or drop a shift of workers
• Property taxes	• Direct labor	• Natural gas	• Add or drop a production line
• Insurance	• Packaging	• Maintenance	• Add or drop a warehouse
• Office salaries	• Shipping	• Electricity	• Add or drop a sales region
• Depreciation*	• Indirect materials	• Water	

*Except for units-of-production.

NEED-TO-KNOW 18-1

Classifying Costs

C1

Determine whether each of the following is best described as a fixed, variable, mixed, or step-wise cost as the number of product units changes.

a. Rubber used to manufacture tennis balls

b. Depreciation (straight-line method)

c. Salesperson pay

d. Supervisory salaries—an additional supervisor is added as another shift is added

e. Packaging materials

Solution

a. Variable

b. Fixed

c. Mixed

d. Step-wise

e. Variable

Do More: Do More: QS 18-1, QS 18-2, E 18-1, E 18-2, E 18-3

MEASURING COST BEHAVIOR

P1

Estimate costs using the scatter diagram, high-low method, and regression.

Cost-volume-profit analysis identifies and measures costs using their fixed and variable components. Managers do this by collecting cost data at various levels of activity. We then identify and measure the fixed and variable cost components. Three methods are commonly used to estimate fixed and variable costs.

- **Scatter Diagram**
- **High-Low Method**
- **Regression**

Each method is explained using the unit and cost data shown in Exhibit 18.4, which are from a start-up company that uses units

produced as the activity base in estimating cost behavior.

EXHIBIT 18.4

Data for Estimating Cost Behavior

Month	Units Produced	Total Cost	Month	Units Produced	Total Cost
January . . .	27,500	$21,500	July	30,000	$23,500
February . .	22,500	20,500	August	52,500	28,500
March	25,000	25,000	September .	37,500	26,000
April	35,000	21,500	October	62,500	29,000
May	47,500	25,500	November . .	67,500	31,000
June.	17,500	18,500	December . .	57,500	26,000

Scatter Diagram

A **scatter diagram** is a graph of unit volume and cost data. In Exhibit 18.5, each point reflects total costs and units produced during each of the last 12 months. For example, March shows units produced of 25,000 and costs of $25,000.

The **estimated line of cost behavior** is drawn on a scatter diagram to show the relation between cost and unit volume. This line best visually "fits" the points in a scatter diagram. Fitting this line is sometimes done with spreadsheet software. The line in Exhibit 18.5 shows a mixed cost. The total cost is greater than zero even when no units are produced, and it increases in proportion to increases in units produced. We discuss two approaches to estimating the fixed and variable cost components of this mixed cost.

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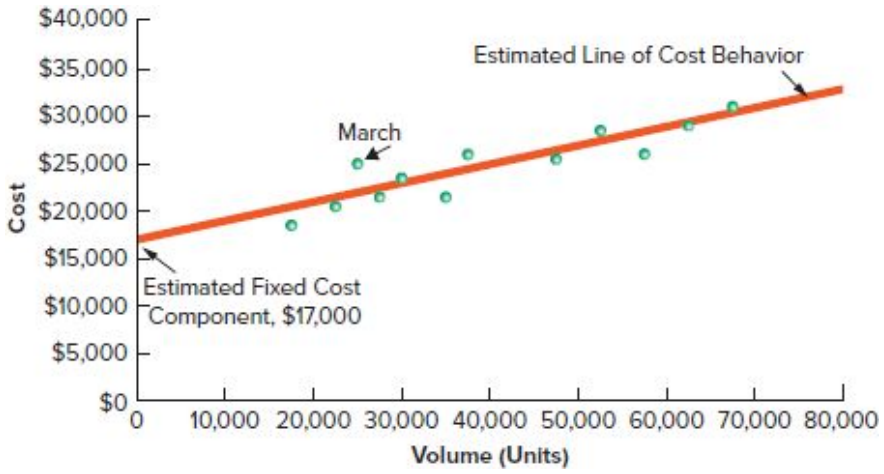
EXHIBIT 18.5

Scatter Diagram



High-Low Method

The **high-low method** uses just two points to estimate the cost equation: the highest and lowest *volume* levels. The high-low method follows three steps.

Step 1: Identify the highest and lowest volume; these might not be the highest or lowest *costs*.

Step 1: Compute the slope (variable cost per unit) using the high and low volume.

Step 1: Compute total fixed costs by computing total variable cost at either the high or low volume, and then subtracting that amount from the total cost at that volume.

High-Low Method Example

Step 1: In Exhibit 18.4, the lowest number of units produced is 17,500 and the highest is 67,500. The costs corresponding to these unit volumes are $18,500 and $31,000.

Step 2: The variable cost per unit is calculated as: change in cost divided by change in units. Using data from the highest and lowest unit volumes, this results in a *slope*, or estimated variable cost per unit of $0.25, as computed in Exhibit 18.6.

EXHIBIT 18.6

Variable Cost per Unit—High-Low Method

$$\text{Variable cost per unit} = \frac{\text{Cost at highest volume} - \text{Cost at lowest volume}}{\text{Highest volume} - \text{Lowest volume}} = \frac{\$31{,}000 - \$18{,}500}{67{,}500 - 17{,}500} = \frac{\$12{,}500}{50{,}000} = \$0.25 \text{ per unit}$$

Step 3: To estimate fixed cost for the high-low method, we know that total cost equals fixed cost plus variable cost per unit times the number of units. Then we pick either the highest or lowest volume to compute fixed cost. This is shown in Exhibit 18.7—where we use either the highest volume (67,500 units) or the lowest volume (17,500 units) in determining the fixed cost of $14,125. The cost equation from the high-low method is **$14,125 + ($0.25 × Units produced)**.

EXHIBIT 18.7

Determining Fixed Costs—High-Low Method

Using data at highest volume

Total cost = Fixed cost + (Variable cost per unit × Units)
$31,000 = Fixed cost + ($0.25 per unit × 67,500 units)
$31,000 = Fixed cost + $16,875
$14,125 = Fixed cost

Using data at lowest volume

Total cost = Fixed cost + (Variable cost per unit × Units)
$18,500 = Fixed cost + ($0.25 per unit × 17,500 units)
$18,500 = Fixed cost + $4,375
$14,125 = Fixed cost

Regression

Least-squares regression, or simply *regression*, is a statistical method for identifying cost behavior. Excel has functions to determine the fixed cost (= Intercept) and the variable cost (= slope) components of a 'best fit' line for the cost data. This is shown in Appendix 18A. Using regression, the cost equation for the data in Exhibit 18.4 is **$16,688 + ($0.20 × Units produced)**. This means the fixed cost is estimated as $16,688 and the variable cost at $0.20 per unit.

Comparing Cost Estimation Methods

Different cost estimation methods usually result in different estimates of fixed and variable costs, as summarized in Exhibit 18.8. Regression uses more data and therefore should be more accurate than the high-low method. However, the high-low method is easier to apply and often useful for quick cost estimates.

EXHIBIT 18.8

Comparison of Cost Estimation Methods

Estimation Method	Fixed Cost	Variable Cost
High-low	$14,125	$0.25 per unit
Regression	16,688	0.20 per unit

NEED-TO-KNOW 18-2

High-Low Method

P1

Using the information below, apply the high-low method to determine the *cost equation* (total fixed costs plus variable costs per unit).

Period	Units Produced	Total Costs
1	2,400	$11,800
2	1,600	9,800
3	3,200	15,200
4	4,000	17,000

Solution

Step 1: Lowest number of units produced is 1,600 and the highest is 4,000. Costs at these volume levels are $9,800 and $17,000.

Step 2: Compute variable cost per unit.

$$\frac{\text{Cost at highest volume} - \text{Cost at lowest volume}}{\text{Highest volume} - \text{Lowest volume}} = \frac{\$17{,}000 - \$9{,}800}{4{,}000 - 1{,}600} = \frac{\$7{,}200}{2{,}400} = \$3 \text{ per unit}$$

Step 3: Fixed costs are computed in one of two ways.

Using data at lowest volume:
Total cost = Fixed cost + (Variable cost per unit × Units)
$9,800 = Fixed cost + ($3 per unit × 1,600 units)
$9,800 = Fixed cost + $4,800
$5,000 = Fixed cost

Using data at highest volume:
Total cost = Fixed cost + (Variable cost per unit × Units)
$17,000 = Fixed cost + ($3 per unit × 4,000 units)
$17,000 = Fixed cost + $12,000
$ 5,000 = Fixed cost

Do More: Do More: QS 18-4, E 18-5

CONTRIBUTION MARGIN AND BREAK-EVEN ANALYSIS

A1

Compute the contribution margin and describe what it reveals about a company's cost structure.

Contribution Margin

After classifying costs as fixed or variable, we can compute **contribution margin**.

$$\text{Contribution margin} = \text{Sales} - \text{Variable costs}$$

Contribution margin goes to cover fixed costs, and any excess is income. Managers use contribution margin and contribution margin per unit for many key managerial decisions.

Contribution margin per unit is the amount by which a product's unit selling price exceeds its variable costs per unit. Exhibit 18.9 shows the formula for contribution margin per unit.

EXHIBIT 18.9

Contribution Margin per Unit

$$\text{Contribution margin per unit} = \text{Selling price per unit} - \text{Variable costs per unit}$$

Contribution margin ratio is the percent of each sales dollar that remains after deducting the unit variable cost. Exhibit 18.10 shows the formula for contribution margin ratio.

EXHIBIT 18.10

Contribution Margin Ratio

$$\text{Contribution margin ratio} = \frac{\text{Contribution margin per unit}}{\text{Selling price per unit}} \text{ or } \frac{\text{Contribution margin}}{\text{Sales}}$$

As an example, Rydell sells footballs for $100 each and has variable costs of $70 per football. Its fixed costs are $24,000 per month with

monthly capacity of 1,800 units (footballs). Rydell's contribution margin per unit is $30, and its contribution ratio is 30%, computed as follows.

Selling price per unit.	$100		
Variable costs per unit	70		
Contribution margin per unit . . .	$ 30	Contribution margin ratio ($30/$100) . . .	30%

At a selling price of $100 per football, Rydell covers its per unit variable costs and makes $30 per unit to contribute to fixed costs and profit. Its contribution margin ratio is 30%, computed as $30/$100. A contribution margin ratio of 30% means that for each $1 in sales, we get 30 cents to cover fixed costs and produce income.

page 711

Break-Even Point

P2

Compute the break-even point for a single-product company.

The **break-even point**, or *break-even sales*, is the sales level at which total sales equal total costs, resulting in zero income. The break-even point can be stated in either units or dollars of sales. To illustrate, Rydell sells footballs for $100 per unit and has $70 of variable costs per football sold. Its fixed costs are $24,000 per month. We show three different methods to find the break-even point.

- **Formula method**
- **Contribution margin income statement**
- **Cost-volume-profit chart**

Formula Method We compute the break-even point (in units) using the formula in Exhibit 18.11. This formula uses the contribution margin per unit, which for Rydell is $30 ($100 − $70). The break-even sales in units follows.

EXHIBIT 18.11

Break-Even Point in Units

$$\text{Break-even point in units} = \frac{\text{Fixed costs}}{\text{Contribution margin per unit}} = \frac{\$24{,}000}{\$30} = 800 \text{ units}$$

If Rydell sells 800 units this month, its income will be zero. Income increases or decreases by $30 for each unit sold above or below 800 units. For example, if Rydell sells 801 units, income equals $30. If Rydell sells 802 units, income equals $60 (2 × $30).

We can calculate the break-even point in dollars. This uses the contribution margin ratio (30%, or 0.30) to determine the required sales dollars to break even. Exhibit 18.12 shows the formula and Rydell's break-even point in dollars.

EXHIBIT 18.12

Break-Even Point in Dollars

$$\text{Break-even point in dollars} = \frac{\text{Fixed costs}}{\text{Contribution margin ratio}} = \frac{\$24{,}000}{30\% \text{ or } 0.30} = \$80{,}000 \text{ sales}$$

Contribution Margin Income Statement Method The left side of Exhibit 18.13 shows the format of a *contribution margin income statement*. It is an important tool for internal decision making, but it is not a replacement for a traditional income statement for external reporting. A contribution margin income statement separately classifies costs as variable or fixed, and it reports contribution margin.

EXHIBIT 18.13

Contribution Margin Income Statement

Contribution Margin Income Statement Format
Sales
– Variable costs
Contribution margin
– Fixed costs
Income

Contribution Margin Income Statement (at Break-Even) For Month Ended January 31	
Sales (800 units at $100 each)	$80,000
Variable costs (800 units at $70 each)	56,000
Contribution margin (800 units at $30 each)	24,000
Fixed costs	24,000
Income	$ 0

Point: At break-even, income=$0.

The right side of Exhibit 18.13 shows the contribution margin income statement at the break-even point for Rydell. We set income to zero and set contribution margin equal to fixed costs ($24,000). For Rydell's contribution margin to equal $24,000, it must sell 800 units ($24,000/$30). The resulting contribution margin income statement

shows that sales of $80,000, or 800 units, is needed to cover the variable ($56,000) and fixed ($24,000) costs.

Decision Maker

Sales Manager You can accept only one of two customer orders due to limited capacity. The first order is for 100 units with a contribution margin of $600 per unit. The second order is for 500 units with a contribution margin of $160 per unit. Which order do you accept? ■ *Answer:* Total contribution margin is $60,000 ($600 per unit × 100 units) or $80,000 ($160 per unit × 500 units) for the two orders. The second order provides the larger contribution margin and is the order you would accept. Another factor to consider is the potential for a long-term relationship with these customers, including repeat sales and growth.

Dmitry Kalinovsky/Shutterstock

Cost-Volume-Profit Chart A third way to find the break-even point is to use a **cost-volume-profit (CVP) chart** (*break-even chart*). Exhibit 18.14 shows Rydell's CVP chart. Two key lines in the chart show sales and costs at different output levels.

1. **Total costs.** This line starts at the $24,000 fixed costs level on the vertical axis. The slope of this line is the $70 variable cost per unit. This line ends at Rydell's capacity level of 1,800 units. Total costs at that point are $150,000: $24,000 fixed costs + ($70 per unit variable costs × 1,800 units).
2. **Total sales.** This line starts at zero on the vertical axis (zero units and zero dollars of sales). The slope of this line equals the $100 selling price per unit. This line ends at Rydell's maximum capacity level of 1,800 units. Total sales at that point are $180,000: $100 sales price per unit × 1,800 units.

EXHIBIT 18.14

Cost-Volume-Profit Chart

The CVP chart provides some key observations.

- **Break-even point,** where the total cost line and total sales line intersect—at 800 units, or $80,000.
- **Income or loss,** measured as the vertical distance between the sales line and the total cost line at any level of units sold (a loss is to the left of the break-even point; a profit is to the right). As the number of units sold increases, the loss area decreases or the profit area increases.
- **Maximum productive capacity,** which is 1,800 units (the largest unit number on the CVP chart). At this point, we expect sales of $180,000 and its largest income of $30,000.

Changes in Estimates

CVP analysis uses past data for estimates of the future to make managerial decisions. We can change those estimates if we believe another set of estimates is more likely to occur or if we wish to see how sensitive the results are to a change in estimates. Exhibit 18.15 shows two different sets of estimates, most likely estimates and pessimistic estimates, and how they impact break-even points.

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EXHIBIT 18.15

Alternative Estimates for Break-Even Analysis

	Selling Price per Unit	Variable Cost per Unit	Contribution Margin per Unit	Total Fixed Costs	Break-Even in Units
Most likely	$100	$70	$30	$24,000	800
Pessimistic . . .	96	72	24	27,000	1,125

Using the pessimistic estimates, the contribution margin per unit is $24 ($96 − $72), and the revised break-even in units is in Exhibit 18.16.

EXHIBIT 18.16

Revised Break-Even in Units

$$\text{Revised break-even point in units} = \frac{\$27{,}000}{\$24} = 1{,}125 \text{ units}$$

Exhibit 18.17 summarizes the effects of changes in CVP inputs on break-even. If the sales price per unit increases, then break-even decreases. If the sales price per unit decreases, then break-even increases. If either variable cost per unit or total fixed cost increases, then break-even increases. If either variable cost per unit or total fixed cost decreases, then break-even decreases.

EXHIBIT 18.17

Break-Even for Alternative CVP Inputs

Sales Price per Unit	Break-Even
Increases →	Decreases
Decreases →	Increases

Variable Cost per Unit	Break-Even
Increases →	Increases
Decreases →	Decreases

Fixed Costs in Total	Break-Even
Increases →	Increases
Decreases →	Decreases

Decision Ethics

Supervisor Your team is conducting a CVP analysis for a new product. Different sales projections have different incomes. One member suggests picking numbers yielding favorable income because any estimate is "as good as any other." Another member suggests dropping unfavorable data points for cost estimation. What do you do? ■ *Answer:* Your dilemma is whether to go along with the suggestions to "adjust" the numbers to make the project look like it will achieve sufficient profits. You should not follow these suggestions. People will be affected negatively if you adjust the numbers and the project is unprofitable. Moreover, if it does fail, an investigation would likely reveal that data in the proposal were adjusted to make the project look good.

Kadmy/iStock/Getty Images

NEED-TO-KNOW 18-3

Contribution Margin and Break-Even Point

A1 P2

Hudson Co. has annual fixed costs of $400,000. Its one product sells for $170 per unit, and it has variable costs of $150 per unit.

1. Compute the contribution margin per unit.
2. Compute the break-even point (in units) using the formula method.
3. Prepare a contribution margin income statement at the break-even point.

Solution

1. Contribution margin per unit = $170 − $150 = $20
2. Break-even point = $400,000/$20 = 20,000 units
3.

Contribution Margin Income Statement (at Break-Even) For Year Ended December 31	
Sales (20,000 units at $170 each)	$3,400,000
Variable costs (20,000 units at $150 each)	3,000,000
Contribution margin (20,000 units at $20 each)	400,000
Fixed costs	400,000
Income	$ 0

Do More: QS 18-6, QS 18-8, QS 18-9, QS 18-10, E 18-7, E 18-9, E 18-11

APPLYING COST-VOLUME-PROFIT ANALYSIS

C2

Describe several applications of cost-volume-profit analysis.

Cost-volume-profit analysis is useful in evaluating the effects of different business strategies.

Margin of Safety

All companies want to do better than break-even. A company's **margin of safety** follows.

$$\text{Margin of safety} = \text{Expected (or actual) sales} - \text{Break-even sales}$$

Margin of safety is the amount that sales can decline before the company incurs a loss. Margin of safety is expressed in dollars or as a percent of expected sales.

To demonstrate, Rydell's break-even point in dollars is $80,000. If its expected sales are $100,000, the margin of safety is $20,000 ($100,000 − $80,000). As a percent, the margin of safety is 20% of expected sales, as shown in Exhibit 18.18. Management decides whether the margin of safety is adequate given factors such as sales variability, competition, consumer tastes, and economic conditions.

EXHIBIT 18.18

Margin of Safety (in Percent)

$$\text{Margin of safety (in percent)} = \frac{\text{Expected sales} - \text{Break-even sales}}{\text{Expected sales}} = \frac{\$100{,}000 - \$80{,}000}{\$100{,}000} = 20\%$$

Computing Income from Expected Sales and Costs

Point: 1,500 units of sales is 700 units above Rydell's break-even. Income can be computed as 700 units × $30 contribution margin per unit.

Managers can use contribution margin income statements to forecast future sales and income. To demonstrate, assume Rydell's management expects to sell 1,500 units in January. What is the expected income if this sales level is achieved? We compute Rydell's expected income in Exhibit 18.19.

EXHIBIT 18.19

Computing Expected Income from Expected Sales

Contribution Margin Income Statement For Month Ended January 31	
Sales (1,500 units at $100 each)	$150,000
Variable costs (1,500 units at $70 each)	105,000
Contribution margin (1,500 units at $30 each)	45,000
Fixed costs	24,000
Income	$ 21,000

Computing Sales for a Target Income

Evaluating target income is a key application of CVP analysis. CVP analysis helps to determine the sales level needed to achieve the target income.

To demonstrate, Rydell has monthly fixed costs of $24,000 and a 30% (0.30) contribution margin ratio. Assume it sets a target income of $12,000. Using the formula in Exhibit 18.20, Rydell needs $120,000 of sales to get a $12,000 target income.

EXHIBIT 18.20

Computing Sales (Dollars) for a Target Income

$$\text{Dollar sales at target income} = \frac{\text{Fixed costs + Target income}}{\text{Contribution margin ratio}} = \frac{\$24{,}000 + \$12{,}000}{30\% \text{ or } 0.30} = \$120{,}000$$

Alternatively, we can compute *unit sales* needed to achieve a target income. To do this, use *contribution margin per unit*. Exhibit 18.21 shows this for Rydell.

EXHIBIT 18.21

Computing Sales (Units) for a Target Income

$$\text{Unit sales at target income} = \frac{\text{Fixed costs + Target income}}{\text{Contribution margin per unit}} = \frac{\$24{,}000 + \$12{,}000}{\$30} = 1{,}200 \text{ units}$$

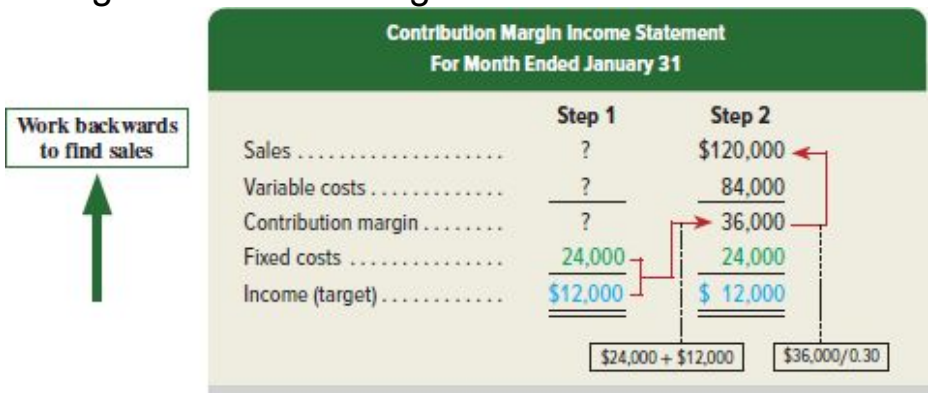
We can use the contribution margin income statement approach to compute sales for a target income in two steps. page 715

Step 1: **Calculate contribution margin at target income**. Working backwards, we begin at the bottom and insert the $24,000 fixed costs and the $12,000 target income, as shown in Exhibit 18.22. This means contribution margin is $36,000 ($24,000 + $12,000).

Step 2: **Calculate Sales**. Divide the $36,000 contribution margin by the 30% contribution margin ratio to solve for sales of $120,000, or 1,200 units at $100 each. This also means variable costs are 70% of sales, or $84,000.

EXHIBIT 18.22

Using Contribution Margin Income Statement to Find Target Sales



Decision Insight

Mic Drop Concert promotion is a risky and low-margin business. A recent **Ariana Grande** tour grossed over $100 million in ticket revenue. How much went to the promoters? After paying the costs of each venue (staff, electricity, security, insurance) and Ariana's share of ticket revenues, the promoters might have about $15 million to apply against their own costs. **Live Nation**, Ariana's promoters, recently posted a small profit after several successive years of not breaking even. ■

Dave Hogan/Getty Images

NEED-TO-KNOW 18-4

Contribution Margin, Target Income, and Margin of Safety

A1 C2

A manufacturer predicts fixed costs of $502,000. Its product sells for $180 per unit, and it incurs variable costs of $126 per unit. Its target income is $200,000.

1. Compute the contribution margin ratio.
2. Compute the dollar sales needed to achieve the target income.
3. Compute the unit sales needed to achieve the target income.
4. Break-even sales is 9,296 units. Compute the margin of safety (in dollars) if the company expects to sell 10,000 units.

Solution

1. $$\text{Contribution margin ratio} = \frac{\$180 - \$126}{\$180} = 30\%, \text{ or } 0.30$$

2. $$\text{Dollar sales at target income} = \frac{\$502{,}000 + \$200{,}000}{0.30} = \$2{,}340{,}000$$

3. $$\text{Unit sales at target income} = \frac{\$502{,}000 + \$200{,}000}{\$180 - \$126} = 13{,}000 \text{ units}$$

4. $$\text{Margin of safety} = (10{,}000 \times \$180) - (9{,}296 \times \$180) = \$126{,}720$$

Do More: Do More: QS 18-17, QS 18-18, QS 18-19, E 18-12, E 18-13

Evaluating Business Strategies

We can use CVP to analyze the effects of alternative business strategies on break-even, income, and margin of safety. For example, we might want to know what happens to income if we automate a manual process or if we increase advertising. We provide two examples.

Capital Expenditure—New Machinery Assume a new page 716 machine increases monthly fixed costs from $24,000 to $30,000 and decreases variable costs by $10 per unit (from $70 per unit to $60 per unit). Rydell's break-even point in dollars is currently $80,000. How would the new machine affect the break-even point in dollars? If Rydell maintains its selling price of $100 per unit, its contribution margin per unit increases to $40—computed as $100 per unit minus the (new) variable costs of $60 per unit. With this new machine, the revised contribution margin ratio per unit is 40% (computed as $40/$100). The revised break-even point in dollars is $75,000, as computed in Exhibit 18.23. The new machine would lower Rydell's break-even point by $5,000, or 50 units, per month.

EXHIBIT 18.23

Revised Break-Even

$$\text{Revised break-even point in dollars} = \frac{\text{Revised fixed costs}}{\text{Revised contribution margin ratio}} = \frac{\$30{,}000}{40\%} = \$75{,}000$$

Spending—Advertising A manager proposes that an increase of $3,000 in monthly advertising will increase sales by $25,000 per month

(at a selling price of $100 per unit). Fixed costs before the advertising increase are $24,000. The contribution margin ratio will continue to be 30%. With the advertising increase, the revised break-even point in dollars is $90,000, as computed in Exhibit 18.24.

EXHIBIT 18.24

Revised Break-Even

$$\text{Revised break-even point in dollars} = \frac{\text{Revised fixed costs}}{\text{Contribution margin ratio}} = \frac{\$27{,}000}{30\%} = \$90{,}000$$

Exhibit 18.18 showed Rydell's margin of safety was 20% when expected sales was $100,000. Rydell expects sales of $125,000 ($100,000 + $25,000) after the advertising increase. The revised margin of safety is computed in Exhibit 18.25. The advertising campaign would increase its margin of safety from 20% to 28%.

EXHIBIT 18.25

Revised Margin of Safety

$$\text{Revised margin of safety (in percent)} = \frac{\text{Expected sales} - \text{Break-even sales}}{\text{Expected sales}} = \frac{\$125{,}000 - \$90{,}000}{\$125{,}000} = 28\%$$

Sales Mix and Break-Even

P3

Compute the break-even point for a multiproduct company.

For companies that sell more than one type of product, **sales mix** is the proportion of sales volume for each product. For example, if a company normally sells 1,200 footballs and 800 basketballs each period (2,000 units total), its sales mix is 60% footballs (1,200/2,000) and 40% basketballs (800/2,000). This sales mix is expressed as 6:4.

When a mix of products is sold, break-even can be computed with a **weighted-average contribution margin per unit**. This measure combines the per unit contribution margins of each product by their weights in the sales mix. To demonstrate, assume Rydell expands its product line to include basketballs. It adds another production shift,

increasing its fixed costs to $48,000. Information for the two products is in Exhibit 18.26.

EXHIBIT 18.26

Sales Mix Data

	Footballs	Basketballs
Sales price per unit	$100	$120
Variable costs per unit	70	85
Contribution margin per unit	$ 30	$ 35
Sales mix percent	60%	40%

Using the data in Exhibit 18.26, the weighted-average contribution margin is computed in Exhibit 18.27 page 717

EXHIBIT 18.27

Weighted-Average Contribution Margin per Unit

$$\text{Weighted-average contribution margin per unit} = \text{Contribution margin per unit for each product} \times \text{Sales mix percent for each product}$$
$$= (\$30 \times 60\%) + (\$35 \times 40\%)$$
$$= \$32 \text{ per unit}$$

The break-even point in unit sales is computed with the formula from Exhibit 18.11, but using the weighted-average contribution margin per unit, as shown in Exhibit 18.28.

EXHIBIT 18.28

Weighted-Average Break-Even in Units

$$\text{Break-even point in units} = \frac{\text{Fixed costs}}{\text{Weighted-average contribution margin per unit}} = \frac{\$48{,}000}{\$32} = 1{,}500 \text{ units}$$

The number of units of each product type is then computed by multiplying the break-even point in units (1,500) by the sales mix percent, as shown in the second column of Exhibit 18.29. The right three columns compute contribution margin at break-even. We multiply unit sales by the contribution margin per unit to get contribution margin for each product. The $48,000 total contribution margin exactly equals the $48,000 fixed costs, resulting in zero income at break-even.

EXHIBIT 18.29

Unit Sales by Product Type at Break-Even

Product	Break-Even Units × Sales Mix	Unit Sales	Contribution Margin per Unit	Contribution Margin
Footballs	1,500 × 60%	900	$30	$27,000
Basketballs	1,500 × 40%	600	35	21,000
Total		1,500		$48,000

Analytics Insight

For Our Eyes Only Retail businesses use big data to understand shopping behavior and attract new customers. **Amazon**'s "recommendation engine" tailors recommendations based on customers' browsing and buying habits. A consulting firm estimates that 35% of Amazon's revenue is generated from its recommendations. ■

NEED-TO-KNOW 18-5

Contribution Margin and Break-Even Point for Two Products

P3

A manufacturer of two models of soccer balls, Practice and Pro, shows the information below. The company has annual fixed costs of $700,000.

	Practice	Pro
Sales price per unit	$20	$60
Variable costs per unit	10	20
Sales mix percent	75%	25%

1. What is the weighted-average contribution margin per unit?
2. What is the break-even point in units?
3. How many units of each model is sold at the break-even point?

Solution

1. Weighted-average contribution margin per unit = ($10 × 75%) + ($40 × 25%) = $17.50
2. $$\text{Break-even point in units} = \frac{\$700{,}000}{\$17.50} = 40{,}000 \text{ units}$$

3. Unit sales of each model at break-even point (table at right).

Model	Break-Even Units × Sales Mix	Unit Sales
Practice . . .	40,000 × 75% =	30,000
Pro.	40,000 × 25% =	10,000

Do More: QS 18-21,E 18-22, E 18-23

Assumptions in Cost-Volume-Profit Analysis

CVP analysis relies on several assumptions:

- Costs can be classified as variable or fixed.
- Costs are linear within the relevant range.
- Units produced are sold (inventory is constant).
- Sales mix is constant.

If costs and sales differ from these assumptions, the results of CVP analysis can be less useful. Managers understand that CVP analysis gives approximate answers to questions and enables them to make rough estimates about the future.

CORPORATE SOCIAL RESPONSIBILITY

Manufacturers try to increase the sustainability of their materials and packaging. **Nike** recently reengineered its shoeboxes to use 30% less material. These lighter shoeboxes can be

shipped in cartons that are 20% lighter. Nike also now uses recycled polyester in much of its clothing. The company estimates it has reused the equivalent of over 2 billion plastic bottles in recent years.

Before Initiative	
Break-even	800 units
Margin of safety	20%
Forecasted income	$21,000

These and other sustainability initiatives impact both variable and fixed costs and CVP analysis. Consider Rydell, the football manufacturer illustrated in this chapter. Rydell expects to sell 1,500 footballs per month, at a price of $100 per unit. Variable costs are $70 per unit and monthly fixed costs are $24,000. Rydell is considering using recycled materials. This would add $1,160 in fixed costs per month and reduce variable costs by $4 per unit. Management wants to know the impact for break-even point, margin of safety, and forecasted income. Analysis is in Exhibit 18.30.

EXHIBIT 18.30

Revised Break-Even, Margin of Safety, and Income

$$\text{Revised break-even point in units} = \frac{\text{Revised fixed costs}}{\text{Revised contribution margin}} = \frac{\$25{,}160}{\$34} = 740 \text{ units}$$

$$\text{Revised margin of safety} = \frac{\text{Expected sales} - \text{Break-even sales}}{\text{Expected sales}} = \frac{\$150{,}000 - \$74{,}000}{\$150{,}000} = 50.7\%$$

$$\text{Revised forecasted income} = (\text{Units sold} \times \text{Contribution margin per unit}) - \text{Fixed costs}$$
$$= (1{,}500 \times \$34) - \$25{,}160 = \$25{,}840$$

SmartSweets

Tara Bosch, founder of this chapter's feature company, **SmartSweets**, is on a mission for people to "kick sugar and keep candy." SmartSweet customers "kick" out over 1 billion grams of sugar per year.

Decision Analysis — Degree of Operating Leverage

A2

Analyze changes in sales using the degree of operating leverage.

CVP analysis is especially useful when management wishes to predict income from alternative strategies. These strategies can involve changes in selling prices, fixed costs, variable costs, sales volume, and product mix. Managers are interested in seeing the effects of changes in some or all of these factors. *Contribution margin per unit* is one way to predict income effects; for every additional unit sold, income increases by contribution margin per unit.

A useful measure to assess the effect of changes in the level of sales on income is the **degree of operating leverage (DOL)**, as shown in Exhibit 18.31.

EXHIBIT 18.31

Degree of Operating Leverage

$$\text{Degree of operating leverage} = \frac{\text{Contribution margin}}{\text{Income}}$$

To demonstrate, assume Rydell Company sells 1,200 footballs. At this sales level, its contribution margin and income are computed as page 719

Rydell Company	
Sales (1,200 × $100)	$120,000
Variable costs (1,200 × $70)	84,000
Contribution margin	36,000
Fixed costs	24,000
Income	$ 12,000

Rydell's degree of operating leverage (DOL) is computed in Exhibit 18.32.

EXHIBIT 18.32

Rydell's Degree of Operating Leverage

$$\text{Degree of operating leverage} = \frac{\text{Contribution margin}}{\text{Income}} = \frac{\$36{,}000}{\$12{,}000} = 3.0$$

We then use DOL to predict the change in income from a change in sales. For example, if Rydell expects sales to either increase or decrease by 10%, and these changes are within Rydell's relevant range, we can compute the change in income using DOL in Exhibit 18.33.

EXHIBIT 18.33

Impact of Change in Sales on Income

$$\text{Change in income (\%)} = \text{DOL} \times \text{Change in sales (\%)}$$
$$= 3.0 \times 10\% = 30\%$$

If Rydell's sales *increase* by 10%, its income will increase by $3,600 (computed as $12,000 × 30%), to $15,600. If, instead, Rydell's sales decrease by 10%, its income will decrease by $3,600, to $8,400. We can prove these results with contribution margin income statements, as shown below. Companies with a higher degree of operating leverage have larger income effects from changes in unit sales. For example, a company with DOL of 3 will expect a larger income increase from a 10% change in sales than would a company with a DOL of 2.

	Current	Sales Increase by 10%	Sales Decrease by 10%
Sales	$120,000	$132,000	$108,000
Variable costs	84,000	92,400	75,600
Contribution margin	36,000	39,600	32,400
Fixed costs	24,000	24,000	24,000
Income	$ 12,000	$ 15,600	$ 8,400

NEED-TO-KNOW 18-6

COMPREHENSIVE

Break-Even and Sales for Target Income

Sport Caps manufactures and sells caps. Fixed costs are $150,000 per month, and variable costs are $5 per cap. The caps are sold for $8 each. Production capacity is 100,000 caps per month.

Required

1. Compute the following.
   - **a.** Contribution margin per cap.
   - **b.** Break-even point in number of caps sold.
   - **c.** Income at 30,000 caps sold.
   - **d.** Income at 85,000 caps sold.
   - **e.** Number of caps sold to get $60,000 of income.
2. Compute the following.
   - **a.** Contribution margin ratio.
   - **b.** Break-even point in sales dollars.
   - **c.** Income at $250,000 of sales.
   - **d.** Income at $600,000 of sales.
   - **e.** Dollars of sales to achieve $60,000 of income.

SOLUTION

1. a.

$$\begin{aligned}\text{Contribution margin per cap} &= \text{Selling price per unit} - \text{Variable cost per unit}\\ &= \$8 - \$5 = \underline{\underline{\$3}}\end{aligned}$$

b.

$$\text{Break-even point in caps} = \frac{\text{Fixed costs}}{\text{Contribution margin per cap}} = \frac{\$150{,}000}{\$3} = \underline{\underline{50{,}000 \text{ caps}}}$$

c.

page 720

$$\begin{aligned}\text{Income at 30,000 caps sold} &= (\text{Units} \times \text{Contribution margin per unit}) - \text{Fixed costs}\\ &= (30{,}000 \times \$3) - \$150{,}000 = \underline{\underline{\$(60{,}000) \text{ loss}}}\end{aligned}$$

d.

$$\begin{aligned}\text{Income at 85,000 caps sold} &= (\text{Units} \times \text{Contribution margin per unit}) - \text{Fixed costs}\\ &= (85{,}000 \times \$3) - \$150{,}000 = \underline{\underline{\$105{,}000 \text{ profit}}}\end{aligned}$$

e.

$$\begin{aligned}\text{Unit sales for \$60,000 income} &= \frac{\text{Fixed costs} + \text{Target income}}{\text{Contribution margin per cap}}\\ &= \frac{\$150{,}000 + \$60{,}000}{\$3} = \underline{\underline{70{,}000 \text{ caps}}}\end{aligned}$$

2. a. $$\text{Contribution margin ratio} = \frac{\text{Contribution margin per unit}}{\text{Selling price per unit}} = \frac{\$3}{\$8} = 0.375 \text{ or } 37.5\%$$

b. $$\text{Break-even point in dollars} = \frac{\text{Fixed costs}}{\text{Contribution margin ratio}} = \frac{\$150{,}000}{37.5\%} = \$400{,}000$$

c. $$\text{Income at sales of \$250,000} = (\text{Sales} \times \text{Contribution margin ratio}) - \text{Fixed costs}$$
$$= (\$250{,}000 \times 37.5\%) - \$150{,}000 = \$(56{,}250) \text{ loss}$$

d. $$\text{Income at sales of \$600,000} = (\text{Sales} \times \text{Contribution margin ratio}) - \text{Fixed costs}$$
$$= (\$600{,}000 \times 37.5\%) - \$150{,}000 = \$75{,}000 \text{ income}$$

e. $$\text{Dollars of sales to achieve \$60,000 income} = \frac{\text{Fixed costs} + \text{Target income}}{\text{Contribution margin ratio}}$$
$$= \frac{\$150{,}000 + \$60{,}000}{37.5\%} = \$560{,}000$$

APPENDIX

18A Using Excel for Cost Estimation

Point: The intercept function solves for total fixed costs. The slope function solves for the variable cost per unit.

Microsoft Excel® and other spreadsheet software can be used to perform least-squares regressions to identify cost behavior. In Excel, the INTERCEPT and SLOPE functions are used. The following screen shot reports the data from Exhibit 18.4 in cells Al through C13 and shows the cell contents to find the intercept (cell B15) and slope (cell B16). Cell B15 uses Excel to find the intercept from a least-squares regression of total cost (shown as C2:C13 in cell B15) on units produced (shown as B2:B13 in cell B15). Spreadsheet software is useful in understanding cost behavior when many data points (such as monthly total costs and units produced) are available.

Excel can also be used to create scatter diagrams such as that in Exhibit 18.5. To draw a scatter diagram with a line of fit, follow these steps:

1. Highlight the data cells we wish to diagram; in this example, start from cell C13 and highlight through cell B2.
2. Then select “Insert” and “Scatter” (X,Y) from the drop-down menus. Selecting the chart type in the upper left corner of the choices under “Scatter” will produce a diagram that looks like that in Exhibit 18.5, without a line of fit.
3. To add a line of fit (also called a trend line), select “Design,” “Add Chart Element,” “Trendline,” and “Linear” from the drop-down menus. This will produce a diagram that looks like that in Exhibit 18.5, including the line of fit but without the formatting.
4. To have the trend line intersect the y-axis, add one more row to the data for zero units produced (0) and the fixed cost from the Excel slope function ($16,688.24 in this example).

	A	B	C
1	**Month**	**Units Produced**	**Total Cost**
2	January	27,500	$21,500
3	February	22,500	20,500
4	March	25,000	25,000
5	April	35,000	21,500
6	May	47,500	25,500
7	June	17,500	18,500
8	July	30,000	23,500
9	August	52,500	28,500
10	September	37,500	26,000
11	October	62,500	29,000
12	November	67,500	31,000
13	December	57,500	26,000
14			**Result**
15	**Intercept**	=INTERCEPT(C2:C13, B2:B13)	$16,688.24
16	**Slope**	=SLOPE(C2:C13, B2:B13)	$ 0.1995

APPENDIX

18B Variable Costing and Performance Reporting

Compute unit cost and income under both absorption and variable costing.

This chapter showed the usefulness of *contribution margin*, or selling price minus variable costs, in CVP analysis. The contribution margin income statement introduced in this chapter is also known as a **variable costing income statement**. In **variable costing**, only variable costs relating to production are included in product costs. These costs include direct materials, direct labor, and *variable* overhead costs. Thus, under variable costing, *fixed* overhead costs are excluded from product costs and instead are expensed in the period incurred. Variable costing can be useful in many managerial analyses and decisions.

The variable costing method is not allowed, however, for external financial reporting. Instead, GAAP requires **absorption costing**. Under absorption costing, product costs include direct materials, direct labor, *and all overhead*, both variable and fixed. Thus, under absorption costing, fixed overhead costs are expensed when the goods are sold. Managers can still use variable costing information for internal decision making, but they must use absorption costing for external reporting purposes.

Computing Unit Cost To illustrate the difference between absorption costing and variable costing, let's consider the product cost data in Exhibit 18B.1 from IceAge, a skate manufacturer.

EXHIBIT 18B.1

Summary Product Cost Data

Direct materials	$4 per unit	Variable overhead	$3 per unit
Direct labor	$8 per unit	Fixed overhead	$600,000 per year
Expected units produced per year	60,000 units		

Using the product cost data, Exhibit 18B.2 shows the product cost per unit for both absorption and variable costing.

For absorption costing, the product cost per unit is $25, which consists of $4 in direct materials, $8 in direct labor, $3 in variable overhead and $10 in fixed overhead ($600,000⁄60,000 units).

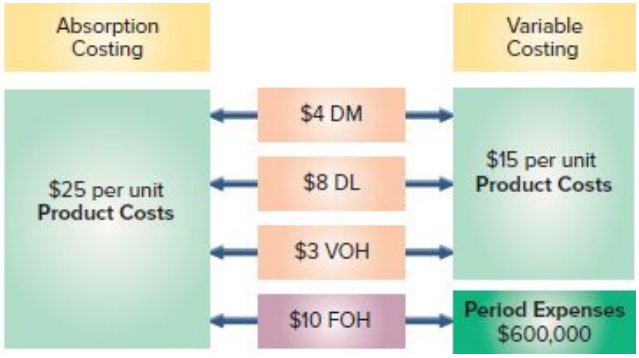
For variable costing, the product cost per unit is $15, which consists of $4 in direct materials, $8 in direct labor, and $3 in variable

overhead. Fixed overhead costs of $600,000 are treated as a period cost and are recorded as expense in the period incurred. *The difference between the two costing methods is the exclusion of fixed overhead from product costs for variable costing*.

EXHIBIT 18B.2

Unit Cost Computation

Product Cost per Unit	Absorption Costing	Variable Costing
Direct materials	$ 4	$ 4
Direct labor	8	8
Overhead		
Variable overhead	3	3
Fixed overhead	10	
Total product cost per unit	$25	$15



Income Reporting The prior section showed how different treatment of fixed overhead costs leads to different product costs per unit under absorption and variable costing. This section shows the effects for income reporting.

Let's return to IceAge Company. Below are the page 722 manufacturing cost data for IceAge as well as additional data on selling and administrative expenses. Assume that IceAge began the year with no units in inventory. During the year, IceAge produced 60,000 units and sold 40,000 units at $40 each, leaving 20,000 units in ending inventory.

Let's prepare income statements for IceAge both under absorption costing and under variable costing. Under variable costing, expenses are grouped according to cost behavior—variable or fixed, and production or nonproduction. Under absorption costing, expenses are grouped by function but not separated into variable and fixed components.

Units Produced Exceed Units Sold Exhibit 18B.3 shows absorption costing and variable costing income statements. During the year, 60,000 units were produced, but only 40,000 units were sold, which means 20,000 units remain in ending inventory.

EXHIBIT 18.B3

Income under Absorption and Variable Costing

ICEAGE COMPANY
Income Statement (Absorption Costing)
For Year Ended December 31

Sales (40,000 × $40)	$1,600,000
Cost of goods sold (40,000 × $25[†])	1,000,000
Gross profit	600,000
Selling and administrative expenses [$200,000 + (40,000 × $2)]	280,000
Income	$ 320,000

[†]$4 DM + $8 DL + $3 VOH + $10 FOH.
[‡]$4 DM + $8 DL + $3 VOH.

ICEAGE COMPANY
Income Statement (Variable Costing)
For Year Ended December 31

Sales (40,000 × $40)		$1,600,000
Variable expenses		
Variable cost of goods sold (40,000 × $15[‡])	$600,000	
Variable selling and administrative expenses (40,000 × $2)	80,000	680,000
Contribution margin		920,000
Fixed expenses		
Fixed overhead	600,000	
Fixed selling and administrative expenses	200,000	800,000
Income		$ 120,000

Income is $320,000 under absorption costing. Under variable costing, income is $120,000. This $200,000 difference is due to the treatment of fixed overhead. Because the variable costing method expenses fixed overhead (FOH) as a period cost of $600,000, and the absorption costing method expenses FOH based on the number of units sold (40,000 × $10), income is lower under variable costing by $200,000 (20,000 units × $10).

Toshifumi Kitamura/AFP/Getty Images

When production exceeds sales by 20,000 units (60,000 versus 40,000), the $200,000 ($10 × 20,000 units) of fixed overhead cost allocated to these 20,000 units is included in the cost of ending inventory. This means that $200,000 of fixed overhead cost incurred in 2021 is not expensed until future years under absorption costing, when it is reported in cost of goods sold as those products are sold. Consequently, income for the current year under absorption costing is $200,000 higher than income under variable costing. Even though sales (of 40,000 units) and the number of units produced (totaling

60,000) are the same under both costing methods, income differs greatly due to the treatment of fixed overhead. We can generalize this result to link units produced and sold to income under absorption costing versus variable costing.

Units produced are:	Income under absorption costing is:
Equal to units sold	Equal to Income under variable costing
Greater than units sold.	Greater than income under variable costing
Less than units sold	Less than income under variable costing

Converting Income under Variable Costing to Income under Absorption Costing In the current year, IceAge produced 20,000 more units than it sold. Those 20,000 units remaining in ending inventory will be sold in future years. When those units are sold, the $200,000 of fixed overhead costs attached to them will be page 723 expensed, resulting in lower income under the absorption costing method. This leads to a simple way to convert income under variable costing to income under absorption costing.

$$\text{Income under absorption costing} = \text{Income under variable costing} + \text{Fixed overhead cost in ending inventory*} - \text{Fixed overhead cost in beginning inventory*}$$

*Under absorption costing

For example, if IceAge produces 60,000 units and sells 80,000 units next year, it reports income under variable costing of $1,040,000. Income under absorption costing is then computed as

$$\text{Income under absorption costing} = \$1{,}040{,}000 + \$0 - \$200{,}000 = \$840{,}000$$

Differences in income between variable and absorption costing are summarized below.

NEED-TO-KNOW 18-7

Computing Product Cost per Unit

P4

A manufacturer reports the following data.

Direct materials	$6 per unit	Variable overhead	$11 per unit
Direct labor	$14 per unit	Fixed overhead	$680,000 per year
Units produced	20,000 units		

1. Compute total product cost per unit under absorption costing.
2. Compute total product cost per unit under variable costing.

Solution

Per Unit Costs	(1) Absorption Costing	(2) Variable Costing
Direct materials	$ 6	$ 6
Direct labor	14	14
Variable overhead	11	11
Fixed overhead ($680,000/20,000)	34	—
Total product cost per unit	$65	$31

Do More: QS 18-23, QS 18-24, QS 18-25, QS 18-26, E 18-62

Summary: Cheat Sheet

IDENTIFYING COST BEHAVIOR

Fixed costs: Costs that do not change in total as volume changes.

Variable costs: Costs that change proportionately with volume.

Mixed costs: Costs that include both fixed and variable components.

Step-wise costs: Costs with step pattern, but fixed in each relevant range.

Relevant range: Normal operating range; neither near zero nor maximum capacity.

MEASURING COST BEHAVIOR

Cost equation: Fixed costs + (Variable cost per unit × Units produced)

High-Low: Estimates cost equation using highest and lowest volumes.

$$\text{Variable cost per unit} = \frac{\text{Cost at highest volume} - \text{Cost at lowest volume}}{\text{Highest volume} - \text{Lowest volume}}$$

$$\text{Total costs} = \text{Fixed cost} + (\text{Variable cost per unit} \times \#\ \text{of units})$$

Regression: Statistical method using all data. Likely more accurate.

CONTRIBUTION MARGIN AND BREAK-EVEN

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$$\text{Contribution margin per unit} = \text{Selling price per unit} - \text{Variable costs per unit}$$

$$\text{Contribution margin ratio} = \frac{\text{Contribution margin per unit}}{\text{Selling price per unit}}$$

Contribution Margin Income Statement Format
Sales
– Variable costs
Contribution margin
– Fixed costs
Income

Contribution Margin Income Statement (at Break-Even) For Month Ended January 31	
Sales (800 units at $100 each)	$80,000
Variable costs (800 units at $70 each)	56,000
Contribution margin (800 units at $30 each)	24,000
Fixed costs	24,000
Income	$ 0

Break-even point in units and in dollars

$$\text{Break-even point in units} = \frac{\text{Fixed costs}}{\text{Contribution margin per unit}}$$

$$\text{Break-even point in dollars} = \frac{\text{Fixed costs}}{\text{Contribution margin ratio}}$$

APPLYING COST-VOLUME-PROFIT ANALYSIS

Margin of safety: Amount that sales can drop before company incurs a loss.

$$\text{Margin of safety (in percent)} = \frac{\text{Expected sales} - \text{Break-even sales}}{\text{Expected sales}}$$

Dollar sales for a target income

$$\text{Dollar sales at target income} = \frac{\text{Fixed costs} + \text{Target income}}{\text{Contribution margin ratio}}$$

Unit sales for a target income

$$\text{Unit sales at target income} = \frac{\text{Fixed costs} + \text{Target income}}{\text{Contribution margin per unit}}$$

Business strategy and break-even

$$\text{Revised break-even point in dollars} = \frac{\text{Revised fixed costs}}{\text{Revised contribution margin ratio}}$$

SALES MIX AND BREAK-EVEN

Sales mix: Proportion of sales volumes for various products or services.

Weighted-average contribution margin:

$$\begin{aligned}&\text{Contribution margin per unit product 1} \times \%\text{ sales product 1}\\ &+ \text{Contribution margin per unit product 2} \times \%\text{ sales product 2}\\ &= \text{Weighted-average contribution margin per unit}\end{aligned}$$

$$\text{Break-even sales in units} = \frac{\text{Fixed costs}}{\text{Weighted-average contribution margin per unit}}$$

$$\text{Units of each product to sell at break-even} \begin{cases}\text{Break-even units} \times \%\text{ sales product 1}\\ \text{Break-even units} \times \%\text{ sales product 2}\end{cases}$$

Degree of operating leverage (DOL)

$$\text{DOL} = \text{Contribution margin}/\text{Income}$$

Using DOL to predict Income from Sales

$$\text{Change in income (\%)} = \text{DOL} \times \text{Change in sales (\%)}$$

Key Terms

Absorption costing (721)

Break-even point (711)

Contribution margin(710)

Contribution margin per unit (710)

Contribution margin ratio (710)

Cost-volume-profit (CVP) analysis (705)

Cost-volume-profit (CVP) chart (712)

Degree of operating leverage (DOL) (718)

Estimated line of cost behavior (708)

High-low method (709)

Least-squares regression (709)

Margin of safety (714)

Mixed cost (707)

Relevant range of operations (707)

Sales mix (716)

Scatter diagram (708)

Step-wise cost (707)

Variable costing (721)

Variable costing income statement (721)

Weighted-average contribution margin per unit (716)

Multiple Choice Quiz

1. A company's only product sells for $150 per unit. Its variable costs per unit are $100, and its fixed costs total $75,000. What is its contribution margin per unit?

a. $50

b. $250

c. $100

d. $150

e. $25

2. Using information from question 1, what is the company's contribution margin ratio?

a. 66⅔%

b. 100%

c. 50%

d. 0%

e. 33⅓%

3. Using information from question 1, what is the company's break-even point in units?

a. 500 units

b. 750 units

c. 1,500 units

d. 3,000 units

e. 1,000 units

4. A company's estimated sales are $300,000 and its sales at break-even are $180,000. Its margin of safety in dollars is

a. $180,000.

c. $480,000.

b. $120,000.

d. $60,000.

e. $300,000.

5. A product sells for $400 per unit and its variable costs per unit are $260. The company's fixed costs are $840,000. If the company desires $70,000 income, what is the required dollar sales?

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a. $2,400,000

b. $200,000

d. $2,275,000

c. $2,600,000

e. $1,400,000

ANSWERS TO MULTIPLE CHOICE QUIZ

1. a; $150 − $100 = $50
2. e; ($150 − $100)/$150 = 33⅓%
3. c; $75,000/$50 CM per unit = 1,500 units
4. b; $300,000 − $180,000 = $120,000
5. c; Contribution margin ratio = ($400 − $260)/$400 = 0.35
   Targeted sales = ($840,000 + $70,000)/0.35 = $2,600,000

Superscript letter A or B denotes assignments based on Appendix 18A or 18B.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

connect

QUICK STUDY

QS 18-1

Identifying cost type

C1

Excel:

Enter data

Select:

Insert

Charts

All Charts

Line

Listed here are three separate series of costs measured at various volume levels. Examine each series and identify whether it is best described as a fixed, variable, or step-wise cost. *Hint:* It can help to graph each cost series.

Volume (Units)	Series 1	Series 2	Series 3
0	$ 0	$450	$ 800
100	800	450	800
200	1,600	450	800
300	2,400	450	1,600
400	3,200	450	1,600
500	4,000	450	2,400
600	4,800	450	2,400

QS 18-2

Identifying cost type

C1

Determine whether each of the following is best described as a fixed, variable, or mixed cost with respect to product units.

1. Rubber used to manufacture athletic shoes.
2. Salesperson salary plus commission.
3. Packaging expense.
4. Depreciation expense of warehouse.
5. Factory rent.
6. Taxes on factory building.
7. Hourly wages of assembly-line worker.

QS 18-3

Classifying costs

C1

Following are costs for eight different items. Costs are shown for three different levels of units produced and sold. Classify each of the eight cost items as either variable, fixed, or mixed.

Costs for Different Levels of Units Produced and Sold	At 0 units	At 2,000 units	At 4,000 units
Direct labor	$ 0	$10,000	$20,000
Depreciation on factory equipment	3,000	3,000	3,000
Direct materials	0	6,000	12,000
Rent on factory building	1,000	1,000	1,000
Salesperson compensation	3,000	3,000	4,000
Factory supervisor salary	4,000	4,000	4,000
Factory utilities	100	500	700
Insurance on factory building	800	800	800

QS 18-4

Measuring costs using high-low method **P1**

The following information is available for a company's maintenance cost over the last seven months. Using the high-low method, estimate both the fixed and variable components of its maintenance cost.

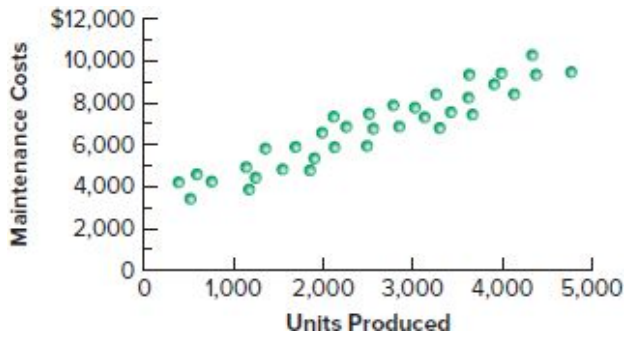
Month	Units Produced	Maintenance Cost
June	90	$5,450
July	180	6,900
August	120	5,100
September	150	6,000
October	210	6,900
November	240	8,100
December	60	3,600

QS 18-5

Interpreting a scatter diagram

P1

This scatter diagram shows past units produced and their corresponding maintenance costs.



1. Review the scatter diagram and classify maintenance costs as either fixed, variable, or mixed.
2. If 3,000 units are produced, are maintenance costs expected to be greater than $5,000?

QS 18-6

Contribution margin ratio **A1**

Compute the contribution margin ratio and fixed costs using the following data.

Sales	$5,000	Variable costs	$3,000	Income.	$400

QS 18-7

Determining contribution margin components

A1

Solve for the missing amounts *a* through *f* for the following separate cases.

Case	Sales price per unit	Variable costs per unit	Contribution margin per unit	Contribution margin ratio
1	$20	$16	(*a*)	(*b*)
2	(*c*)	30	$10	(*d*)
3	(*e*)	(*f*)	50	20%

QS 18-8

Contribution margin per unit and break-even units **P2**

Viva sells its waterproof phone case for $90 per unit. Fixed costs total $162,000, and variable costs are $36 per unit. Determine the (1) contribution margin per unit and (2) break-even point in units.

QS 18-9

Contribution margin ratio and break-even dollars **P2**

Viva sells its waterproof phone case for $90 per unit. Fixed costs total $162,000, and variable costs are $36 per unit. Determine the (1) contribution margin ratio and (2) break-even point in dollars.

QS 18-10

Computing break-even **P2**

Zhao Co. has fixed costs of $354,000. Its single product sells for $175 per unit, and variable costs are $116 per unit. Determine the break-even point in units.

QS 18-11

Preparing a contribution margin income statement **P2**

Zhao Co. has fixed costs of $354,000. Its single product sells for $175 per unit, and variable costs are $116 per unit. The company reports sales of 10,000 units. Prepare a contribution margin income statement for the year ended December 31.

QS 18-12

Determining break-even components **P2**

Solve for the missing amounts *a* through *d* for the following separate cases.

Case	Sales price per unit	Variable costs per unit	Total Fixed costs	Break-even In units
1	$20	$16	$40,000	(*a*)
2	25	5	(*b*)	5,000
3	30	(*c*)	81,000	9,000
4	(*d*)	4	48,000	8,000

QS 18-13

Break-even and margin of safety **P2**

Coors Company expects sales of $340,000 (4,000 units at $85 per unit). The company's total fixed costs are $175,000 and its variable costs are $35 per unit. Compute (*a*) break-even in units and (*b*) the margin of safety in dollars.

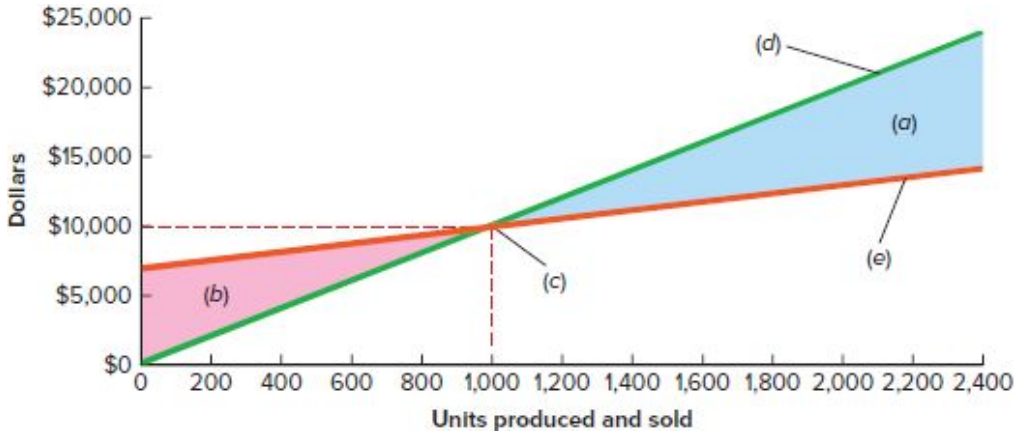
QS 18-14

Interpreting a CVP chart

P2

Match the descriptions 1 through 5 with labels *a* through *e* on the CVP chart.

1. Break-even point
2. Total sales line
3. Loss area
4. Profit area
5. Total costs line



QS 18-15

Interpreting a CVP chart

P2

Refer to the CVP chart in QS 18-14 and solve for each of the items below.

1. Units produced at break-even point
2. Dollar sales at break-even point
3. Capacity in units is there a profit or a loss?

4. Are fixed costs greater than $10,000?

5. If 1,400 units are produced and sold,

QS 18-16

Analyzing changes to break-even point

C2

Zulu sells its waterproof phone case for $90 per unit. Fixed costs total $200,000, and variable costs are $40 per unit. (*a*) Compute its break-even in units. (*b*) Will the break-even point in units increase or decrease in response to each of the following independent changes?

Change	Break-Even In Units will:	Change	Break-Even In Units will:
1. Fixed costs increase to $225,000	_____	4. Variable costs increase to $58 per unit	_____
2. Variable costs decrease to $26 per unit	_____	5. Fixed costs decrease to $150,000	_____
3. Selling price per unit decreases to $80	_____	6. Selling price per unit increases to $120 ...	_____

QS 18-17

Computing unit sales to get target income **C2**

Zulu sells its waterproof phone case for $90 per unit. Fixed costs total $200,000, and variable costs are $40 per unit. Compute the units that must be sold to get a target income of $216,000.

QS 18-18

Margin of safety in dollars and as a percent of sales **C2**

Zhao Co. has fixed costs of $354,000. Its single product sells for $175 per unit, and variable costs are $116 per unit. If the company expects sales of 10,000 units, compute its margin of safety (*a*) in dollars and (*b*) as a percent of expected sales.

QS 18-19

Target income **C2**

Zhao Co. has fixed costs of $354,000. Its single product sells for $175 per unit, and variable costs are $116 per unit. Compute the units that must be sold to achieve a target income of $118,000.

QS 18-20

Computing income from unit sales changes

C2

A manufacturer's contribution margin income statement for the year follows. Prepare a contribution margin income statement if the number of units sold (*a*) increases by 200 units and (*b*) decreases by 200 units.

Sales ($10 per unit × 10,000 units)	$100,000
Variable costs	60,000
Contribution margin	40,000
Fixed costs	30,000
Income	$ 10,000

QS 18-21

Sales mix and break-even **P3**

US-Mobile manufactures and sells two products, tablet computers (60% of sales) and smartphones (40% of sales). Fixed costs are $500,000, and the weighted-average contribution margin per unit is $125. How many units of each product are sold at the break-even point?

QS 18-22

Computing and analyzing operating leverage **A2**

Singh Co. reports a contribution margin of $960,000 and fixed costs of $720,000. (1) Compute its income. (2) Compute its degree of operating leverage. (3) If sales increase by 15%, what amount of income is expected?

QS 18-23[B]

Computing unit cost under absorption costing **P4**

Vintage Company reports the following information. Compute its product cost per unit under absorption costing.

Direct materials	$10 per unit	Variable overhead	$10 per unit
Direct labor	$20 per unit	Fixed overhead	$160,000 per year
Units produced	20,000 units		

QS 18-24[B]

Computing unit cost under variable costing **P4**

Refer to QS 18-23. Compute its product cost per unit under variable costing.

QS 18-25[B]

Variable costing income statement **P4**

Aces Inc., a manufacturer of tennis rackets, began operations this year. The company produced 6,000 rackets and sold 4,900. Each racket was sold at a price of $90. Fixed overhead costs are $78,000 for the year, and fixed selling and administrative costs are $65,200 for the year. The company also reports the following per unit variable costs for the year. Prepare an income statement under variable costing.

Direct materials	$12
Direct labor	8
Variable overhead	5
Variable selling and administrative expenses	2

QS 18-26[B]

Absorption costing income statement **P4**

Aces Inc., a manufacturer of tennis rackets, began operations this year. The company produced 6,000 rackets and sold 4,900. Each racket was sold at a price of $90. Fixed overhead costs are $78,000

for the year, and fixed selling and administrative costs are $65,200 for the year. The company also reports the following per unit variable costs for the year. Prepare an income statement under absorption costing.

Direct materials	$12
Direct labor	8
Variable overhead	5
Variable selling and administrative expenses	2

connect

EXERCISES

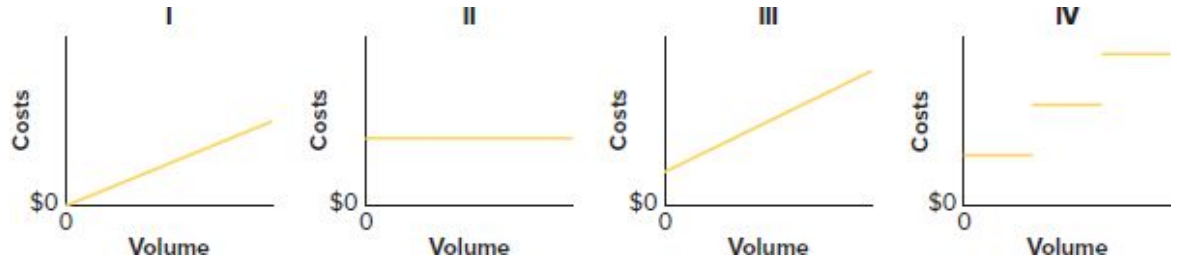
Exercise 18-1

Identifying cost type

C1

Following are four graphs representing various cost behaviors.

1. Identify whether the cost behavior in each graph is mixed, step-wise, fixed, or variable.
2. Identify the graph (I, II, III, or IV) that best illustrates the cost behavior for each of the following: (*a*) Factory policy requires one supervisor for every 10,000 units produced; (*b*) real estate taxes on factory; (*c*) electricity charge that includes the standard monthly charge plus a charge for each kilowatt hour; and (*d*) leather used in making shoes.



Exercise 18-2

Defining cost types

C1

Match each of the cost classifications *a* through *e* with its definition.

a. Total cost

b. Mixed cost

c. Variable cost

d. Step-wise cost

e. Fixed cost

1. The combined amount of all costs.

2. Remains constant over a relevant range of volume; when it reaches the end of its relevant range, it changes by a lump sum and remains at that level until it exceeds that relevant range.

3. Has a component that remains the same over all volume levels and another component that increases in direct proportion to increases in volume.

4. Remains constant over all volume levels within the relevant range.

5. Increases in direct proportion to increases in volume; its amount is constant for each unit produced.

Exercise 18-3

Identifying cost type

C1

Following are four series of costs measured at various volume levels. Identify each series as either fixed, variable, mixed, or step-wise. *Hint:* It can help to graph each cost series.

	A	B	C	D	E
	Volume (Units)	**Series A**	**Series B**	**Series C**	**Series D**
1	0	$ 0	$2,500	$1,000	$5,000
2	400	3,600	3,100	1,000	5,000
3	800	7,200	3,700	2,000	5,000
4	1,200	10,800	4,300	2,000	5,000
5	1,600	14,400	4,900	3,000	5,000
6	2,000	18,000	5,500	3,000	5,000
7	2,400	21,600	6,100	4,000	5,000

Excel:

Enter data

Select:

Insert

Charts

All Charts

Line

Exercise 18-4

Classifying costs

C1

Classify each of the following costs as either variable, fixed, or mixed. Costs are from a manufacturer of portable basketball hoops.

1. Factory supervisor salary, $4,000 per month
2. Utilities, $50 per month plus $0.05 per unit produced
3. Assembly worker hourly wages
4. Factory equipment depreciation, $2,000 per month
5. Salesperson pay, $2,000 per month plus 5% of dollar sales
6. Factory insurance, $1,500 per month
7. Screws to assemble hoops
8. Factory rent, $3,000 per month
9. Metal for rims
10. Glass for backboards
11. Office salaries, $3,000 per month
12. Plastic for hoop bases

Exercise 18-5

Measuring costs using high-low method

P1

Felix & Co. reports the following information. (1) Use the high-low method to estimate the fixed and variable components of total costs. (2) Estimate total costs if 3,000 units are produced.

Period	Units Produced	Total Costs	Period	Units Produced	Total Costs
1	0	$2,500	6	2,000	$5,500
2	400	3,100	7	2,400	6,100
3	800	3,700	8	2,800	6,700
4	1,200	4,300	9	3,200	7,300
5	1,600	4,900	10	3,600	7,900

Exercise 18-6[A]

Appendix: Measuring costs using regression **P1**

Refer to the information from Exercise 18-5. Use spreadsheet software to use ordinary least-squares regression to estimate the cost equation, including fixed and variable cost amounts.

Exercise 18-7

Contribution margin

A1

A jeans maker is designing a new line of jeans called Slams. Slams will sell for $205 per unit and cost $164 per unit in variable costs to make. Fixed costs total $60,000.

1. Compute the contribution margin per unit.
2. Compute the contribution margin ratio.
3. Compute income if 5,000 units are produced and sold.

Exercise 18-8

Computing missing amounts in contribution margin income statements

A1

Compute the missing amounts *a* through *j* for the contribution margin income statements below.

	Company A		Company B	
Number of units sold	*a*		1,975	
	Total	Per unit	Total	Per unit
Sales	$208,000	$65	*f*	*g*
Variable costs	150,400	*b*	$39,500	*h*
Contribution margin	*c*	*d*	43,450	*i*
Fixed costs	*e*		19,750	
Income	$ 46,400		*j*	

Exercise 18-9

Contribution margin and break-even **P2**

Sunn Co. manufactures a single product that sells for $180 per unit and whose variable costs are $135 per unit. The company's annual fixed costs are $562,500. Compute (*a*) contribution margin per unit, (*b*) contribution margin ratio, (*c*) break-even point in units, and (*d*) break-even point in dollars of sales.

Exercise 18-10

Income reporting and break-even analysis

P2

Sunn Co. manufactures a single product that sells for $180 per unit and whose variable costs are $135 per unit. The company's annual fixed costs are $562,500.

1. Prepare a contribution margin income statement at the break-even point.
2. If the company's fixed costs increase by $135,000, what amount of sales (in dollars) is needed to break even?

Exercise 18-11

Computing break-even units and sales **P2**

Hudson Co. reports the following contribution margin income statement. Compute (1) break-even point in units and (2) break-even point in sales dollars.

Contribution Margin Income Statement For Year Ended December 31	
Sales (9,600 units at $225 each)	$2,160,000
Variable costs (9,600 units at $180 each)	1,728,000
Contribution margin	432,000
Fixed costs	324,000
Income	$ 108,000

Exercise 18-12

Target income and margin of safety **C2**

Refer to the information in Exercise 18-11.

1. Assume Hudson has a target income of $162,000. What amount of sales dollars is needed to produce this target income?
2. If Hudson achieves its target income, what is its margin of safety (in percent)?

Exercise 18-13

Computing sales to achieve target income **C2**

Sunn Co. manufactures a single product that sells for $180 per unit and whose variable costs are $135 per unit. The company's annual fixed costs are $562,500. Management targets an annual income of $1,012,500. Compute the (1) unit sales to earn the target income and (2) dollar sales to earn the target income.

Exercise 18-14

Contribution margin income statement

C2

Sunn Co. manufactures a single product that sells for $180 per unit and whose variable costs are $135 per unit. The company's annual

fixed costs are $562,500. The sales manager predicts that next year's annual sales of the company's product will be 40,000 units at a price of $200 per unit. Variable costs are predicted to increase to $140 per unit, but fixed costs will remain at $562,500. What amount of income can the company expect to earn under these predicted changes? *Hint:* Prepare a contribution margin income statement as in Exhibit 18.19 for the next year.

Exercise 18-15

Predicting sales and variable costs using contribution margin **C2**

Bloom Company predicts it will incur fixed costs of $160,000 and earn income of $164,000 in the next period. Its expected contribution margin ratio is 25%. Compute the amounts of expected (1) total dollar sales and (2) total variable costs.

Exercise 18-16

Computing variable and fixed costs **C2**

Harrison Co. expects to sell 200,000 units of its product next year, which would generate total sales of $17,000,000. Management predicts that income for next year will be $1,250,000 and that the contribution margin per unit will be $25. Use this information to compute next year's expected (*a*) variable costs and (*b*) fixed costs.

Exercise 18-17

Evaluating strategies–advertising **C2**

Refer to the information in Exercise 18-11. The marketing manager believes that increasing advertising costs by $81,000 will increase the company's sales volume to 11,000 units. Prepare a contribution margin income statement for the next year assuming the company incurs the additional advertising costs.

Exercise 18-18

Evaluating strategies–price increase **C2**

Refer to the information in Exercise 18-11. If the company raises its selling price to $240 per unit, compute its (1) contribution margin per unit, (2) contribution margin ratio, (3) break-even point in units, and (4) break-even point in sales dollars.

Exercise 18-19

Evaluating strategies–new machine **C2**

Refer to the information in Exercise 18-11. The company is considering buying a new machine that will increase its fixed costs by $40,500 per year and decrease its variable costs by $9 per unit. Prepare a contribution margin income statement for the next year assuming the company purchases this machine.

Exercise 18-20

Computing income effects of different business strategies **C2**

A manufacturer's contribution margin income statement for the year follows. Prepare contribution margin income statements for each of the three separate cases below.

Contribution Margin Income Statement	
Sales (10,000 units × $10 per unit)	$100,000
Variable costs (10,000 units × $6 per unit)	60,000
Contribution margin (10,000 units × $4 per unit)	40,000
Fixed costs	30,000
Income	$ 10,000

1. The 10,000 units produced and sold increases to 10,400 units and fixed costs increase by $5,000.
2. Unit selling price decreases by 5% and units produced and sold increase by 8%. *Hint:* A unit increase has both a sales and costs impact.
3. Fixed costs increase by $20,000, variable costs per unit decrease by $2, and units produced and sold increase by 500.

Exercise 18-21

Predicting unit and dollar sales using contribution margin **C2**

Nombre Company management predicts $390,000 of variable costs, $430,000 of fixed costs, and income of $155,000 in the next period. Management also predicts that the contribution margin per unit will be $9. Compute the (1) total expected dollar sales for next period and (2) number of units expected to be produced and sold next period.

Exercise 18-22

CVP analysis with two products **P3**

Handy Home sells windows (80% of sales) and doors (20% of sales). The selling price of each window is $200 and of each door is $500. The variable cost of each window is $125 and of each door is $350. Fixed costs are $720,000. Compute (1) weighted-average contribution margin, (2) break-even point in units using the weighted-average contribution margin, and (3) number of units of each product that will be sold at the break-even point.

Exercise 18-23

CVP analysis with three products **P3**

R&R Tax Service offers tax and consulting services to individuals and small businesses. Data for fees and costs for three types of tax returns follow. Fixed costs total $18,000. Use this information to determine the (1) weighted-average contribution margin, (2) break-even point in units using the weighted-average contribution margin, and (3) number of units of each product that will be sold at the break-even point.

Type of Return	Sales Mix	Fee Charged	Variable Cost per Return
Easy.....	50%	$ 50	$ 30
Moderate.....	30%	125	75
Business	20%	275	100

Exercise 18-24

Computing and comparing operating leverage

A2

Information for two companies follows. (1) Compute the degree of operating leverage (DOL) for each company. (2) Which company is expected to produce a greater percent increase in income from a 20% increase in sales?

	Skittles Co.	Starburst Co.
Sales	$6,000,000	$4,500,000
Contribution margin	3,600,000	1,125,000
Fixed costs	2,600,000	375,000

Exercise 18-25

Computing and analyzing operating leverage

A2

Refer to the information in Exercise 18-11.

1. Compute the company's degree of operating leverage.
2. If sales decrease by 5% in the next year, what will be the company's income?
3. Prepare a contribution margin income statement for the next year assuming sales decrease by 5%.

Exercise 18-26[B]

Computing absorption costing income **P4**

A manufacturer reports the information below for three recent years. Compute income for each of the three years using absorption costing.

	Year 1	Year 2	Year 3
Variable costing income	$110,000	$114,400	$118,950
Beginning finished goods inventory (units)	0	1,200	700
Ending finished goods inventory (units)	1,200	700	800
Fixed overhead per unit	$2.50	$2.50	$2.50

PROBLEM SET A

Problem 18-1A

Measuring costs using high-low method **P1**

Alden Co.'s monthly data for the past year follow. Management wants to use these data to predict future variable and fixed costs.

Month	Units Sold	Total Cost	Month	Units Sold	Total Cost
1	320,000	$160,000	7	340,000	$220,000
2	160,000	100,000	8	280,000	160,000
3	280,000	220,000	9	80,000	64,000
4	200,000	100,000	10	160,000	140,000
5	300,000	230,000	11	100,000	100,000
6	200,000	120,000	12	110,000	80,000

Required

1. Estimate both the variable costs per unit and the total monthly fixed costs using the high-low method.
2. Use the answers for variable and fixed costs from part 1 to predict future total costs when sales volume is (*a*) 220,000 units and (*b*) 240,000 units.

Problem 18-2A

Contribution margin income statement and contribution margin ratio

A1

The following costs result from the production and sale of 1,000 drum sets manufactured by Tight Drums Company for the year ended December 31. The drum sets sell for $500 each.

Variable costs		Fixed costs	
Plastic for casing	$17,000	Taxes on factory	$ 5,000
Wages of assembly workers	82,000	Factory maintenance	10,000
Drum stands	26,000	Factory machinery depreciation	40,000
Sales commissions	15,000	Lease of equipment for sales staff	10,000
		Accounting staff salaries	35,000
		Administrative salaries	125,000

Required

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1. Prepare a contribution margin income statement for the year.
2. Compute contribution margin per unit and contribution margin ratio.

Analysis Component

3. For each dollar of sales, how much is left to cover fixed costs and contribute to income?

Problem 18-3A

Break-even analysis; income targeting and strategy

C2 A1 P2

Astro Co. sold 20,000 units of its only product and reported income of $25,000 for the current year. During a planning session for next year's activities, the production manager notes that variable costs can be reduced 40% by installing a machine that automates several operations. To obtain these savings, the company must increase its annual fixed costs by $241,000. The selling price per unit will not change.

Contribution Margin Income Statement For Year Ended December 31	
Sales ($50 per unit)	$1,000,000
Variable costs ($40 per unit)	800,000
Contribution margin	200,000
Fixed costs	175,000
Income	$ 25,000

Required

1. Compute the break-even point in dollar sales for next year assuming the machine is installed.
2. Prepare a contribution margin income statement for next year that shows the expected results with the machine installed. Assume sales are $1,000,000.
3. Compute the sales level required in both dollars and units to earn $208,000 of target income for next year with the machine installed.

Check (2) Income, $104,000

Problem 18-4A

Break-even analysis, different cost structures, and income calculations

C2 A1 P2

Henna Co. produces and sells two products, Carvings and Mementos. It manufactures these products in separate factories and markets them through different channels. They have no shared costs. This year, the company sold 50,000 units of each product. Income statements for each product follow.

	Carvings	Mementos
Sales	$2,000,000	$2,000,000
Variable costs	1,600,000	250,000
Contribution margin	400,000	1,750,000
Fixed costs	125,000	1,475,000
Income	$ 275,000	$ 275,000

Required

1. Compute the break-even point in dollar sales for each product.
2. Assume that the company expects sales of each product to decline to 30,000 units next year with no change in unit selling price. Prepare a contribution margin income statement for the next year (as shown above with columns for each of the two products).
3. Assume that the company expects sales of each product to increase to 60,000 units next year with no change in unit selling

price. Prepare a contribution margin income statement for the next year (as shown above with columns for each of the two products).

Check (3) Income: Carvings, $355,000; Mementos, $625,000

Analysis Component

4. If sales of each product decrease to 30,000 units, which product would experience a greater decrease in income?

Problem 18-5A

Contribution margin; income effects of alternative strategies

C2 A1 P2

Burchard Company sold 40,000 units of its only product for $25 per unit this year. Manufacturing and selling the product required $525,000 of fixed costs. Its per unit variable costs follow.

Direct materials	$8.00	Variable overhead costs	$1.00
Direct labor	5.00	Variable selling and administrative costs	0.50

For the next year, management will use a new material, which will reduce direct materials costs to $4.50 per unit and reduce direct labor costs to $2 per unit. Sales, total fixed costs, variable overhead costs per unit, and variable selling and administrative costs per unit will not change. Management is also considering raising its selling price to $30 per unit, which would decrease unit sales volume to 36,000 units.

page 734

Required

1. Compute the contribution margin per unit from (*a*) using the new material and (*b*) using the new material *and* increasing the selling price.

2. Prepare a contribution margin income statement for next year with two columns showing the expected results of (*a*) using the new material and (*b*) using the new material *and* increasing the selling price.

Analysis Component

3. Using answers to part 2, should management raise the selling price?

Problem 18-6A

Break-even analysis

P2

Praveen Co. manufactures and markets a number of rope products. Management is considering the future of Product XT, a special rope for hang gliding that has not been as profitable as planned. Because Product XT is manufactured and marketed independently of the other products, its total costs can be precisely measured. Next year's plans call for a $200 selling price per unit. Its fixed costs for the year are expected to be $270,000. Variable costs for the year are expected to be $140 per unit.

Required

1. Estimate Product XT's break-even point in terms of (*a*) sales units and (*b*) sales dollars.
2. Prepare a contribution margin income statement for Product XT at the break-even point.

Check (1*a*) Break-even sales, 4,500 units

Problem 18-7A

Break-even analysis with two products **P3**

Patriot Co. manufactures flags in two sizes, small and large. The company has total fixed costs of $240,000 per year. Additional data follow.

	Small	Large
Sales price per unit.	$20	$30
Variable costs per unit . . .	$13	$18
Sales mix percent	80%	20%

The company is considering buying new equipment that would increase total fixed costs by $48,000 per year *and* reduce the variable costs of each type of flag by $1 per unit.

Required

1. Compute the weighted-average contribution margin *without* the new equipment.
2. Assume the new equipment is *not* purchased. Determine the break-even point in total sales units and the break-even point in units for *each* product.
3. Assume the new equipment is purchased. Compute the break-even point in total sales units and the number of units to sell for *each* product.

PROBLEM SET B

Problem 18-1B

Cost estimation using high-low method **P1**

Sun Co.'s monthly data for the past year follow. Management wants to use these data to predict future variable and fixed costs.

Month	Units Sold	Total Cost	Month	Units Sold	Total Cost
1	195,000	$ 97,000	7 ...	145,000	$ 93,000
2	125,000	87,000	8 ...	185,000	105,000
3	105,000	73,000	9 ...	135,000	85,000
4	155,000	89,000	10 ...	85,000	58,000
5	95,000	81,000	11 ...	175,000	95,000
6	215,000	110,000	12 ...	115,000	79,000

Required

1. Estimate both the variable costs per unit and the total monthly fixed costs using the high-low method.
2. Use the answers for variable and fixed costs from part 1 to predict future total costs when sales volume is (*a*) 100,000 units and (*b*) 170,000 units.

Analysis Component

3. Use these data to prepare a scatter diagram. Draw an estimated line of cost behavior and determine whether the cost appears to be variable, fixed, or mixed.

Problem 18-2B

Contribution margin income statement and contribution margin ratio

A1

The following costs result from the production and sale of 12,000 LEGO sets manufactured by LEGO Company for the year ended December 31. The LEGO sets sell for $20 each.

Variable costs		Fixed costs	
Plastic for LEGO sets	$ 3,000	Rent on factory	$ 6,750
Wages of assembly workers	30,000	Factory cleaning service	4,520
Labeling	3,000	Factory machinery depreciation	20,000
Sales commissions	6,000	Lease of office equipment	1,050
		Office staff salaries	15,000
		Administrative salaries	120,000

Required

1. Prepare a contribution margin income statement for the year.
2. Compute contribution margin per unit and contribution margin ratio.

Analysis Component

3. For each dollar of sales, how much is left to cover fixed costs and contribute to income?

Problem 18-3B

Break-even analysis; income targeting and strategy

C2 A1 P2

Rivera Co. sold 20,000 units of its only product and reported income of $20,000 for the current year. During a planning session for next year's activities, the production manager notes that variable costs can be reduced 25% by installing a machine that automates several

operations. To obtain these savings, the company must increase its annual fixed costs by $113,000. The selling price will not change.

Contribution Margin Income Statement For Year Ended December 31	
Sales (20,000 × $37.50 per unit)	$750,000
Variable costs (20,000 × $30 per unit)	600,000
Contribution margin	150,000
Fixed costs	130,000
Income	$ 20,000

Required

1. Compute the break-even point in dollar sales for next year assuming the machine is installed.
2. Prepare a contribution margin income statement for next year that shows the expected results with the machine installed. Assume sales are $750,000.
3. Compute the sales level required in both dollars and units to earn $87,000 of target income for next year with the machine installed.

Check (2) Income, $57,000

Problem 18-4B

Break-even analysis, different cost structures, and income calculations

C2 A1 P2

Stam Co. produces and sells two products, BB and TT. It manufactures these products in separate factories and markets them through different channels. They have no shared costs. This year, the company sold 50,000 units of each product. Income statements for each product follow.

	Product BB	Product TT
Sales	$800,000	$800,000
Variable costs	560,000	100,000
Contribution margin	240,000	700,000
Fixed costs	100,000	560,000
Income	$140,000	$140,000

Required

1. Compute the break-even point in dollar sales for each product.
2. Assume that the company expects sales of each product to decline to 33,000 units next year with no change in the unit selling price. Prepare a contribution margin income statement for the next year (as shown above with columns for each of the two products).
3. Assume that the company expects sales of each product to increase to 64,000 units next year with no change in the unit selling prices. Prepare a contribution margin income statement for the next year (as shown above with columns for each of the two products).

Check (2) Income: BB, $58,400; TT, $(98,000)

Analysis Component

4. If sales of each product increase to 64,000 units, which product would experience a greater increase in income? Explain.

Problem 18-5B

Contribution margin; income effects of alternative strategies

C2 A1 P2

Connor Company sold 30,000 units of its only product for $28 per unit this year. Manufacturing and selling the product required $225,000 of fixed costs. Its per unit variable costs follow.

Direct materials	$10	Variable overhead costs	$2
Direct labor	6	Variable selling and administrative costs	1

For the next year, management will use a new material, which will reduce direct materials costs to $8 per unit and reduce direct labor costs to $5 per unit. Sales, total fixed costs, variable overhead costs per unit, and variable selling and administrative costs per unit will not change. Management is also considering raising its selling price to $30 per unit, which would decrease unit sales volume to 25,000 units.

Required

1. Compute the contribution margin per unit from (*a*) using the new material and (*b*) using the new material *and* increasing the selling price.
2. Prepare a contribution margin income statement for next year with two columns showing the expected results of (*a*) using the new material and (*b*) using the new material *and* increasing the selling price.

Analysis Component

3. Using answers to part 2, should management raise the selling price?

Problem 18-6B

Break-even analysis

P2 P3

Hip-Hop Co. manufactures and markets several products. Management is considering the future of one product, electronic keyboards, that has not been as profitable as planned. Because this product is manufactured and marketed independently of the other products, its total costs can be precisely measured. Next year's plans call for a $350 selling price per unit. Fixed costs for the year are expected to be $42,000. Variable costs for the year are expected to be $210 per unit.

Required

1. Estimate the keyboards' break-even point in terms of (*a*) sales units and (*b*) sales dollars.
2. Prepare a contribution margin income statement for keyboards at the break-even point.
3. Prepare a CVP chart for keyboards like that in Exhibit 18.14. Use 700 keyboards as the maximum number of sales units on the horizontal axis of the graph and $250,000 as the maximum dollar amount on the vertical axis.

Check (1) Break-even sales, 300 units

Problem 18-7B

Break-even analysis with two products

P3

Milano Co. manufactures backpacks in two sizes, small and large. The company has total fixed costs of $520,000 per year. Additional data follow.

	Small	Large
Sales price per unit.	$60	$80
Variable costs per unit . . .	$30	$60
Sales mix percent	60%	40%

The company is considering buying new equipment that would increase total fixed costs by $50,000 per year *and* reduce the variable costs of each type of backpack by $4 per unit.

Required

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1. Compute the weighted-average contribution margin *without* the new equipment.
2. Assume the new equipment is *not* purchased. Determine the break-even point in total sales units and the break-even point in units for *each* product.
3. Assume the new equipment is purchased. Compute the break-even point in total sales units and the number of units to sell for each product.

SERIAL PROBLEM

Business Solutions **P3**

This serial problem began in Chapter 1 and continues through most of the book. If previous chapter segments were not completed, the serial problem can begin at this point.

SP 18 Business Solutions sells upscale modular desk units (60% of sales) and office chairs (40% of sales). Selling prices are $1,250 per

desk unit and $500 per chair. Variable costs are $750 per desk unit and $250 per chair. Fixed costs are $120,000.

Required

1. Compute the weighted-average contribution margin.
2. Compute the break-even point in units.
3. Compute the number of units of each product that would be sold at the break-even point.

Alexander Image/Shutterstock

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA 18-1 Quick Study, Computing contribution margin and break-even, **A1**, **P1**—similar to QS 18-8 and QS 18-9.

Tableau DA 18-2 Exercise, Computing break-even, target income, and margin of safety, **C2**—similar to Exercise 18-11, Exercise 18-12, and Exercise 18-13.

Tableau DA 18-3 Mini-case, Evaluating strategies, **C2**—similar to Exercise 18-17, Exercise 18-19, and Exercise 18-20.

Accounting Analysis connect

COMPANY ANALYSIS

A2

APPLE

AA 18-1 **Apple** offers extended service contracts that provide repair coverage for its products. Assume its repair division reports the following annual results.

Sales (60,000,000 units × $72 per unit)	$4,320,000,000
Variable costs (60,000,000 units × $32 per unit)	1,920,000,000
Contribution margin	2,400,000,000
Fixed costs	2,000,000,000
Income	$ 400,000,000

Required

1. Compute the repair division's degree of operating leverage.
2. Compute the amount of repair division income if unit sales increase by 8%.

COMPARATIVE ANALYSIS

A2

APPLE

GOOGLE

AA 18-2 Both **Apple** and **Google** sell electronic devices, and each of these companies has a different product mix. Assume the following data are available for both companies.

$ millions	Apple	Google
Sales	$260,174	$161,857
Variable costs	122,034	86,302
Fixed costs	82,884	41,212

Required

page 738

1. Compute income for each company.
2. Compute the degree of operating leverage for each company.

3. If unit sales decline, which company would experience the larger decline in income?

EXTENDED ANALYSIS

A2

AA 18-3 Assumed data for **Samsung** and **Apple** follow.

$ millions	Samsung	Apple
Contribution margin	$74,612	$138,140
Income	18,653	55,256

Required

1. Compute the degree of operating leverage for each company.
2. Based on the degree of operating leverage, which company's income will increase more from an increase in unit sales?

Discussion Questions

1. What is a variable cost? Identify two variable costs.
2. When output volume increases, do variable costs per unit increase, decrease, or stay the same within the relevant range of activity? Explain.
3. When output volume increases, do fixed costs per unit increase, decrease, or stay the same within the relevant range of activity? Explain.
4. What four inputs are needed in cost-volume-profit analysis?
5. What is a mixed cost? Provide an example.
6. Define and describe *contribution margin per unit*.
7. Define and explain the *contribution margin ratio*.
8. Identify two ways in which a contribution margin income statement differs in format from a traditional income statement.

9. In performing CVP analysis for a manufacturing company, what simplifying assumption is usually made about the volume of production and the volume of sales?

10. What is margin of safety?

11. What is the relevant range of operations? How is it important in CVP analysis?

12. List three methods to measure cost behavior.

13. How is a scatter diagram used to identify and measure the behavior of a company's costs?

14. In cost-volume-profit analysis, what is the estimated income at the break-even point?

15. CVP analysis relies on what four assumptions?

16. Why are fixed costs shown as a horizontal line on a CVP chart?

17. What important assumption underlies *multiproduct* CVP analysis?

18. What is the degree of operating leverage? How is it computed?

19. **Apple** produces tablet computers. Identify some of the variable and fixed product costs associated with that production. *Hint:* Limit costs to product costs.

APPLE

20. Should **Apple** use single-product or multiproduct break-even analysis? Explain.

APPLE

21. **Samsung** is thinking of expanding sales of its most popular smartphone model by 65%. Should we expect its variable and fixed costs for this model to stay within the relevant range? Explain.

Samsung

22B. **Google** uses variable costing for several business decisions. How can variable costing income be converted to absorption

costing income?

GOOGLE

Beyond the Numbers

ETHICS CHALLENGE

C1

BTN 18-1 Labor costs of an auto repair mechanic are seldom based on actual hours worked. Instead, this labor cost is based on an industry average of time estimated to complete a repair job. This means a customer can pay, for example, $120 for two hours of work on a car when the actual time worked was only one hour. Many experienced mechanics can complete repair jobs faster than the industry average. Assume that you are asked to complete a survey on time spent to complete common repair jobs for a repair center. The survey calls for objective input, and many questions require detailed cost data and analysis. The mechanics and owners know you have the survey and encourage you to complete it in a way that increases the average billable hours for repair work.

Required

page 739

Write a one-page memorandum to the mechanics and owners that describes the direct labor analysis you will undertake in completing this survey.

COMMUNICATING IN PRACTICE

C2

BTN 18-2 Several important assumptions underlie CVP analysis. Assumptions often help simplify and focus our analysis of sales and costs. A common application of CVP analysis is as a tool to forecast sales, costs, and income.

Required

Assume that you are actively searching for a job. Prepare a half-page report identifying (1) three assumptions relating to your expected revenue (salary) and (2) three assumptions relating to your

expected costs for the first year of your new job. Be prepared to discuss your assumptions in class.

TEAMWORK IN ACTION

C2

BTN 18-3 A local movie theater owner explains to you that ticket sales on weekends and evenings are strong, but attendance during the weekdays, Monday through Thursday, is poor. The owner proposes to offer a contract to the local grade school to show educational materials at the theater for a set charge per student during school hours. The owner asks your help to prepare a CVP analysis listing the cost and sales projections for the proposal. The owner must propose to the school's administration a charge per child. At a minimum, the charge per child needs to be sufficient for the theater to break even.

Required

Your team is to prepare two separate lists of questions that enable you to complete a reliable CVP analysis of this situation. One list is to be answered by the school's administration, the other by the owner of the movie theater.

ENTREPRENEURIAL DECISION

C1 A1

BTN 18-4 **SmartSweets**, launched by entrepreneur Tara Bosch as described in this chapter's opener, makes gummy candy without sugar and from all-natural ingredients.

Required

1. Identify at least two fixed costs that do not change regardless of how much candy Tara's company sells.
2. SmartSweets is growing. How could overly optimistic sales estimates hurt Tara's business?
3. Explain how cost-volume-profit analysis can help Tara manage her company.

19 Variable Costing and Analysis

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Chapter Preview

VARIABLE COSTING AND ABSORPTION COSTING

P1 Variable costing

Absorption costing

Computing unit cost

NTK 19-1

INCOME REPORTING

P2 Production = sales

Production > sales

Production < sales

Reporting summary

NTK 19-2

PRODUCTION AND PRICING

C1 Planning production

P3 Setting target prices and analyzing special orders

Variable costing for services

A1 Contribution margin ratio

A2 *Appendix:* Converting income

NTK 19-3

Learning Objectives

CONCEPTUAL

C1 Describe how absorption costing can result in overproduction.

ANALYTICAL

A1 Apply contribution margin ratio for business decisions.

A2 *Appendix 19A*—Convert income under variable costing to income under absorption costing.

PROCEDURAL

P1 Compute unit cost under both absorption and variable costing.

P2 Prepare and analyze an income statement using absorption costing and using variable costing.

P3 Determine product selling price and analyze special orders.

Da Bomb!

“Make it more fun!”—**Caroline and Isabel Bercaw**

EDINA, MN—Sisters Caroline and Isabel Bercaw were bored. So, they made *bath bombs*. “We wanted ours to be more fun,” recalls Caroline. Their creation was bath bombs that reveal a surprise after dissolving—charms, jewelry, and toys.

Consumers noticed. “We sold out on our first day,” says Isabel. “We made more and those sold out the next day.” Their idea turned into their company, **Da Bomb** (**DaBombFizzers.com**).

“We use only a few ingredients, and we handmake everything in our own production facility,” explains Caroline. They control product quality, packaging, and distribution. They also set up an accounting system to measure and track costs and income.

The sisters now produce about 700,000 bath bombs per month. To get there, they had to answer questions such as: “Should we take an order five-times our normal volume?” They also moved production out of their basement into a large manufacturing facility. This increased fixed costs. The sisters explain that understanding variable and fixed costs is key to know how income changes with production and sales changes.

With Mom, Dad, and brother Harry pitching in, Da Bomb is flying high. “Our family makes a great team,” says Isabel. Adds Caroline, “You are never too young, or too old, to accomplish something.”

Renee Jones Schneider/Minneapolis Star Tribune/ZUMA Wire/Alamy Live News

Sources: *Da Bomb website*, January 2021; *Business News Daily*, November 2017; *Edina Magazine*, May 2018; *UPS Longitudes*, May 2019

INTRODUCING VARIABLE COSTING AND ABSORPTION COSTING

P1

Compute unit cost under both absorption and variable costing.

This chapter illustrates and compares two costing methods.

- **Variable costing** adds together direct materials, direct labor, and *variable* overhead costs in product costs. This method is useful for many managerial decisions, but it cannot be used for external financial reporting.
- **Absorption costing** adds together direct materials, direct labor, and both *variable* and *fixed* overhead costs in product costs. This method is required for external financial reporting under GAAP, but it can result in misleading product cost information and poor managerial decisions.

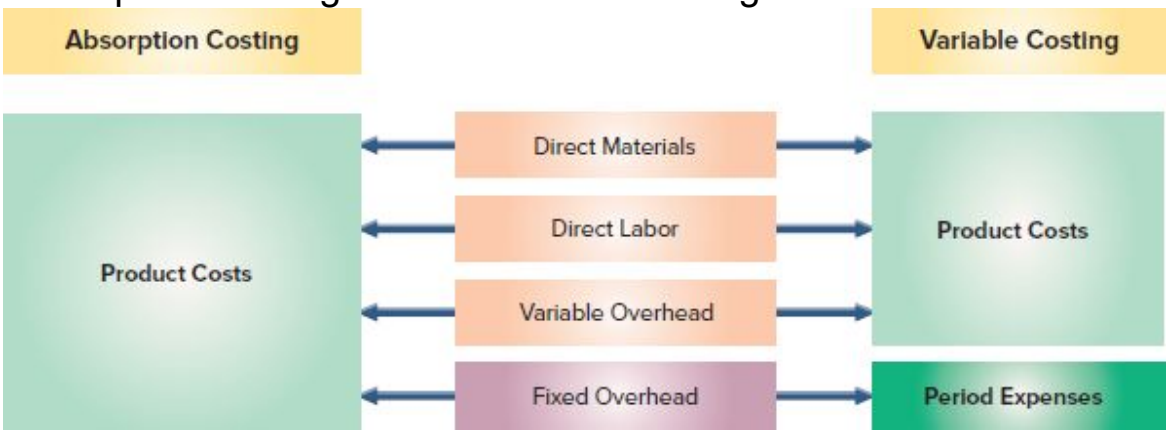
Exhibit 19.1 compares the absorption and variable costing methods. Both methods include direct materials, direct labor, and variable overhead in product costs. The key difference is their reporting of

fixed overhead costs. Fixed overhead costs are included in product costs under absorption costing but included in period expenses under variable costing. Product costs are included in inventory until the goods are sold, at which time they are included in cost of goods sold. Period expenses are reported as expenses immediately in the period in which they are incurred.

Point: Under variable costing, fixed overhead is expensed when units are produced. Under absorption costing, fixed overhead is expensed when units are sold (as part of cost of goods sold).

EXHIBIT 19.1

Absorption Costing versus Variable Costing



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Computing Unit Product Cost

To demonstrate the difference between absorption costing and variable costing, consider the product cost data in Exhibit 19.2 from IceAge, a skate manufacturer.

EXHIBIT 19.2

Product Cost Data

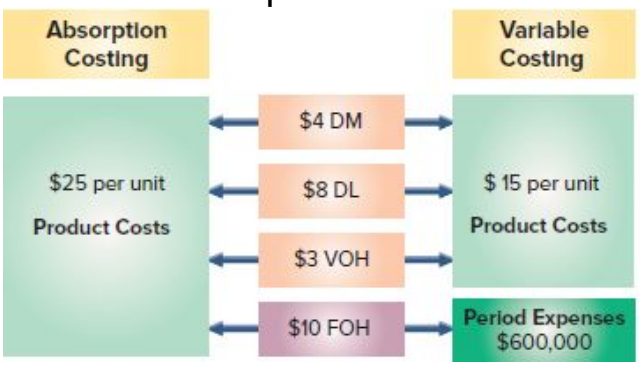
Direct materials	$4 per unit	Variable overhead	$3 per unit
Direct labor	$8 per unit	Fixed overhead	$600,000 per year
Units produced (per year)	60,000 units		

Using the product cost data, Exhibit 19.3 shows the product cost per unit computations for both absorption and variable costing.

- For absorption costing, product cost per unit is $25. This consists of $4 in direct materials, $8 in direct labor, $3 in variable overhead, and $10 in fixed overhead ($600,000/60,000 units).
- For variable costing, product cost per unit is $15, which consists of $4 in direct materials, $8 in direct labor, and $3 in variable overhead. Fixed overhead costs of $600,000 are treated as a period cost and expensed in the period incurred. **The difference between the costing methods is fixed overhead is included in product costs for absorption costing.**

EXHIBIT 19.3

Unit Cost Computation



Product Cost per Unit	Absorption Costing	Variable Costing
Direct materials	$ 4	$ 4
Direct labor	8	8
Overhead costs		
Variable	3	3
Fixed	10	—
Total product cost per unit	$25	$15

NEED-TO-KNOW 19-1

Computing Product Cost per Unit

P1

A manufacturer reports the following data.

Direct materials	$6 per unit	Variable overhead	$11 per unit
Direct labor	$14 per unit	Fixed overhead	$680,000 per year
Units produced	20,000 units		

1. Compute total product cost per unit under absorption costing.
2. Compute total product cost per unit under variable costing.

Solution

Per Unit Costs	(1) Absorption Costing	(2) Variable Costing
Direct materials	$ 6	$ 6
Direct labor	14	14
Variable overhead	11	11
Fixed overhead ($680,000/20,000)	34	—
Total product cost per unit	$65	$31

Do More: Do More: QS 19-1, QS 19-2,QS 19-3, E 19-1, E 19-2

INCOME REPORTING

P2

Prepare and analyze an income statement using absorption costing and using variable costing.

The different treatment of fixed overhead costs leads to different product costs per unit under absorption and variable costing. This also impacts income reporting.

Below are data for IceAge Company. Assume its variable costs per unit, annual fixed costs, and sales price do not change.

Product Costs		Selling and Administrative Expenses	
Direct materials	$4 per unit	Variable	$2 per unit
Direct labor	$8 per unit	Fixed	$200,000 per year
Variable overhead	$3 per unit	**Sales**	
Fixed overhead	$600,000 per year	Sales price	$40 per unit

Sales and production information for IceAge follows. Units produced equal those sold for Year 1, but units produced exceed those sold for Year 2. Units produced are less than those sold for Year 3. IceAge began Year 1 with no units in beginning inventory.

	Units Produced	Units Sold	Units in Ending Inventory
Year 1	60,000	60,000	0
Year 2	60,000	40,000	20,000
Year 3	60,000	80,000	0

We prepare income statements for IceAge under absorption costing and under variable costing for each of these 3 years. We consider three cases: when units produced are equal to units sold; when units produced exceed units sold; when units produced are less than units sold. **Income differs between the costing methods when inventory levels change.** Inventory levels change when units produced do not equal units sold.

Units Produced Equal Units Sold

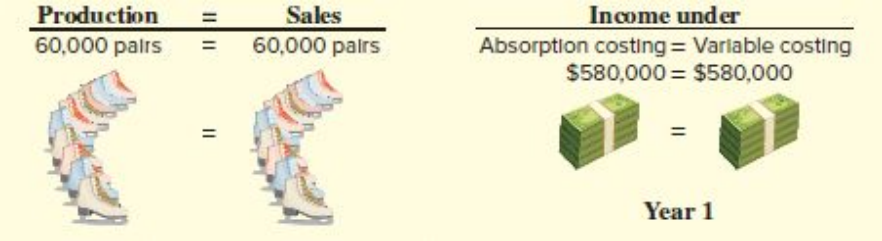


Exhibit 19.4 presents the Year 1 income statement for both costing methods. The income statement under variable costing (on right) is a **contribution margin income statement**. **Contribution margin** is sales minus variable costs. **Variable cost of goods sold** is the direct materials, direct labor, and variable overhead costs for units sold. The absorption costing income statement (on left) does not separate expenses into variable and fixed components.

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EXHIBIT 19.4

Income when Units Produced Equal Units Sold

ICEAGE COMPANY
Income Statement (Absorption Costing)
For Year Ended December 31, Year 1

Sales (60,000 × $40)	$2,400,000
Cost of goods sold (60,000 × $25[†])	1,500,000
Gross profit	900,000
Selling and administrative expenses [$200,000 + (60,000 × $2)]	320,000
Income	**$ 580,000**

[†]$4 DM + $8 DL + $3 VOH + $10 FOH
[‡]$4 DM + $8 DL + $3 VOH

ICEAGE COMPANY
Income Statement (Variable Costing)
For Year Ended December 31, Year 1

Sales (60,000 × $40)		$2,400,000
Variable expenses		
Variable cost of goods sold (60,000 × $15[‡])	$900,000	
Variable selling and administrative expenses (60,000 × $2)	120,000	1,020,000
Contribution margin		1,380,000
Fixed expenses		
Fixed overhead	600,000	
Fixed selling and administrative expenses	200,000	800,000
Income		**$ 580,000**

Exhibit 19.4 shows that **income is identical under absorption costing and variable costing when the units produced equal the units sold.** This is because the $600,000 fixed overhead (FOH) that is expensed under variable costing is equal to the $600,000 (60,000 units × $10 FOH per unit) that is included in cost of goods sold under absorption costing when units produced equal units sold.

Point: Contribution margin (Sales − Variable expenses) is different from gross profit (Sales − Cost of sales).

Units Produced Exceed Units Sold

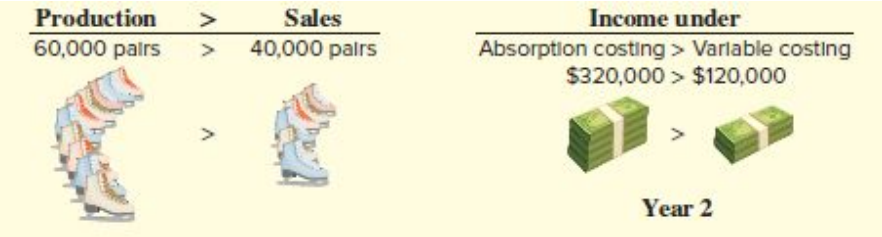

Exhibit 19.5 shows absorption costing and variable costing income statements for Year 2 when 60,000 units were produced, but only 40,000 units were sold. This means 20,000 units remain in ending inventory.

For Year 2, income is $320,000 under absorption costing. Under variable costing, income is $120,000. The cause of this $200,000 income difference is the different treatment of fixed overhead. The $600,000 of fixed overhead (FOH) is expensed under variable costing as a period cost, but under absorption costing the FOH is expensed based on the number of units sold (40,000 units × $10 FOH per unit). This means income is lower under variable costing by $200,000 (20,000 units × $10).

EXHIBIT 19.5

Income when Units Produced Exceed Units Sold

ICEAGE COMPANY Income Statement (Absorption Costing) For Year Ended December 31, Year 2	
Sales (40,000 × $40)	$1,600,000
Cost of goods sold (40,000 × $25†)	1,000,000
Gross profit	600,000
Selling and administrative expenses [$200,000 + (40,000 × $2)]	280,000
Income	**$ 320,000**

†$4 DM + $8 DL + $3 VOH + $10 FOH
‡$4 DM + $8 DL + $3 VOH

ICEAGE COMPANY Income Statement (Variable Costing) For Year Ended December 31, Year 2		
Sales (40,000 × $40)		$1,600,000
Variable expenses		
Variable cost of goods sold (40,000 × $15‡)	$600,000	
Variable selling and administrative expenses (40,000 × $2)	80,000	680,000
Contribution margin		920,000
Fixed expenses		
Fixed overhead	600,000	
Fixed selling and administrative expenses	200,000	800,000
Income		**$ 120,000**

When the number of units produced differs from the number of units sold, inventory levels change. The dollar amount for finished goods inventory reported on the balance sheet will also differ between absorption and variable costing. From Exhibit 19.3, product costs per unit are $25 under absorption costing and $15 per unit for variable costing. With 20,000 units in ending finished goods inventory (60,000 units produced − 40,000 units sold), the Year 2 inventory balances under each costing method follow. The $200,000 difference between the two methods is due to fixed overhead costs being included in finished goods inventory under absorption costing but not under variable costing. This $200,000 of fixed overhead cost is included in cost of goods sold under absorption costing only when that inventory is sold.

Year 2	Finished Goods Inventory
Absorption Costing (20,000 inventory units × $25 product cost)	$500,000
Variable Costing (20,000 inventory units × $15 product cost)	$300,000

Units Produced Are Less Than Units Sold

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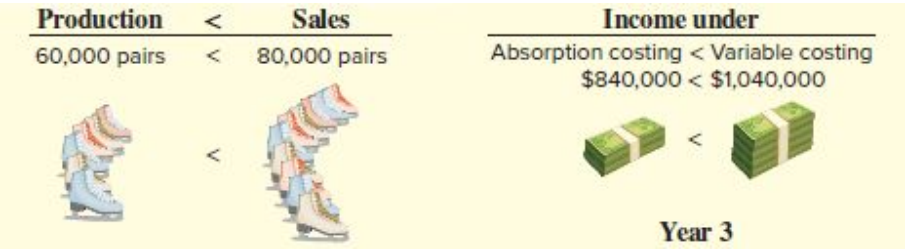

Exhibit 19.6 shows absorption costing and variable costing income statements for Year 3 when IceAge produced 60,000 units and sold 80,000 units. This means IceAge sold all that it produced in Year 3, and it sold the 20,000 units in beginning finished goods inventory. Its income is $840,000 using absorption costing, but it is $1,040,000 using variable costing.

EXHIBIT 19.6

Income when Units Produced Are Less Than Units Sold

ICEAGE COMPANY
Income Statement (Absorption Costing)
For Year Ended December 31, Year 3

Sales (80,000 × $40)	$3,200,000
Cost of goods sold (80,000 × $25[†])	2,000,000
Gross profit	1,200,000
Selling and administrative expenses [$200,000 + (80,000 × $2)]	360,000
Income	**$ 840,000**

[†]$4 DM + $8 DL + $3 VOH + $10 FOH
[‡]$4 DM + $8 DL + $3 VOH

ICEAGE COMPANY
Income Statement (Variable Costing)
For Year Ended December 31, Year 3

Sales (80,000 × $40)		$3,200,000
Variable expenses		
Variable cost of goods sold (80,000 × $15[‡])	$1,200,000	
Variable selling and administrative expenses (80,000 × $2)	160,000	1,360,000
Contribution margin		1,840,000
Fixed expenses		
Fixed overhead	600,000	
Fixed selling and administrative expenses	200,000	800,000
Income		**$1,040,000**

The $200,000 income difference is due to fixed overhead (FOH). Beginning inventory in Year 3 under absorption costing includes $200,000 of fixed overhead cost incurred in Year 2, which is included in cost of goods sold in Year 3 under absorption costing when the units are sold. When 80,000 units are sold in Year 3, total cost of goods sold under absorption costing is $2,000,000 (80,000 units × $25). Of this amount, $800,000 is FOH (80,000 units × $10), which consists of $600,000 from the current year and $200,000 from the prior year. However, variable costing reports $600,000 in FOH expenses as it has for all 3 years.

Summarizing Income Reporting

Units	Income Effect
Production = Sales	Absorption = Variable
Production > Sales	Absorption > Variable
Production < Sales	Absorption < Variable

IceAge's income reported under both variable costing and absorption costing for Year 1 through Year 3 is summarized in Exhibit 19.7. Total income is $1,740,000 for this time period for *both* methods. **Income under absorption costing and income under variable costing differ whenever the units produced differ from units sold.** These differences in income are due to the different timing with which fixed overhead costs are reported in income under the two methods. *Income under absorption costing is higher when more units are produced than sold and is lower when less units are produced than sold*.

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EXHIBIT 19.7

Summary of Income Reporting

	Units Produced	Units Sold	Income under Absorption Costing	Income under Variable Costing
Year 1	60,000	60,000	$ 580,000	$ 580,000
Year 2	60,000	40,000	320,000	120,000
Year 3	60,000	80,000	840,000	1,040,000
Totals	180,000	180,000	$1,740,000	$1,740,000

For IceAge, the 180,000 total units produced over the three-year period exactly equal the 180,000 units sold over that period. This means that the difference between *total* absorption costing income and *total* variable costing income for the three-year period is zero. In reality, production and sales quantities rarely exactly equal each other over a short period of time. We normally see differences in income for these two methods extending over several years.

NEED-TO-KNOW 19-2

Computing Income under Absorption and Variable Costing

P2

ZBest Mfg. began operations and reported the following for its year ended December 31.

Direct materials	$6 per unit	Units produced	20,000 units
Direct labor	$11 per unit	Units sold	14,000 units
Variable overhead	$3 per unit	Variable selling and administrative expenses	$2 per unit
Fixed overhead	$680,000 per year	Fixed selling and administrative expenses	$112,000 per year
Sales price	$80 per unit		

1. Prepare an income statement under absorption costing for the year ended December 31.
2. Prepare an income statement under variable costing for the year ended December 31.

Solution

ZBEST MFG.
Income Statement (Absorption Costing)
For Year Ended December 31

Sales (14,000 × $80)	$1,120,000
Cost of goods sold (14,000 × $54*)	756,000
Gross profit	364,000
Selling and administrative expenses [$112,000 + (14,000 × $2)]	140,000
Income	$ 224,000

*$6 DM + $11 DL + $3 VOH + $34 FOH ($680,000/20,000)
†$6 DM + $11 DL + $3 VOH

Do More: QS 19-4 through QS 19-9, E 19-7 through E 19-13

ZBEST MFG.
Income Statement (Variable Costing)
For Year Ended December 31

Sales (14,000 × $80)		$1,120,000
Variable expenses		
Variable cost of goods sold (14,000 × $20†)	$280,000	
Variable selling and admin. expenses (14,000 × $2)	28,000	308,000
Contribution margin		812,000
Fixed expenses		
Fixed overhead	680,000	
Fixed selling and administrative expenses	112,000	792,000
Income		$ 20,000

The $204,000 difference in income between the two methods is due to units produced exceeding units sold.

PRODUCTION AND PRICING

This section examines absorption and variable costing in the following business decisions.

- **Planning production**
- **Analyzing special orders**
- **Setting target prices**
- **Assessing costs for services**

Planning Production

C1

Describe how absorption costing can result in overproduction.

Many companies link manager bonuses to income computed under absorption costing because this is how income is reported to shareholders (per GAAP). This can lead some managers to overproduce and create excess inventory.

To illustrate how a bonus system can lead to overproduction under absorption costing, let's use IceAge's Year 1 data with one change: its manager decides to produce 100,000 units instead 60,000. Because only 60,000 units are sold, the 40,000 units of excess production will be in ending finished goods inventory. page 747

The left side of Exhibit 19.8 shows the $25 product cost per unit under absorption costing when 60,000 units are produced (same as Exhibit 19.3). The right side shows the $21 product cost per unit when 100,000 units are produced.

Total product cost per unit is $4 less when 100,000 units are produced. This is because the company is spreading the $600,000

fixed overhead cost over 40,000 more units when 100,000 units are produced than when 60,000 units are produced.

EXHIBIT 19.8

Unit Cost under Absorption Costing for Different Production Levels

Absorption Costing 60,000 Units Produced	Per Unit
Direct materials	$ 4
Direct labor	8
Variable overhead	3
Fixed overhead ($600,000/60,000 units)	10
Total product cost per unit	**$25**

Absorption Costing 100,000 Units Produced	Per Unit
Direct materials	$ 4
Direct labor	8
Variable overhead	3
Fixed overhead ($600,000/100,000 units)	6
Total product cost per unit	**$21**

The $4 per unit difference in product cost impacts income. Exhibit 19.9 shows the Year 1 income statement under absorption costing for the two production levels.

EXHIBIT 19.9

Income under Absorption Costing for Different Production Levels

ICEAGE COMPANY Income Statement (Absorption Costing) For Year Ended December 31, Year 1 [60,000 Units Produced; 60,000 Units Sold]	
Sales (60,000 × $40)	$2,400,000
Cost of goods sold (60,000 × $25)	1,500,000
Gross profit	900,000
Selling and administrative expenses [$200,000 + (60,000 × $2)]	320,000
Income	**$ 580,000**

ICEAGE COMPANY Income Statement (Absorption Costing) For Year Ended December 31, Year 1 [100,000 Units Produced; 60,000 Units Sold]	
Sales (60,000 × $40)	$2,400,000
Cost of goods sold (60,000 × $21)	1,260,000
Gross profit	1,140,000
Selling and administrative expenses [$200,000 + (60,000 × $2)]	320,000
Income	**$ 820,000**

Common sense suggests that overproducing and creating excess inventory should not increase income. Yet, income under absorption costing is $240,000 greater if IceAge produces 40,000 more units than it sells. The reason is that $240,000 of fixed overhead (40,000 units × $6) is included in ending inventory instead of being expensed as cost of goods sold in Year 1. This shows that under absorption costing, a manager can increase current year income just by producing more

and disregarding whether the excess units can be sold or not. This incentive problem encourages inventory buildup, which leads to increased costs in storage and obsolescence.

Karl Weatherly/The Image Bank Unreleased/Getty Images

This manager incentive problem is avoided when income is measured using variable costing. To illustrate, Exhibit 19.10 reports income under variable costing for the same production levels used in Exhibit 19.9. Under variable costing, managers cannot increase income by merely increasing production without increasing sales. Income under variable costing is not affected by production level changes because *all* fixed overhead costs are expensed in the year when incurred. Under variable costing, companies increase income by selling more units, not by producing excess inventory.

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EXHIBIT 19.10

Income under Variable Costing for Different Production Levels

ICEAGE COMPANY
Income Statement (Variable Costing)
For Year Ended December 31, Year 1
[60,000 Units Produced; 60,000 Units Sold]

Sales (60,000 × $40)		$2,400,000
Variable expenses		
Variable cost of goods sold (60,000 × $15)	$900,000	
Variable selling and administrative expenses (60,000 × $2)	120,000	1,020,000
Contribution margin		1,380,000
Fixed expenses		
Fixed overhead	600,000	
Fixed selling and administrative expenses	200,000	800,000
Income		**$ 580,000**

ICEAGE COMPANY
Income Statement (Variable Costing)
For Year Ended December 31, Year 1
[100,000 Units Produced; 60,000 Units Sold]

Sales (60,000 × $40)		$2,400,000
Variable expenses		
Variable cost of goods sold (60,000 × $15)	$900,000	
Variable selling and administrative expenses (60,000 × $2)	120,000	1,020,000
Contribution margin		1,380,000
Fixed expenses		
Fixed overhead	600,000	
Fixed selling and administrative expenses	200,000	800,000
Income		**$ 580,000**

Decision Ethics

Production Manager Due to competition, your company projects unit sales to be 35% less than last year. The CEO is concerned that top executives won't receive bonuses. The controller suggests that if the company produces as many units as last year, reported income might be high enough for bonuses to be paid. Should your company produce excess

inventory to maintain income? ■ *Answer:* Under absorption costing, fixed overhead costs are spread over all units produced. Thus, fixed cost for each unit will be lower if more units are produced. This means the company can increase income by producing excess units even if sales remain constant. But excess inventory leads to increased storage cost and obsolescence. Also, producing excess inventory to meet income levels for bonuses harms owners and is unethical.

Setting Target Price

P3

Determine product selling price and analyze special orders.

Over the long run, a product selling price must be high enough to cover all costs and provide an acceptable return to owners. For this purpose, *absorption* cost is useful because it reflects the full costs that a selling price must exceed for the company to be profitable. We use a three-step process to determine product selling price.

Step 1: Determine the product cost per unit using absorption costing.

Step 2: Determine the target *markup* on product cost per unit.

Step 3: Add the target markup to the product cost to find the target selling price.

To illustrate, under absorption costing, IceAge's product cost is $25 per unit (from Exhibit 19.3). IceAge's management determines a target **markup**, an amount added to cost, to cover selling and administrative expenses. IceAge targets a markup of 60% of absorption cost and computes a $40 target selling price in Exhibit 19.11.

EXHIBIT 19.11

Target Selling Price with Absorption Costing

Step 1	Absorption cost per unit (from Exhibit 19.3) . . .	$25
Step 2	Target markup per unit ($25 × 60%)	15
Step 3	Target selling price per unit	$40

Analyzing Special Orders

Over the long run, a selling price must cover all fixed and variable costs. Over the short run, fixed costs do not change with changes in production levels. This means that managers should accept special orders *if the special-order price exceeds variable cost*.

Steve Mason/Photodisc/Getty Images

To illustrate, let's return to IceAge. Its variable cost of goods sold per unit is $15 and its variable selling and administrative expenses are $2 per unit. Assume that it receives a special order for 1,000 pairs of skates at an offer price of $22 per pair from a foreign skating school. This special order will not affect IceAge's regular sales and it has excess capacity to fill the order.

Using absorption costing, the product cost of $25 per unit is more than the special-order price of $22 per unit. This might suggest that management should reject the order. Closer analysis shows this order should be accepted. The $22 special-order price exceeds the $17 *variable* cost ($15 + $2) of the product. Specifically, Exhibit 19.12 reveals that contribution margin (and income) would increase by $5,000 from accepting the order. The reason for accepting the special order is in the different behavior of variable and fixed costs. If the order is rejected, only variable costs are saved. Fixed costs do not change in the short run regardless of rejecting or accepting this order. Because sales exceed variable costs for this order, accepting the special order increases contribution margin.

Point: Fixed overhead does not increase from this special order because IceAge has excess capacity.

EXHIBIT 19.12

Contribution Margin for a Special Order

Special Order Analysis	
Sales (1,000 × $22)	$22,000
Variable costs (1,000 × $17)	17,000
Contribution margin	$ 5,000

Decision Maker

Internal Auditor Your company uses absorption costing. Management is disappointed because its external auditors are requiring it to write off an inventory amount because it exceeds what the company could reasonably sell in the foreseeable future. Why would management produce more than it sells? ■ *Answer:* If bonuses are tied to income, managers have incentives to increase income for personal gain. If absorption costing is used, management can reduce current-period expenses (and raise income) with overproduction, which shifts fixed production costs to future periods. This decision fails to consider whether there is a viable market for all units produced. An auditor can conclude that the inventory does not have "future economic value" and pressure management to write it off. Such a write-off reduces income by the cost of excess inventory.

Variable Costing for Services

Variable costing also applies to service companies. Because service companies do not produce inventory, differences in income from absorption and variable costing do not apply. Still, a focus on variable costs can be useful in managerial decisions for service firms.

For service firms, variable costs change as the volume of services provided change. Fixed costs do not change as the volume of services provided change. One example is a hotel receiving an offer to reserve a large block of rooms at a discounted price. Another example is "special-order" pricing for airlines when they sell tickets shortly before a flight at a deeply discounted price. If the discounted price exceeds variable costs, such sales increase contribution margin and income.

To illustrate, BlueSky provides charter airline services. Its variable costing income statement for the year is in Exhibit 19.13.

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EXHIBIT 19.13

Variable Costing Income Statement for Service Provider

Income Statement (Variable Costing) For Year Ended December 31		
Revenue (120 flights × $50,000 per flight)		$6,000,000
Variable expenses		
Wages, salaries, and benefits	$1,920,000	
Fuel and oil	1,080,000	
Food and beverages	600,000	3,600,000
Contribution margin		2,400,000
Fixed expenses		
Depreciation	300,000	
Rent	420,000	720,000
Income		$1,680,000

Based on an activity level of 120 flights (60% of its capacity), variable cost per flight is $30,000, computed as $3,600,000/120. BlueSky's normal price is $50,000 per flight. A group has offered BlueSky $35,000 to fly its members to Washington, D.C. In making its decision, BlueSky should *ignore fixed costs and focus on variable costs*. The company's expected contribution margin from the special offer follows. BlueSky should accept the special offer as it provides a contribution margin of $5,000. An incorrect analysis based on absorption costing might lead management to reject the offer.

Point: In a later chapter we look at special offers with incremental fixed costs. This chapter assumes no incremental fixed costs for special offers.

Special Offer Analysis	
Revenue	$35,000
Variable costs	30,000
Contribution margin	$ 5,000

NEED-TO-KNOW 19-3

Setting Target Prices and Analyzing a Special Offer

P3

Part 1. A manufacturer's absorption cost per unit is $60. Compute the target selling price per unit if a 30% markup is targeted.

Solution

Absorption cost per unit	$60
Target markup per unit ($60 × 30%)	18
Target selling price per unit	$78

Do More: QS 19-20, E 19-14

Part 2. A hotel normally rents its 200 luxury suites at a rate of $500 per night per suite. The hotel's cost per night per suite is $400, shown below.

Variable costs	$160
Fixed costs	240
Total cost per night per suite	$400

The hotel's manager has received an offer to reserve a block of 40 suites for $250 per suite for one night during the hotel's off-season, when it has many available suites. Should the offer be accepted or rejected? What is the contribution margin from accepting the offer?

Solution

page 751

Contribution margin from accepting the offer is $3,600. The offer should be accepted.

Special Offer Analysis	
Revenue (40 suites × $250)	$10,000
Variable costs (40 suites × $160)	6,400
Contribution margin	$ 3,600

Do More: QS 19-20, QS 19-21, E 19-17, E 19-18, E 19-19

CORPORATE SOCIAL RESPONSIBILITY

This chapter showed alternative ways to compute income. When businesses consider the effects of their operations on the environment, more ways to measure income emerge.

For example, **Puma**, a maker of athletic shoes and apparel, developed an **environmental profit and loss (EP&L) report,** or *EP&L report*. This report lists the impact on human welfare from PUMA's business activities in monetary terms. Profit is the monetary value of activities that benefit the environment, and loss is the monetary value of activities that harm the environment. While many companies measure and attempt to reduce their water usage, carbon emissions, and waste, PUMA takes the next step by putting environmental impacts into monetary terms.

Exhibit 19.14 shows one form of an EP&L report for PUMA. In this year, PUMA reported no profits from activities that benefited the environment, but it did report losses (costs) of several activities that harmed the environment.

EXHIBIT 19.14

Environmental Profit and Loss Report

Environmental Profit and Loss ($ millions)		
Environmental profits		$ 0
Environmental losses		
Water use	$47	
Carbon emissions	47	
Land use	37	
Air pollution	11	
Waste	3	145
Net environmental loss		$(145)

Putting environmental impacts into monetary terms enables companies to better grasp the effects of their activities. PUMA's net environmental loss from Exhibit 19.14, although not included in computing GAAP net income, was over 70% of income for that year. In addition, over 85% of the company's environmental costs are from suppliers and processors at early stages of the company's supply chain, and roughly 66% of its environmental costs are from its

footwear division. The EP&L report enables managers to develop strategies that are likely to have the greatest impact in reducing environmental costs.

Da Bomb, this chapter's opening company, is also concerned with the environment. Proceeds from the sale of its "Earth Bomb" go to organizations that help clean up oceans. Da Bomb has also created over 150 jobs in Caroline and Isabel's community.

Renee Jones Schneider/Minneapolis Star Tribune/ZUMA Wire/Alamy Live News

Decision Analysis ■■■ Contribution Margin Ratio

A1

Apply contribution margin ratio for business decisions.

Variable costing is useful in analyzing performance of business divisions such as sales territories and product lines. From the variable costing income statement, we compute the following **contribution margin ratio** for analysis purposes. Recall: Contribution margin = Sales − Variable expenses.

$$\text{Contribution margin ratio} = \frac{\text{Contribution margin}}{\text{Sales}}$$

Contribution margin ratio is the percent of sales that remains after subtracting variable expenses. For example, if contribution margin is $200,000 and sales are $500,000, the contribution margin ratio is 0.40 ($200,000/$500,000), or 40%. This means 40% of each sales dollar remains to cover fixed costs and contribute to income. A higher contribution margin ratio is better.

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Contribution Margin Analysis by Territory We return to Year 1 of our IceAge example to show the use of contribution margin ratio in

analyzing sales territories. IceAge has two sales territories, Western and Eastern, and each sells 30,000 units. A selling price of $40 per unit and a variable costs of goods sold of $15 per unit are the same in each territory. Variable selling and administrative expenses differ for the territories. Contribution margin ratio for each territory is in Exhibit 19.15.

EXHIBIT 19.15

Contribution Margin Ratio by Territory

	Western Territory		Eastern Territory	
Sales (30,000 × $40)		$1,200,000		$1,200,000
Variable expenses				
Variable cost of goods sold (30,000 × $15)	$450,000		$450,000	
Variable selling and admin. expenses (30,000 × $2.60; 30,000 × $1.40)	78,000	528,000	42,000	492,000
Contribution margin		$ 672,000		$ 708,000
Contribution margin ratio		56%		59%

Although sales and variable cost of goods sold are the same for the two territories, the contribution margin ratio is higher for the Eastern territory of 59% ($708,000/$1,200,000) than for the Western territory of 56%. This difference in contribution margin ratio is from higher variable selling and administrative expenses in the Western territory. Analysis of contribution margin ratio by sales territory can impact IceAge's business decisions such as:

- Reducing variable selling and administrative expenses in the Western territory.
- Increasing sales efforts in the Eastern territory.

Contribution Margin Analysis by Product Line We can also apply this analysis to IceAge's two product lines: hockey skates and figure skates. Units sold, selling prices per unit, and variable selling and administrative expenses per unit are the same for each product line, but variable cost of goods sold per unit is higher for figure skates. With this information we compute the contribution margin ratio by product line in Exhibit 19.16. Contribution margin ratio for hockey skates of 60% ($720,000/$1,200,000) is higher than that for figure skates of 55%. The difference in contribution margin ratio is due to higher variable cost of goods sold per unit for figure skates.

Analysis of contribution margin ratio by product line can impact managerial decisions such as:

- Increasing the selling price per unit for figure skates.
- Decreasing the variable cost of goods sold per unit for figure skates.
- Increasing sales efforts for hockey skates.

EXHIBIT 19.16

Contribution Margin Ratio by Product Line

	Hockey Skates		Figure Skates	
Sales (30,000 × $40)		$1,200,000		$1,200,000
Variable expenses				
Variable cost of goods sold (30,000 × $14; 30,000 × $16)	$420,000		$480,000	
Variable selling and administrative expenses (30,000 × $2)	60,000	480,000	60,000	540,000
Contribution margin		$ 720,000		$ 660,000
Contribution margin ratio		**60%**		**55%**

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NEED-TO-KNOW 19-4

COMPREHENSIVE

Product Cost per Unit and Income Reporting under Variable and Absorption Costing

Navarro Company began operations on January 1, Year 1. Cost and sales data for its first two years of operations are shown below.

Manufacturing costs		Production and sales	
Direct materials	$80 per unit	Units produced, Year 1	2,000 units
Direct labor	$120 per unit	Units sold, Year 1	1,900 units
Overhead costs		Units in ending inventory, Year 1	100 units
Variable	$30 per unit	Units produced, Year 2	2,000 units
Fixed	$140,000 per year	Units sold, Year 2	2,100 units
Selling and administrative expenses		Units in ending inventory, Year 2	0 units
Variable	$10 per unit	Sales price per unit	$500 per unit
Fixed	$81,000 per year		

Required

1. Compute product cost per unit under absorption costing and under variable costing.
2. Prepare an income statement for Year 1 under absorption costing and variable costing.
3. Prepare an income statement for Year 2 under absorption costing and variable costing.

SOLUTION

1.

Product Cost per Unit	Absorption Costing	Variable Costing
Direct materials	$ 80	$ 80
Direct labor	120	120
Overhead		
Variable	30	30
Fixed ($140,000 ÷ 2,000 units)	70	—
Total product cost per unit	$300	$230

2. Absorption costing income statement for Year 1.

Income Statement (Absorption Costing) For Year Ended December 31, Year 1	
Sales (1,900 × $500)	$950,000
Cost of goods sold (1,900 × $300)	570,000
Gross profit	380,000
Selling and administrative expenses [$81,000 + (1,900 × $10)]	100,000
Income	$280,000

Variable costing income statement for Year 1.

Income Statement (Variable Costing) For Year Ended December 31, Year 1		
Sales (1,900 × $500)		$950,000
Variable expenses		
Variable cost of goods sold (1,900 × $230)	$437,000	
Variable selling and administrative expenses (1,900 × $10)	19,000	456,000
Contribution margin		494,000
Fixed expenses		
Fixed overhead	140,000	
Fixed selling and administrative expenses	81,000	221,000
Income		$273,000

3. Absorption costing income statement for Year 2.

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Income Statement (Absorption Costing) For Year Ended December 31, Year 2	
Sales (2,100 × $500)	$1,050,000
Cost of goods sold (2,100 × $300)	630,000
Gross profit	420,000
Selling and administrative expenses [$81,000 + (2,100 × $10)]	102,000
Income	$ 318,000

Variable costing income statement for Year 2.

Income Statement (Variable Costing) For Year Ended December 31, Year 2		
Sales (2,100 × $500)		$1,050,000
Variable expenses		
Variable costs of goods sold (2,100 × $230)	$483,000	
Variable selling and administrative expenses (2,100 × $10)	21,000	504,000
Contribution margin		546,000
Fixed expenses		
Fixed overhead	140,000	
Fixed selling and administrative expenses	81,000	221,000
Income		$325,000

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APPENDIX

19A Converting Income from Variable Costing to Absorption Costing

A2

Convert income under variable costing to income under absorption costing.

Companies can use variable costing for *internal* reporting and business decisions, but they must use absorption costing for *external* reporting and tax reporting. For companies concerned about maintaining two costing systems, we can readily convert income under variable costing to income under absorption costing.

Income under variable costing is converted to income under absorption costing by adding the fixed overhead cost in ending finished goods (FG) inventory and subtracting the fixed overhead cost in beginning finished goods (FG) inventory. Exhibit 19A.1 shows this calculation.

EXHIBIT 19A.1

Formula to Convert Variable Costing Income to Absorption Costing

$$\text{Income under absorption costing} = \text{Income under variable costing} + \text{Fixed overhead in ending FG inventory*} - \text{Fixed overhead in beginning FG inventory*}$$

*Under absorption costing.

Exhibit 19A.2 shows the computations for IceAge. To convert variable costing income to absorption costing income for Year 2, add the fixed overhead in ending FG inventory. To restate variable costing income to absorption costing income for Year 3, subtract the fixed overhead in beginning FG inventory, which was incurred in Year 2 but expensed in the Year 3 cost of goods sold when the inventory was sold.

EXHIBIT 19A.2

Converting Variable Costing Income to Absorption Costing Income

	Year 1	Year 2	Year 3
Variable costing income (from Exhibit 19.7)	$580,000	$120,000	$1,040,000
Add: Fixed overhead in ending FG inventory (Yr 2: 20,000 × $10)	0	200,000	0
Less: Fixed overhead in beginning FG inventory (Yr 3: 20,000 × $10)	0	0	(200,000)
Absorption costing income	$580,000	$320,000	$ 840,000

Differences between absorption costing income and variable costing income are smaller when

- Fixed overhead is a small percentage of total manufacturing costs.
- Inventory levels are low, as with just-in-time systems.
- Inventory turnover is rapid. The more quickly inventory turns over, the greater proportion of product costs are included in cost of goods sold relative to that remaining in ending inventory.
- Period of analysis is long. Income differences between absorption costing and variable costing decrease as income is compared over longer periods.

Summary: Cheat Sheet

VARIABLE AND ABSORPTION COSTING

Absorption costing: Fixed overhead is in product costs.

Variable costing: Fixed overhead is in period expenses.

Product Cost per Unit	Absorption Costing	Variable Costing
Direct materials	$ 4	$ 4
Direct labor	8	8
Overhead costs		
Variable	3	3
Fixed	10	—
Total product cost per unit	$25	$15

INCOME REPORTING

General rule: When inventory levels *change:* Absorption costing income ≠ Variable costing income.

Units	Income Effect
Production = Sales	Absorption = Variable
Production > Sales	Absorption > Variable
Production < Sales	Absorption < Variable

Income Statement Formats:

Income Statement (Absorption Costing)	
Sales	$#
Cost of goods sold	#
Gross profit	#
Selling and administrative expenses	#
Income	$#

Income Statement (Variable Costing)		
Sales		$#
Variable expenses		
Variable cost of goods sold	$#	
Variable selling and admin. expenses	#	#
Contribution margin		#
Fixed expenses		
Fixed overhead	#	
Fixed selling and admin. expenses	#	#
Income		$#

PRODUCTION AND PRICING

Setting target price:

Step 1	Absorption cost per unit (from Exhibit 19.3)	$25
Step 2	Target markup per unit ($25 × 60%)	15
Step 3	Target selling price per unit	$40

Analyzing special orders:

Accept if: Price > Variable costs.

Example (per unit amounts): $22 special offer price for 1,000 units, $25 absorption cost; $17 variable cost.

Special Order Analysis	
Sales (1,000 × $22)	$22,000
Variable costs (1,000 × $17)	17,000
Contribution margin	$ 5,000

Contribution margin ratio:

$$\text{Contribution margin ratio} = \frac{\text{Contribution margin}}{\text{Sales}}$$

Convert income: Variable to Absorption costing

$$\text{Income under absorption costing} = \text{Income under variable costing} + \text{Fixed overhead in ending FG inventory*} - \text{Fixed overhead in beginning FG inventory*}$$

*Under absorption costing.

Key Terms

Absorption costing (also called **full costing)** (741)

Contribution margin (743)

Contribution margin income statement (743)

Contribution margin per unit (744)

Contribution margin ratio (751)

Environmental profit and loss (EP&L) report (751)

Markup (748)

Special order (749)

Variable costing (also called **direct** or **marginal costing**) (741)

Variable cost of goods sold (743)

Multiple Choice Quiz

Answer questions 1 and 2 using the following data.

Units produced	1,000
Variable costs	
Direct materials	$3 per unit
Direct labor	$5 per unit
Variable overhead	$3 per unit
Variable selling and administrative	$1 per unit
Fixed overhead	$3,000 total
Fixed selling and administrative	$1,000 total

1. Product cost per unit under absorption costing is
   - **a.** $11.
   - **b.** $12.
   - **c.** $14.
   - **d.** $15.
   - **e.** $16.
2. Product cost per unit under variable costing is
   - **a.** $11.
   - **b.** $12.
   - **c.** $14.
   - **d.** $15.
   - **e.** $16.
3. Under variable costing, which costs are included in product cost?
   - **a.** All variable product costs, including direct materials, direct labor, and variable overhead.
   - **b.** All variable and fixed product costs, including direct materials, direct labor, and both variable and fixed overhead.

c. All variable product costs except for variable overhead.

d. All variable and product costs, except for both variable and fixed overhead.

4. The difference between product cost per unit under absorption costing as compared to that under variable costing is

a. Direct materials and direct labor.

b. Fixed and variable portions of overhead.

c. Fixed overhead only.

d. Variable overhead only.

5. When production exceeds sales, which of the following is true?

a. No change occurs to inventories for either absorption costing or variable costing methods.

b. Use of absorption costing produces a higher income than the use of variable costing.

c. Use of absorption costing produces a lower income than the use of variable costing.

d. Use of absorption costing causes inventory value to decrease more than it would through the use of variable costing.

ANSWERS TO MULTIPLE CHOICE QUIZ

1. c; $14, computed as $3 + $5 + $3 + ($3,000⁄1,000 units).

2. a; $11, computed as $3 + $5 + $3 (consisting of all variable product costs).

3. a

4. c

5. b

[A]*Superscript letter A denotes assignments based on Appendix 19A.*

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use

different numbers, and instructors can turn this feature on or off.

connect

QUICK STUDY

QS 19-1

Computing unit cost under absorption costing

P1

Vintage Company reports the following information. Compute product cost per unit under absorption costing.

Direct materials	$10 per unit	Variable overhead	$10 per unit
Direct labor	$20 per unit	Fixed overhead	$160,000 per year
Units produced per year	20,000 units		

QS 19-2

Computing unit cost under variable costing **P1**

Refer to information in QS 19-1. Compute product cost per unit under variable costing.

QS 19-3

Classifying product and period costs

P1

Classify each of the costs below as either a product cost or a period cost under (*a*) absorption costing and (*b*) variable costing.

Cost	Amount	Absorption Costing	Variable Costing
Direct materials	$3 per unit		
Direct labor	$5 per unit		
Variable overhead	$2 per unit		
Fixed overhead	$200,000 per year		
Variable selling and administrative expenses	$0.50 per unit		
Fixed selling and administrative expenses	$100,000 per year		

QS 19-4

Variable costing income statement

P2

Aces Inc., a manufacturer of tennis rackets, began operations this year. The company produced 6,000 rackets and sold 4,900. Each racket was sold at a price of $90. Fixed overhead costs are $78,000 per year, and fixed selling and administrative costs are $65,200 per year. The company also reports the following per unit variable costs for the year. Prepare an income statement under variable costing.

Direct materials	$12
Direct labor	8
Variable overhead	5
Variable selling and administrative expenses	2

QS 19-5

Reporting inventory using variable costing

P2

Refer to information in QS 19-4. Compute the cost of ending finished goods inventory reported on the balance sheet using variable costing.

QS 19-6

Absorption costing income statement

P2

Aces Inc., a manufacturer of tennis rackets, began operations this year. The company produced 6,000 rackets and sold 4,900. Each racket was sold at a price of $90. Fixed overhead costs are $78,000 per year, and fixed selling and administrative costs are $65,200 per year. The company also reports the following per unit variable costs for the year. Prepare an income statement under absorption costing.

Direct materials	$12
Direct labor	8
Variable overhead	5
Variable selling and administrative expenses	2

QS 19-7

Reporting inventory using absorption costing

P2

Refer to the information in QS 19-6. Compute the cost of ending finished goods inventory reported on the balance sheet using absorption costing.

QS 19-8

Computing inventory under absorption and variable costing

P2

A manufacturer has 100 units in finished goods inventory at the end of the year. Using the per unit information below, compute the cost of finished goods inventory reported on the balance sheet under (*a*) absorption costing and (*b*) variable costing.

Direct materials	$20 per unit	Variable overhead	$8 per unit
Direct labor	$12 per unit	Fixed overhead	$10 per unit

QS 19-9

Computing gross profit under absorption costing

P2

Ramort Company reports the following for its single product. Ramort produced and sold 20,000 units this year. Compute gross profit under absorption costing.

Direct materials	$10 per unit
Direct labor	$12 per unit
Variable overhead	$3 per unit
Fixed overhead	$40,000 per year

Variable selling and administrative expenses	$2 per unit
Fixed selling and administrative expenses	$65,200 per year
Sales price	$60 per unit

QS 19-10

Absorption costing and overproduction **C1**

Refer to information in QS 19-9. Ramort doubles its production from 20,000 to 40,000 units while sales remain at the current 20,000 unit level. (*a*) Compute gross profit when production is 40,000 units under absorption costing. (*b*) What is the change in gross profit by increasing production from 20,000 units to 40,000 units under absorption costing?

QS 19-11

Computing contribution margin under variable costing **P2**

Refer to information in QS 19-9. Compute contribution margin for the company under variable costing.

QS 19-12

Variable costing and overproduction **C1**

Refer to information in QS 19-9. Ramort doubles its production from 20,000 to 40,000 units while sales remain at the current 20,000 unit level. (*a*) Compute contribution margin when production is 40,000 units under variable costing. (*b*) What is the change in contribution margin by increasing production from 20,000 units to 40,000 units under variable costing?

QS 19-13

Absorption costing and overproduction

C1

Under absorption costing, a company had the following per unit costs when 10,000 units were produced.

Direct materials	$ 3
Direct labor	2
Variable overhead	4
Fixed overhead ($50,000/10,000 units)	5
Total product cost per unit	$14

1. Compute total product cost per unit under absorption costing if instead 12,500 units are produced. Total fixed overhead remains at $50,000.
2. If units produced is greater than units sold, will cost of goods sold under absorption costing *increase* or *decrease*?

QS 19-14

Computing gross profit

P2

D'Souza Company sold 10,000 units of its product for $80 per unit. Cost of goods sold is $55 per unit. Variable selling and administrative expenses are $10 per unit. Compute gross profit under absorption costing.

QS 19-15

Computing contribution margin **P2**

D'Souza Company sold 10,000 units of its product for $80 per unit. Each unit had $40 in variable cost of goods sold and $10 in variable selling and administrative expenses. Compute contribution margin.

QS 19-16

Compute contribution margin **P2**

A manufacturer reports the following. Compute contribution margin.

Sales	$600,000
Variable cost of goods sold	200,000
Fixed overhead	160,000

Variable selling and administrative expenses	$70,000
Fixed selling and administrative expenses	50,000

QS 19-17

Compute contribution margin ratio **A1**

Refer to information in QS 19-16 and compute the contribution margin ratio.

QS 19-18

Comparing variable and absorption costing income **P2**

For each of the three independent cases below, determine whether absorption costing income will be greater than, less than, or equal to variable costing income.

	Case 1	Case 2	Case 3
Beginning inventory units	0	0	300
Units produced	1,000	1,400	1,300
Units sold	1,000	1,100	1,600

QS 19-19

Prepare absorption costing income statement **P2**

Diaz Company reports the following variable costing income statement for its only product. Sales total 50,000 units, but production was 80,000 units. Diaz had no beginning finished goods inventory. Prepare an absorption costing income statement.

Income Statement (Variable Costing)		
Sales (50,000 units × $60 per unit)		$3,000,000
Variable expenses		
Variable cost of goods sold (50,000 units × $28 per unit)	$1,400,000	
Variable selling and administrative expenses (50,000 units × $5 per unit)	250,000	1,650,000
Contribution margin		1,350,000
Fixed expenses		
Fixed overhead	320,000	
Fixed selling and administrative expenses	160,000	480,000
Income		$ 870,000

QS 19-20

Target pricing

P3

A manufacturer reports the following information. Compute the (*a*) total product cost per unit under absorption costing and (*b*) target selling price per unit under absorption costing.

Direct materials	$50 per unit	Fixed overhead	$2 per unit
Direct labor	$12 per unit	Target markup	40%
Variable overhead	$6 per unit		

QS 19-21

Analyze special order

P3

Li Company produces a product that sells for $84 per unit. The product cost per unit using absorption costing is $70. A customer contacts Li and offers to purchase 2,000 units of this product for $68 per unit. Variable costs of goods sold with this order would be $30 per unit, and variable selling and administrative costs would be $18 per unit. This special order would not require any additional fixed costs and Li has sufficient capacity to produce this special order without affecting regular sales.

(*a*) Compute contribution margin for this special order. (*b*) Should Li accept this special order?

QS 19-22

Contribution margin ratio by sales territory **A1**

Dane Co. reports the information below. (*a*) Compute the contribution margin ratio for each sales territory. (*b*) Which sales territory performed better based on contribution margin ratio?

	Northern Territory	Southern Territory
Sales	$1,000,000	$1,200,000
Contribution margin	400,000	540,000

QS 19-23[A]

Converting variable costing income to absorption costing income **A2**

Ming Company had income of $772,200 based on variable costing. Beginning and ending finished goods inventories were 7,800 units and 5,200 units, respectively. Assume the fixed overhead per unit was $3 for both the beginning and ending finished goods inventory. What is income under absorption costing?

QS 19-24[A]

Converting variable costing income to absorption costing income **A2**

Mortech had income of $250,000 based on variable costing. Beginning and ending finished goods inventories were 50,000 units and 48,000 units, respectively. Assume the fixed overhead per unit was $0.75 for both the beginning and ending finished goods inventory. What is income under absorption costing?

QS 19-25[A]

Converting variable costing income to absorption costing income **A2**

Hong Co. had income of $386,100 under variable costing. Beginning and ending finished goods inventories were 2,600 units and zero units, respectively. Fixed overhead cost was $4 per unit for the beginning finished goods inventory. What is income under absorption costing?

QS 19-26[A]

Converting variable costing income to absorption costing income **A2**

E-Com had income of $130,000 under variable costing. Beginning and ending finished goods inventories were zero units and 4,900 units, respectively. Fixed overhead cost was $2.50 per unit for the ending finished goods inventory. What is income under absorption costing?

QS 19-27[A]

Variable and absorption costing income **A2**

Alex Co. reports variable manufacturing costs of $120 per unit and fixed overhead of $10 per unit. The company produced 20,000 units and sold 18,000 units. The company had no beginning finished goods inventory. (*a*) Determine whether absorption costing income is greater than or less than variable costing income. (*b*) Compute the difference in income between absorption costing income and variable costing income.

QS 19-28[A]

Variable and absorption costing income **A2**

Zarne Co. reports variable manufacturing costs of $60 per unit and fixed overhead of $20 per unit. Beginning finished goods inventory under absorption costing is 500 units. The company produced 7,500 units and sold 8,000 units. (*a*) Determine whether absorption costing income is greater than or less than variable costing income. (*b*) Compute the difference in income between absorption costing income and variable costing income.

EXERCISES

Exercise 19-1

Computing unit and inventory costs under absorption costing

P1

Trio Company reports the following information for its first year of operations.

Direct materials	$15 per unit
Direct labor	$16 per unit
Variable overhead	$ 4 per unit
Fixed overhead	$160,000 per year

Units produced	20,000 units
Units sold	14,000 units
Ending finished goods inventory	6,000 units

1. Compute the product cost per unit using absorption costing.
2. Determine the cost of ending finished goods inventory using absorption costing.
3. Determine the cost of goods sold using absorption costing.

Exercise 19-2

Computing unit and inventory costs under variable costing **P1**

Refer to information in Exercise 19-1. Assume instead the company uses variable costing.

1. Compute the product cost per unit using variable costing.
2. Determine the cost of ending finished goods inventory using variable costing.
3. Determine the cost of goods sold using variable costing.

Exercise 19-3

Income statement under absorption costing and variable costing

P1 P2

Cool Sky reports the following for its first year of operations. The company produced 44,000 units and sold 36,000 units at a price of

$140 per unit.

Direct materials	$60 per unit
Direct labor	$22 per unit
Variable overhead	$8 per unit
Fixed overhead	$528,000 per year

Variable selling and administrative expenses	$11 per unit
Fixed selling and administrative expenses	$105,000 per year

1. Assume the company uses absorption costing. page 761
   a. Determine its total product cost per unit.
   b. Prepare its income statement for the year under absorption costing.
2. Assume the company uses variable costing.
   a. Determine its total product cost per unit.
   b. Prepare its income statement for the year under variable costing.

Check (1*a*) Absorption cost per unit, $102

Exercise 19-4

Computing cost per unit at different production levels

P1 P2

Barnes Co. reports the following for its product for its first year of operations. Compute total product cost per unit using absorption costing for the following production levels: (*a*) 2,000 units, (*b*) 2,400 units, and (*c*) 3,000 units.

Direct materials	$35 per unit
Direct labor	$25 per unit
Variable overhead	$10 per unit

Fixed overhead	$48,000 per year
Variable selling and administrative expenses	$3 per unit
Fixed selling and administrative expenses	$20,000 per year

Exercise 19-5

Computing gross profit at different production levels

P2

Refer to information in Exercise 19-4. The company sells its product for $150 per unit. Compute gross profit using absorption costing assuming the company (*a*) produces and sells 2,000 units and (*b*) produces 2,400 units and sells 2,000 units.

Exercise 19-6

Computing contribution margin at different production levels **P2**

Refer to information in Exercise 19-4. The company sells its product for $150 per unit. Compute contribution margin using variable costing assuming the company (*a*) produces and sells 2,000 units and (*b*) produces 2,400 units and sells 2,000 units.

Exercise 19-7

Income reporting under absorption costing and variable costing

P2

Sims Company began operations on January 1. Its cost and sales information for this year follow.

Direct materials	$40 per unit
Direct labor	$60 per unit
Variable overhead	$30 per unit
Fixed overhead	$7,000,000 per year

Variable selling and administrative expenses	$11 per unit
Fixed selling and administrative expenses	$4,250,000 per year
Units produced	100,000 units
Units sold	70,000 units
Sales price	$350 per unit

1. Prepare an income statement for the year using variable costing.
2. Prepare an income statement for the year using absorption costing.

Exercise 19-8

Variable costing income statement

P2

Kenzi, a manufacturer of kayaks, began operations this year. During this year, the company produced 1,050 kayaks and sold 800 at a price of $1,100 each. At year-end, the company reported the following income statement information using absorption costing.

Sales (800 × $1,100)	$880,000
Cost of goods sold (800 × $500)	400,000
Gross profit	480,000
Selling and administrative expenses	230,000
Income	$250,000

Additional Information

a. Product cost per kayak under absorption costing totals $500, which consists of $400 in direct materials, direct labor, and variable overhead costs and $100 in fixed overhead cost. Fixed overhead of $100 per unit is based on $105,000 of fixed overhead per year divided by 1,050 kayaks produced.

b. The $230,000 in selling and administrative expenses consists of $75,000 that is variable and $155,000 that is fixed.

Prepare an income statement for the current year under variable costing.

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Exercise 19-9

Absorption costing and variable costing income statements

P2

Rey Company's only product sells for $216 per unit. Data for its first year of operations follow. Prepare an income statement for the year assuming (*a*) absorption costing and (*b*) variable costing.

Direct materials	$20 per unit
Direct labor	$28 per unit
Variable overhead	$ 6 per unit
Fixed overhead	$160,000 per year

Variable selling and administrative expenses	$18 per unit
Fixed selling and administrative expenses	$200,000 per year
Units produced and sold	20,000 units

Exercise 19-10

Absorption costing income statement

P2

Hayek Bikes prepares the income statement under variable costing for its managerial reports, and it prepares the income statement under absorption costing for external reporting. For its first month of operations, 375 bikes were produced and 225 were sold. Income statement information under variable costing follows.

Sales (225 × $1,600)	$360,000
Variable cost of goods sold (225 × $625)	140,625
Variable selling and administrative expenses (225 × $65)	14,625
Contribution margin	204,750
Fixed overhead	56,250
Fixed selling and administrative expenses	75,000
Income	$ 73,500

Prepare the company's income statement under absorption costing.

Exercise 19-11

Absorption costing and variable costing income statements **P2**

Oak Mart, a producer of solid oak tables, reports the following data from its first year of business.

Sales price per unit	$320 per unit	Direct materials	$40 per unit
Units produced this year	117,000 units	Direct labor	$62 per unit
Units sold this year	117,000 units	Variable overhead	$28 per unit
Variable selling and administrative expenses	$12 per unit	Fixed overhead	$7,020,000 per year
Fixed selling and administrative expenses	$4,600,000 per year		

1. Prepare the current year income statement using variable costing.
2. Prepare the current year income statement using absorption costing.

Exercise 19-12

Prepare variable costing income statement **P2**

Dion Co. reports the absorption costing income statement below for May. The company began the month with no finished goods inventory. Dion produced 20,000 units, and 2,000 units remain in ending finished goods inventory for May. Fixed overhead was $50,000. Variable selling and administration expenses were $30,000 and fixed selling and administrative expenses were $10,000. Prepare an income statement using variable costing.

Sales (18,000 units)	$360,000
Cost of goods sold	300,000
Gross profit	60,000
Selling and administrative expenses	40,000
Income	$ 20,000

Exercise 19-13

Prepare absorption costing income statement **P2**

Trevor Co. reports the variable costing income statement below for June. The company began the month with no finished goods inventory. It produced 10,000 units in June, and 2,000 units remain in ending finished goods inventory. Prepare an income statement using absorption costing.

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Sales (8,000 units)		$320,000
Variable expenses		
Variable cost of goods sold	$225,000	
Variable selling and administrative expenses	35,000	260,000
Contribution margin		60,000
Fixed expenses		
Fixed overhead	8,000	
Fixed selling and administrative expenses	12,000	20,000
Income		$ 40,000

Exercise 19-14

Absorption costing and overproduction

C1

Jax Inc. reports the following data for its only product. The company had no beginning finished goods inventory and it uses absorption costing.

Sales price	$56.00 per unit
Direct materials	$9.00 per unit

Direct labor	$6.50 per unit
Variable overhead	$11.00 per unit
Fixed overhead	$720,000 per year

1. Compute gross profit assuming (*a*) 60,000 units are produced and 60,000 units are sold and (*b*) 80,000 units are produced and 60,000 units are sold.
2. By how much would the company's gross profit increase or decrease from producing 20,000 more units than it sells?

Exercise 19-15

Absorption costing and overproduction

C1

A manufacturer reports direct materials of $5 per unit, direct labor of $2 per unit, and variable overhead of $3 per unit. Fixed overhead is $120,000 per year, and the company estimates sales of 12,000 units at a sales price of $25 per unit for the year. The company has no beginning finished goods inventory.

1. If the company uses absorption costing, compute gross profit assuming (*a*) 12,000 units are produced and 12,000 units are sold and (*b*) 15,000 units are produced and 12,000 units are sold.
2. If the company uses variable costing, how much would contribution margin differ if the company produced 15,000 units instead of producing 12,000? Assume the company sells 12,000 units. *Hint:* Calculations are not required.

Exercise 19-16

Target pricing **P3**

Huds Inc. reports the information below on its product. The company uses absorption costing and has a target markup of 40% of absorption

cost per unit. Compute the target selling price per unit under absorption costing.

Direct materials	$100 per unit	Variable selling and administrative expenses	$3 per unit
Direct labor	$30 per unit	Fixed selling and administrative expenses	$120,000 per year
Variable overhead	$8 per unit	Units produced	50,000 units per year
Fixed overhead	$600,000 per year	Units sold	50,000 units per year

Exercise 19-17

Analyzing a special offer for a service company

P3

Grand Garden is a hotel with 150 suites. Its regular suite price is $250 per night per suite. The hotel's total cost per night is $140 per suite and consists of the following.

Variable cost	$110
Fixed cost	30
Total cost per night per suite	$140

The hotel manager receives an offer to hold the local Bikers' Club meeting at the hotel in March, which is the hotel's slow season with a low occupancy rate per night. The Bikers' Club would reserve 150 suites for one night if the hotel accepts a price of $125 per night. (*a*) What is the contribution margin from this special offer? (*b*) Should the Bikers' Club offer be accepted or rejected?

Exercise 19-18

Analyzing a special offer for a service company

P3

Empire Airlines reports the following cost data for the year. The company flew 100 private flights during the year. A group has offered Empire $11,000 for a private flight to Chicago for its members. (*a*) What is the contribution margin from accepting the offer? (*b*) Should the offer be accepted or rejected?

Revenue	$20,000 per flight
Wages, salaries, and benefits	$7,000 per flight
Fuel and oil	$4,500 per flight

Food and beverages	$500 per flight
Depreciation	$300,000 per year
Rent	$250,000 per year

Exercise 19-19

Analyzing a special offer for a service company

P3

MidCoast Airlines provides charter airplane services. In October, when the company is operating at 60% of its capacity, it receives a bid from the local college. The college is organizing a trip for a student group. The college budgeted only $30,000 for round-trip airfare. MidCoast Airlines normally charges between $50,000 and $60,000 for such service. MidCoast determines its total cost for the round-trip flight to Washington to be $45,000, which consists of the following.

Variable cost	$25,000
Fixed cost	20,000
Total cost	$45,000

Although the manager at MidCoast supports the college's educational efforts, she is struggling to justify accepting only $30,000. (*a*) What is the contribution margin from accepting the offer? (*b*) Should the airline accept the $30,000 offer from the college?

Exercise 19-20

Contribution margin ratio by sales territory

A1

Big Bikes manufactures and sells mountain bikes in two sales territories, West Coast and East Coast. Information for the year follows. The company sold 500 bikes in each territory.

Per unit	West Coast	East Coast
Sales price	$1,000	$960
Variable cost of goods sold	540	540
Variable selling and administrative expenses	120	60

a. Compute contribution margin (in dollars) for each sales territory.

b. Compute contribution margin ratio for each sales territory. Which sales territory has the better contribution margin ratio?

Exercise 19-21

Contribution margin ratio by product line

A1

Pro Bike manufactures and sells two types of bikes: road bikes and mountain bikes. The company sold 600 units of each type of bike during the year.

Per unit	Road bikes	Mountain bikes
Sales price	$1,200	$800
Variable cost of goods sold	840	480
Variable selling and administrative expenses	60	64

a. Compute contribution margin (in dollars) for each product.

b. Compute contribution margin ratio for each product. Which product has the better contribution margin ratio?

Exercise 19-22[A]

Converting variable costing income to absorption costing income

A2

A manufacturer reports the following information for the past three years. Compute income for each of the three years using absorption costing. *Hint:* Fixed overhead in inventory equals the FOH per unit x Units in inventory.

	Year 1	Year 2	Year 3
Variable costing income	$110,000	$114,400	$118,950
Beginning finished goods inventory (units)	0	1,200	700
Ending finished goods inventory (units)	1,200	700	800
Fixed overhead (FOH) per unit	$2.50	$2.50	$2.50

connect

PROBLEM SET A

Problem 19-1A

Variable costing income statement for two consecutive years

P2

Dowell Company produces a single product. Its income statements under absorption costing for its first two years of operation follow.

Income Statements (Absorption Costing)	Year 1	Year 2
Sales ($46 per unit)	$920,000	$1,840,000
Cost of goods sold ($31 per unit)	620,000	1,240,000
Gross profit	300,000	600,000
Selling and administrative expenses	170,000	220,000
Income	$130,000	$ 380,000

Additional information

a. Sales and production data for these first two years follow.

Units	Year 1	Year 2
Units produced	30,000	30,000
Units sold	20,000	40,000

b. Variable costs per unit and fixed costs per year are unchanged during these years. The company's $31 per unit product cost using absorption costing consists of the following.

Direct materials	$ 5
Direct labor	9
Variable overhead	7
Fixed overhead ($300,000/30,000 units)	10
Total product cost per unit	$31

c. Selling and administrative expenses consist of the following.

Selling and Administrative Expenses	Year 1	Year 2
Variable selling and administrative ($2.50 per unit sold)	$ 50,000	$100,000
Fixed selling and administrative	120,000	120,000
Total	$170,000	$220,000

Required

Prepare income statements for each of these two years under variable costing.

Problem 19-2A

Variable costing income statement

P2

Trez Company began operations this year. During this year, the company produced 100,000 units and sold 80,000 units. The absorption costing income statement for this year follows.

Income Statement (Absorption Costing)	
Sales (80,000 units × $50 per unit)	$4,000,000
Cost of goods sold	2,400,000
Gross profit	1,600,000
Selling and administrative expenses	530,000
Income	$1,070,000

Additional information

a. Selling and administrative expenses consist of $350,000 in annual fixed expenses and $2.25 per unit in variable selling and administrative expenses.

b. The company's product cost of $30 per unit consists of the following.

Direct materials	$5 per unit	Variable overhead	$2 per unit
Direct labor	$14 per unit	Fixed overhead ($900,000/100,000 units)	$9 per unit

Required

Prepare an income statement for the company under variable costing.

Problem 19-3A

page 766

Income reporting, absorption costing, and managerial ethics

C1

Blazer Chemical produces and sells an ice-melting granular used on roadways and sidewalks in winter. It annually produces and sells 20,000 tons of its granular. Because of this year's mild winter, projected demand for its product is only 15,000 tons. Based on projected production and sales of 15,000 tons, the company estimates the following income using absorption costing.

Sales (15,000 tons at $80 per ton)	$1,200,000
Cost of goods sold (15,000 tons at $60 per ton)	900,000
Gross profit	300,000
Selling and administrative expenses	300,000
Income	$ 0

Its product cost per ton follows and consists mainly of fixed overhead because its automated production process uses expensive equipment.

Direct materials	$13 per ton	Variable overhead	$3 per ton
Direct labor	$4 per ton	Fixed overhead ($600,000/15,000 tons)	$40 per ton

Selling and administrative expenses consist of variable selling and administrative expenses of $6 per ton and fixed selling and administrative expenses of $210,000 per year. The company's president will not earn a bonus unless a positive income is reported. The controller mentions that because the company has large storage capacity, it can report a positive income by setting production at the usual 20,000 ton level even though it expects to sell only 15,000 tons.

The president is surprised that the company can report income by producing more without increasing sales.

Required

1. (*a*) Prepare an income statement using absorption costing based on production of 20,000 tons and sales of 15,000 tons. (*b*) Can the company report a positive income by increasing production to 20,000 tons and storing the 5,000 tons of excess production in inventory?
2. By how much does income increase by when producing 20,000 tons and storing 5,000 tons in inventory compared to only producing 15,000 tons?

Problem 19-4A[A]

Converting variable costing income to absorption costing income

A2

Dowell Company produces a single product. Its income under variable costing for its first two years of operation follow.

Variable Costing Income	Year 1	Year 2
Income	$30,000	$480,000

Additional information

a. Sales and production data for these first two years follow.

Units	Year 1	Year 2
Units produced	30,000	30,000
Units sold	20,000	40,000

b. The company's $31 per unit product cost (for both years) using absorption costing consists of the following.

Direct materials	$ 5
Direct labor	9
Variable overhead	7
Fixed overhead ($300,000/30,000 units)	10
Total product cost per unit	$31

Required

page 767

Prepare a table as in Exhibit 19A.2 to convert variable costing income to absorption costing income for both years.

PROBLEM SET B

Problem 19-1B

Variable costing income statement for two consecutive years

P2

Zule Company produces a single product. Its income statements under absorption costing for its first two years of operation follow.

Income Statements (Absorption Costing)	Year 1	Year 2
Sales ($35 per unit)	$1,925,000	$2,275,000
Cost of goods sold ($26 per unit)	1,430,000	1,690,000
Gross profit	495,000	585,000
Selling and administrative expenses	365,000	395,000
Income	$ 130,000	$ 190,000

Additional information

a. Sales and production data for these first two years follow.

Units	Year 1	Year 2
Units produced	60,000	60,000
Units sold	55,000	65,000

b. Its variable costs per unit and fixed costs per year are unchanged during these years. Its $26 per unit product cost using absorption costing consists of the following.

Direct materials	$ 4
Direct labor	6
Variable overhead	8
Fixed overhead ($480,000/60,000 units)	8
Total product cost per unit	$26

c. Its selling and administrative expenses consist of the following.

Selling and Administrative Expenses	Year 1	Year 2
Variable selling and administrative ($3 per unit sold)	$165,000	$195,000
Fixed selling and administrative	200,000	200,000
Total	$365,000	$395,000

Required

Prepare income statements under variable costing for each of these two years.

Problem 19-2B

Variable costing income statement

P2

Lonte Company began operations this year. During this year, the company produced 300,000 units and sold 250,000 units. Its income statement under absorption costing for this year follows.

Income Statement (Absorption Costing)	
Sales (250,000 units × $18 per unit)	$4,500,000
Cost of goods sold	1,875,000
Gross profit	2,625,000
Selling and administrative expenses	2,200,000
Income	$ 425,000

Additional information

a. Selling and administrative expenses consist of $1,200,000 in annual fixed expenses and $4 per unit in variable selling and administrative expenses.

b. The company's product cost of $7.50 per unit consists of the following.

Direct materials	$2.00 per unit	Variable overhead	$1.60 per unit
Direct labor	$2.40 per unit	Fixed overhead ($450,000/300,000 units)	$1.50 per unit

Required

Prepare the company's income statement under variable costing.

Problem 19-3B

Income reporting, absorption costing, and managerial ethics

C1

Pool Pro produces and sells liquid chlorine for swimming pools. The company annually produces and sells 300,000 gallons of its chlorine. Because of this year's cool summer, projected demand for its product is only 250,000 gallons. Based on projected production and sales of 250,000 gallons, the company estimates the following income using absorption costing.

Sales (250,000 gallons at $8 per gallon)	$2,000,000
Cost of goods sold (250,000 gallons at $6.80 per gallon)	1,700,000
Gross profit	300,000
Selling and administrative expenses	300,000
Income	$ 0

Its product cost per gallon follows and consists mainly of fixed overhead because its automated production process uses expensive equipment.

Direct materials	$1.00 per gallon	Variable overhead	$0.40 per gallon
Direct labor	$0.60 per gallon	Fixed overhead ($1,200,000/250,000 gallons)	$4.80 per gallon

Selling and administrative expenses consist of variable selling and administrative expenses of $0.80 per gallon and fixed selling and administrative expenses of $100,000 per year. The company's president will not earn a bonus unless a positive income is reported. The controller suggests that because the company has large storage

capacity, it can report a positive income by setting its production at the usual 300,000 gallon level even though it expects to sell only 250,000 gallons. The president is surprised that the company can report income by producing more without increasing sales.

Required

1. (*a*) Prepare an income statement using absorption costing based on production of 300,000 gallons and sales of 250,000 gallons. (*b*) Can the company report positive income by increasing production to 300,000 gallons and storing the 50,000 gallons of excess production in inventory?
2. Should the company produce 300,000 gallons given that projected demand is 250,000 gallons? Explain, and refer to any ethical implications of such a managerial decision for income reporting.

Problem 19-4B[A]

Converting variable costing income to absorption costing income

A2

Zule Company produces a single product. Its income under variable costing for its first two years of operation follow.

Variable Costing Income	Year 1	Year 2
Income	$7,000	$113,000

Additional information

a. Sales and production data for these first two years follow.

Units	Year 1	Year 2
Units produced	60,000	60,000
Units sold	56,000	64,000

b. The company's $26 per unit product cost (for both years) using absorption costing consists of the following.

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Direct materials	$ 4
Direct labor	6
Variable overhead	8
Fixed overhead ($480,000/60,000 units)	8
Total product cost per unit	$26

Required

Prepare a table as in Exhibit 19A.2 to convert variable costing income to absorption costing income for both years.

SERIAL PROBLEM

Business Solutions

P2

Alexander Image/Shutterstock

This serial problem began in Chapter 1 and continues through most of the book. If previous chapter seg ments were not completed, the serial problem can begin at this point.

SP 19 Santana Rey expects sales of **Business Solutions'** line of computer workstation furniture to equal 300 workstations (at a sales price of $3,000 each) for 2021. The workstations' manufacturing costs include the following.

Direct materials.	$800 per unit	Variable overhead	$100 per unit
Direct labor	$400 per unit	Fixed overhead	$24,000 per year

Selling and administrative expenses for these workstations follow.

Variable	$50 per unit	Fixed	$4,000 per year

Santana is considering how many workstations to produce in 2021. She is confident that she will be able to sell any workstations in her 2021 ending inventory during 2022. However, Santana does not want to overproduce as she does not have sufficient storage space for many more workstations.

Required

1. Compute its income statement under absorption costing assuming
   a. 300 workstations are produced, and 300 workstations are sold.
   b. 320 workstations are produced, and 300 workstations are sold.
2. Compute its income statement under variable costing assuming
   a. 300 workstations are produced, and 300 workstations are sold.
   b. 320 workstations are produced, and 300 workstations are sold.
3. Reviewing results from parts 1 and 2, which costing method, absorption or variable, yields the higher income when 320 workstations are produced and 300 are sold?

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA 19-1 Quick Study, Computing unit and inventory costs under absorption costing, **P1**—similar to QS 19-1 and Exercise

19-1.

Tableau DA 19-2 Exercise, Computing unit and inventory costs under variable costing, **P1**—similar to QS 19-2 and Exercise 19-2.

Tableau DA 19-3 Mini-Case, Income reporting under absorption and variable costing, **P1**, **P2**—similar to QS 19-4, QS 19-6, and Exercise 19-9.

Accounting Analysis connect

COMPANY ANALYSIS

A1

AA 19-1 **Apple** has the following product line information for the current year. Some data are assumed.

$ millions	iPhone	Services
Sales	$142,381	$46,291
Contribution margin	68,343	33,330

Required

1. Compute the contribution margin ratio for both product lines for the current year.
2. Which product line performed better based on contribution margin ratio?

COMPARATIVE ANALYSIS

A1

APPLE

GOOGLE

AA 19-2 **Google** and **Apple** compete for smartphone sales. The companies show the following information for their smartphone product lines for the current year. Some data are assumed.

$ millions	Apple	Google
Sales	$142,381	$17,104
Contribution margin	68,343	6,500

Required

1. Compute the contribution margin ratio for each company's smartphone product line for the current year.
2. Which company's smartphone product line performed better based on contribution margin ratio?

EXTENDED ANALYSIS

A1

AA 19-3 **Samsung** and **Apple** compete for smartphone sales. The companies show the following information for their smartphone product lines for the current year. Some data are assumed.

$ millions	Apple	Samsung
Sales	$142,381	$38,402
Contribution margin	68,343	17,665

Required

1. Compute the contribution margin ratio for each company's smartphone product line for the current year.
2. Which company's smartphone product line performed better based on contribution margin ratio?

Discussion Questions

1. What costs are included in product costs under variable costing?
2. What costs are included in product costs under absorption costing?

3. When units produced exceed units sold for a reporting period, would income under variable costing be greater than, equal to, or less than income under absorption costing? Explain.

4. Describe how the following items are computed: (*a*) gross profit and (*b*) contribution margin.

5. How can absorption costing lead to incorrect special offer decisions?

6. Describe how use of absorption costing in determining income can lead to overproduction and a buildup of inventory. Explain how variable costing can avoid this same problem.

7. Assume that **Apple** has received a special order from a retailer for 1,000 specially outfitted iPads. This is a one-time order, which will not require any additional capacity or fixed costs. What should Apple consider when determining a selling price for these iPads?

APPLE

8. How is the contribution margin ratio computed?

9. How can the contribution margin ratio be used in performance evaluation?

10. How can variable costing income be converted to absorption costing income?

Beyond the Numbers

page 771

ETHICS CHALLENGE

C1

BTN 19-1 FDP Company produces a variety of home security products. Gary Price, the company's president, is concerned with the fourth-quarter market demand for the company's products. Unless something is done in the last two months of the year, the company is likely to miss its earnings expectation of Wall Street analysts. Price still remembers when FDP's earnings were below analysts' expectation by two cents a share three years ago and the

company's share price fell 19% the day earnings were announced. In a recent meeting, Price told his top management that something must be done quickly. One proposal by the marketing vice president was to give a deep discount to the company's major customers to increase the company's sales in the fourth quarter. The company controller pointed out that while the discount could increase sales, it may not help the bottom line; to the contrary, it could lower income. The controller said, "Since we have enough storage capacity, we might simply increase our production in the fourth quarter to increase our reported income."

Required

1. Gary Price is not sure how the increase in production without a corresponding increase in sales could help boost the company's income. Explain to Price how reported income varies with respect to production level.
2. Is there an ethical concern in this situation? If so, which parties are affected? Explain.

COMMUNICATING IN PRACTICE

C1

BTN 19-2 Mertz Chemical has three divisions. Its consumer product division faces strong competition from companies overseas. During its recent teleconference, Ryan Peterson, the consumer product division manager, reported that his division's sales for the current year were below its break-even point. However, when the division's annual reports were received, Billie Mertz, the company president, was surprised that the consumer product division actually reported income of $264,000. How could this be possible?

Required

Assume that you work in the corporate controller's office. Write a half-page memorandum to the president explaining how the division can report income even if its sales are below the break-even point.

TEAMWORK IN ACTION

P3

BTN 19-3 This chapter identified several decision contexts in which managers use product cost information.

Required

Break into teams and identify at least one specific decision context in which absorption costing information is more relevant than variable costing information and at least one decision context in which variable costing information is more relevant than absorption costing. Be prepared to discuss your answers in class.

ENTREPRENEURIAL DECISION

P2

BTN 19-4 **Da Bomb**, co-founded by sisters Caroline and Isabel Bercaw, makes bath bombs.

Required

Isabel and Caroline use variable costing to make business decisions. If the sisters used absorption costing, would we expect the company's income to be more than, less than, or about the same as its income measured under variable costing? Explain.

20 Master Budgets and Planning

page 772

Chapter Preview

BUDGET PROCESS AND ADMINISTRATION

C1 Budgeting process

- Benefits of budgeting
- Human behavior
- Reporting and timing
- Master budget components

NTK 20-1

OPERATINGBUDGETS

P1 Operating budgets:

- Sales
- Production
- Direct materials
- Direct labor
- Overhead
- Cost of Goods Sold
- Expenses

NTK 20-2, 20-3, 20-4

INVESTING AND FINANCING BUDGETS

P2 Capital expenditures budget

Schedule of cash receipts

Schedule of cash payments

Cash budget

NTK 20-5

BUDGETED FINANCIAL STATEMENTS

P3 Budgeted income statement

Budgeted balance sheet

A1 Service companies

P4 *Appendix:* Merchandiser budgeting

NTK 20-6, 20-8

Learning Objectives

CONCEPTUAL

C1 Describe the benefits of budgeting.

ANALYTICAL

A1 Prepare a direct labor budget for a service firm and analyze revenue per employee.

PROCEDURAL

P1 Prepare the operating budgets of a master budget for a manufacturing company.

P2 repare a cash budget for a manufacturing company.

P3 Prepare budgeted financial statements.

P4 *Appendix 20A*—Prepare each component of a master budget for a merchandising company.

Bottled Bliss

"Sell it, don't tell it"—**NAILAH ELLIS-BROWN**

Detroit—Nailah Ellis-Brown's great-grandfather immigrated to the U.S. from Jamaica with a prized family recipe for hibiscus tea. Nailah recalls her great-grandfather's instruction: "This recipe is to be sold, not told." This is what her company, **Ellis Island Tropical Tea** (**Ellisislandtea.com**) does today.

Nailah started small, making tea in her mother's basement and selling it out of the trunk of her car. "Everything from day one has been trial and error," Nailah explains.

In addition to production, packaging, and distribution, Nailah budgets for and controls her costs. Managing direct materials, direct labor, and overhead costs is critical to survival.

Consumer tastes make sales forecasting hard, but Nailah knows that a good sales forecast is the cornerstone of a good budget. "Because our sales volume was low," explains Nailah, "we set our price too high to cover costs." She quickly adjusted the pricing.

As sales grew, Nailah expanded her production facility. Because production budgets are based on the level of sales, she had to update many of her budgets. This new facility increased her overhead costs, which also required changes to overhead budgets. Businesses revise budgets frequently.

Nailah proclaims: “Ours is the only Jamaican sweet tea on the market . . . quitting is not an option.”

Sources: *Ellisislandtea* website, January 2021. *Blackenterprise.com*, January 2016; *ModelDmedia.com*, October 2016; *MSNBC.com* video interview, June 2017. *Youtube* interview on WXYZ in Detroit, April 2016; *Forbes*, June 2018

BUDGET PROCESS AND ADMINISTRATION

Budgeting Process

C1

Describe the benefits of budgeting.

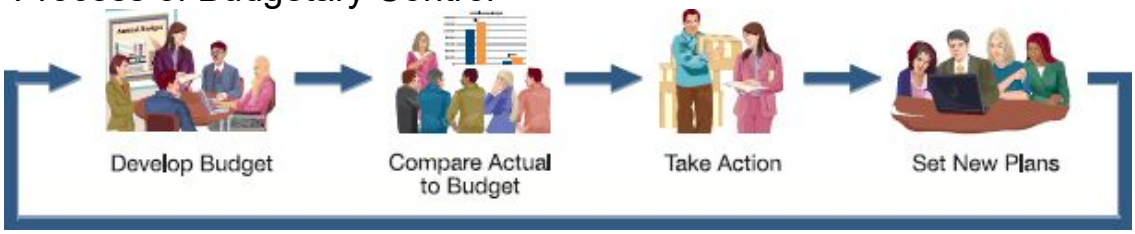
Managers must ensure that activities of employees and departments contribute to meeting the company’s overall goals. This requires

budgeting, the process of planning future business actions and expressing them as formal plans.

A **budget** is a formal statement of a company's plans in dollars. Unlike long-term *strategic plans*, budgets typically cover shorter periods such as a month, quarter, or year. The **budgetary control** process, shown in Exhibit 20.1, refers to management's use of budgets to see that planned objectives are met.

EXHIBIT 20.1

Process of Budgetary Control



The budgetary control process involves four steps: (1) develop the budget from planned objectives, (2) compare actual results to budgeted amounts and analyze differences, (3) take corrective and strategic actions, and (4) establish new objectives and a new budget.

This chapter focuses on the first step in the budgetary control process, developing a budget. The next chapter shows how managers compare budgeted and actual amounts to guide corrective actions and make new plans.

Benefits of Budgeting

Budgets benefit the key managerial functions of planning and controlling.

- **Plan** A budget focuses on future opportunities and threats to the organization. This focus on the future is important because the daily pressures of operating an organization can divert management's attention from planning. Budgeting forces managers to *plan* for the future.
- **Control** The *control* function requires management to evaluate (benchmark) operations against some norm. Because budgeted performance considers important company, industry, and economic factors, a comparison of actual to budgeted performance provides an effective monitoring and control system. This comparison helps management identify problems and take corrective actions if necessary.

- **Coordinate** Budgeting helps to *coordinate* activities so that all employees and departments understand and work toward the company's overall goals.
- **Communicate** Written budgets effectively *communicate* management's specific action plans to all employees. When plans are not written down, conversations can lead to uncertainty and confusion among employees.
- **Motivate** Budgets can be used to *motivate* employees. Budgeted performance levels can provide goals for employees to attain or even exceed. Many companies provide incentives, like cash bonuses, for employee performance that meets or exceeds budget goals.

Decision Insight

Budget Bonus Budgets are important in determining managers' pay. A recent survey shows that 82% of large companies tie managers' bonus payments to beating budget goals. For these companies, bonus payments are frequently more than 20% of total manager pay. ■

Budgeting and Human Behavior

Budgeting can be a positive motivating force when three important guidelines are followed.

1. Goals reflected in a budget should be challenging but attainable.
2. Employees affected by a budget should help prepare it (*participatory budgeting*).
3. Evaluations offer opportunities to explain differences between actual and budgeted amounts.

Example: Assume a company's sales force receives a bonus when sales exceed the budgeted amount. How would this arrangement affect the participatory sales forecasts? *Answer:* Sales reps may understate their budgeted sales.

Potential Negative Outcomes Managers must be aware of potential negative outcomes of budgeting. Pressure to meet budgeted results can cause employees to engage in unethical behavior or commit fraud. Under participatory budgeting, some employees might understate sales budgets and overstate expense budgets to allow themselves a cushion, or *budgetary slack*, to aid in meeting targets. Employees might also spend their budgeted amounts, even on unnecessary items, to ensure their budgets aren't reduced for the next period.

Budget Reporting and Timing

The budget period usually is tied to the company's fiscal year. To help control operations, the annual budget can be separated into quarterly or monthly budgets. These short-term budgets allow management to periodically evaluate performance and take timely corrective action.

Many companies apply **continuous budgeting** by preparing **rolling budgets**. In continuous budgeting, a company continually revises its budgets as time passes. In a rolling budget, a company revises its entire set of budgets by adding a new quarterly budget to replace the quarter that just elapsed. Thus, at any point in time, monthly or quarterly budgets are available for the next 12 months or four quarters.

Decision Insight

Prove It Some companies use **zero-based budgeting**, which requires all expenses to be justified for each new budget. Rather than using last period's budgeted or actual amounts to determine this period's budgets, managers instead analyze each activity in the organization to see if it is necessary. Managers then budget for only necessary activities. Zero-based budgets can help identify waste and reduce costs. ■

Shutterstock

NEED-TO-KNOW 20-1

Budgeting Benefits

C1

Label each item as a positive outcome of budgeting or as *a* negative outcome of budgeting.

1. Budgets provide goals for employees to work toward.
2. Written budgets help communicate plans to all employees.
3. Some employees might understate sales targets in budgets.
4. Budgets force managers to spend time planning for the future.
5. Some employees might always spend budgeted amounts.
6. With rolling budgets, managers can continuously plan ahead.

Solution

1. Positive
2. Positive
3. Negative
4. Positive
5. Negative
6. Positive

Do More: QS 20-1, QS 20-2

OPERATING BUDGETS

P1_____

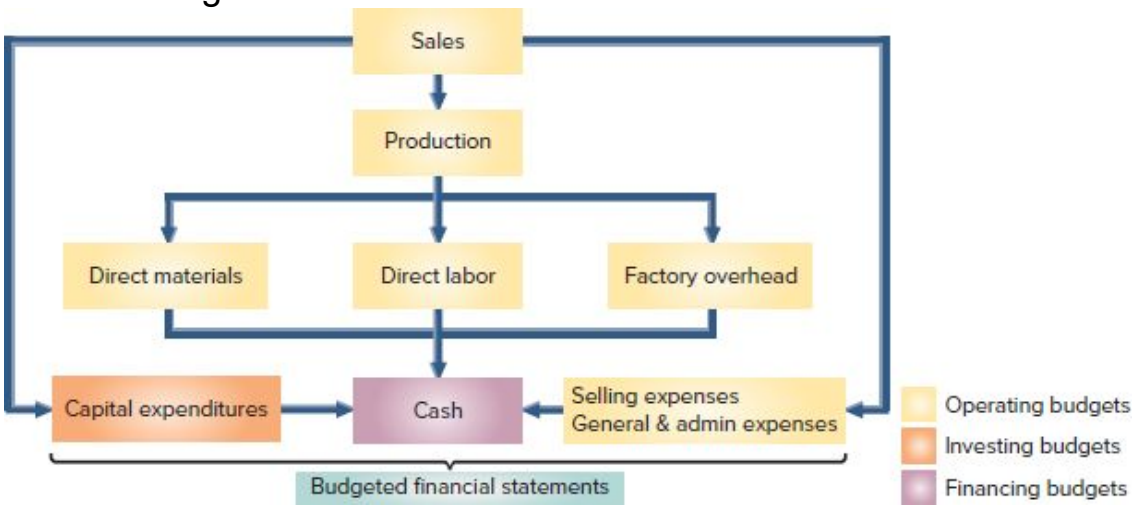
Prepare the operating budgets of a master budget for a manufacturing company.

Master Budget Components

A **master budget** is a formal, comprehensive plan that contains several interconnected budgets. Exhibit 20.2 summarizes the master budgeting process. The master budgeting process begins with the sales budget. The master budget includes individual budgets for sales, production (or merchandise purchases), expenses, capital expenditures, and cash. The process ends with preparation of budgeted financial statements.

EXHIBIT 20.2

Master Budget Process for a Manufacturer



This chapter explains how **Toronto Sticks Company (TSC)**, a manufacturer of hockey sticks, prepares its budgets. Its master budget includes operating, capital expenditures, and cash budgets for each month in each quarter. It also includes a budgeted income statement for each quarter and a budgeted balance sheet as of the last day of each quarter. We show how TSC prepares budgets for October, November, and December. Exhibit 20.3 presents TSC's balance sheet at the start of this budgeting period, which we refer to in preparing the component budgets.

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EXHIBIT 20.3

Balance Sheet

TORONTO STICKS COMPANY
Balance Sheet
September 30

Assets			Liabilities and Equity		
Cash		$ 20,000	Liabilities		
Accounts receivable		25,200	Accounts payable	$ 7,060	
Raw materials inventory (178 pounds @ $20)		3,560	Income taxes payable (due Oct. 31)	20,000	
Finished goods inventory (1,010 units @ $17)		17,170	Loan payable	10,000	$ 37,060
Equipment*	$200,000		Equity		
Less: Accumulated depreciation	36,000	164,000	Common stock	150,000	
			Retained earnings	42,870	192,870
Total assets		$229,930	Total liabilities and equity		$229,930

*Equipment is depreciated on a straight-line basis over 10 years (salvage value is $20,000).

Sales Budget

The first step in preparing the master budget is the **sales budget**, which shows the planned sales units and the budgeted dollars from these sales. The sales budget is the starting point in the budgeting process because many costs, such as variable costs, change with sales. The sales budget comes from analysis of forecasted economic and market conditions, business capacity, and advertising plans.

TSC sold 700 hockey sticks at $60 per unit in September. After considering sales predictions and market conditions, TSC prepares its sales budget for the next three months and the three-month total. The sales budget in Exhibit 20.4 includes forecasts of both unit sales and unit prices.

EXHIBIT 20.4

Sales Budget

TORONTO STICKS COMPANY
Sales Budget

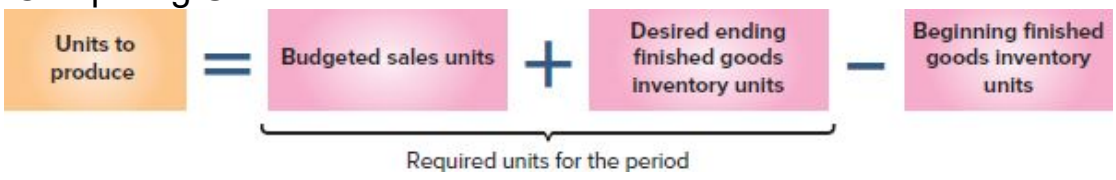
	October	November	December	Totals
Budgeted sales units	1,000	800	1,400	3,200
Selling price per unit	× $ 60	× $ 60	× $ 60	× $ 60
Total budgeted sales	$60,000	$48,000	$84,000	$192,000

Production Budget

A manufacturer prepares a **production budget**, which shows the units to produce each period to meet budgeted sales and a desired inventory level. Manufacturers often set a **safety stock**, a quantity of inventory that helps protect against lost sales caused by unfulfilled demands from customers or delays in shipments from suppliers. Exhibit 20.5 shows how to compute units to produce for a period. **A production budget does not show costs; it is always expressed in units of product.**

EXHIBIT 20.5

Computing Units to Produce



Starting in October, TSC decides that the number of units in its finished goods inventory at each month-end should equal 90% of next month's budgeted sales. For example, inventory at the end of October should

equal 90% of budgeted November sales, and so on. We can now prepare the production budget in Exhibit 20.6.

The production budget can be viewed in two parts.

page 777

1. **Total required units.** Budgeted sales units + Desired ending inventory units.
2. **Units to produce.** Total required units − Beginning inventory units.

This budget reports units to produce each period. Units to produce is the basis of the *manufacturing budgets* for direct materials, direct labor, and overhead.

EXHIBIT 20.6

Production Budget

TORONTO STICKS COMPANY
Production Budget

	October	November	December
Budgeted sales units*	1,000	800	1,400
Add: Desired ending inventory			
1. Total required units — Next period budgeted sales units*	800	1,400	900
1. Total required units — Ratio of inventory to future sales	× 90%	× 90%	× 90%
1. Total required units — Desired ending inventory units	720	1,260	810
Total required units	1,720	2,060	2,210
2. Units to produce — Less: Beginning inventory units	1,010	720	1,260
2. Units to produce — Units to produce	710	1,340	950

* From sales budget in Exhibit 20.4; assume January budgeted sales is 900 units.

Decision Insight

Just-in-Time Managers of *just-in-time* (JIT) inventory systems use sales budgets for short periods (often as few as one or two days) to order just enough merchandise or materials to meet the immediate sales demand. This keeps inventory to a minimum (or zero in an ideal situation). A JIT system minimizes the costs of maintaining inventory, but it is practical only if customers can order in advance or if managers can accurately determine short-term sales demand. Suppliers must be able and willing to ship small quantities regularly and quickly. ■

Juanmonino/E+/Getty Images

NEED-TO-KNOW 20-2

Production Budget

P1

A manufacturing company predicts sales of 220 units for May and 250 units for June. The company wants each month's ending inventory to equal 30% of next month's predicted unit sales. Beginning inventory for May is 66 units. Prepare the company's production budget for May.

Solution

Production Budget	May
Budgeted sales units	220
Add: Desired ending inventory	
Next period budgeted sales units	250
Ratio of inventory to future sales	× 30%
Desired ending inventory units	75
Total required units	295
Less: Beginning inventory units	66
Units to produce	229

Do More: Do More: QS 20-6, QS 20-7, QS 20-8, E 20-3, E 20-4, E 20-5

Direct Materials Budget

The **direct materials budget** shows the budgeted costs for direct materials that must be purchased to meet the budgeted production. Whereas the production budget shows *units* to produce, the direct materials budget translates the units to produce into budgeted *costs*.

Layout of the direct material budget follows.

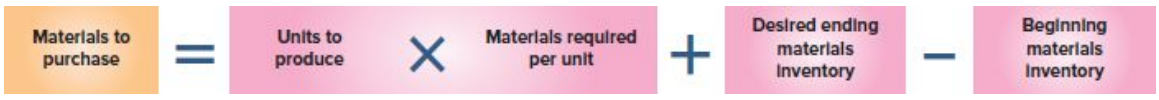


Exhibit 20.7 shows the direct materials budget for TSC, which page 778 has 5 steps to prepare it.

1. **Enter units to produce from the production budget.**
2. **Enter materials required per unit.** For TSC, this is 0.5 pound of wood required per unit. We then compute materials needed for production: for October, we take the 710 units to produce and multiply it by 0.5 pound to get 355 lbs.

3. **Add desired ending materials inventory.** For TSC, its policy (starting in October) is to have ending materials equal to 50% of next period's materials needed. This is 335 lbs. for October (50% of 670).

4. **Subtract beginning materials inventory.** For TSC, this is 178 lbs. for October from Exhibit 20.3. We then compute materials to purchase, which is 512 lbs. (690 − 178).

5. **Enter materials cost.** Materials cost is $20 per pound. We then compute cost of direct materials purchases as $10,240 for October ($20 × 512 pounds).

EXHIBIT 20.7

Direct Materials Budget

TORONTO STICKS COMPANY
Direct Materials Budget

		October	November	December
Materials needed for production	1 Units to produce*	710	1,340	950
	2 Materials required per unit (pounds)	× 0.5	× 0.5	× 0.5
	Materials needed for production (pounds)	355	×50% 670	×50% 475
Materials to purchase	3 Add: Desired ending materials inventory (pounds)	335	237.5	247.5†
	Total materials required (pounds)	690	907.5	722.5
	4 Less: Beginning materials inventory (pounds)	178	335	237.5
	Materials to purchase (pounds)	512	572.5	485.0
Cost of materials purchases	5 Materials cost per pound	$ 20	$ 20	$ 20
	Cost of direct materials purchases	$10,240	$11,450	$9,700

*From production budget in Exhibit 20.6. †Computed from January production requirements.

Direct Labor Budget

The **direct labor budget** shows the budgeted costs for direct labor needed for the budgeted production for the period. Layout of the direct labor budget follows.

Point: Quarter of an hour can be expressed as 0.25 hour (15 min./60 min.).

Exhibit 20.8 shows the direct labor budget for TSC, which has 3 steps to prepare it.

1. **Enter units to produce from the production budget.**

2. **Enter direct labor hours required per unit.** For TSC, this is 0.25 hour. We then compute direct labor hours needed. We multiply the 710 units to produce in October by 0.25 hour to get 177.5 direct hours needed.

3. **Enter direct labor cost per hour.** For TSC, direct labor cost is $12 per hour. We then compute cost of direct labor as $2,130 for October (177.5 hours × $12).

EXHIBIT 20.8

Direct Labor Budget

		TORONTO STICKS COMPANY Direct Labor Budget		
		October	November	December
Direct labor hours needed	1 Units to produce*	710	1,340	950
	2 Direct labor hours required per unit	× 0.25	× 0.25	× 0.25
	Direct labor hours needed	177.5	335	237.5
Cost of direct labor	3 Direct labor cost per hour	$ 12	$ 12	$ 12
	Cost of direct labor	$2,130	$4,020	$2,850

* From production budget in Exhibit 20.6.

NEED-TO-KNOW 20-3

Direct Materials and Direct Labor Budgets

P1

A manufacturing company budgets production of 800 units during June and 900 units during July. Each unit of finished goods requires 2 pounds of direct materials, at a cost of $8 per pound. The company maintains an inventory of direct materials equal to 10% of next month's budgeted production. Beginning direct materials inventory for June is 160 pounds. Each finished unit requires 1 hour of direct labor at the cost of $14 per hour. Prepare the company's (a) direct materials budget for June and (b) direct labor budget for June.

Solution

a.

Direct Materials Budget	June
Units to produce	800
Materials required per unit (lbs.)	× 2
Materials needed for production (lbs.)	1,600
Add: Desired ending materials inventory (lbs.)	180*
Total materials required (lbs.)	1,780
Less: Beginning materials inventory (lbs.)	160
Materials to purchase (lbs.)	1,620
Materials cost per pound	$ 8
Cost of direct materials purchases	$12,960

*900 units × 2 lbs. per unit × 10% = 180 lbs.

b.

Direct Labor Budget	June
Units to produce	800
Direct labor hours required per unit	× 1
Direct labor hours needed	800
Direct labor cost per hour	$ 14
Cost of direct labor	$11,200

Do More: QS 20-9, QS 20-10, QS 20-12, QS 20-13, E 20-8, E 20-9, E 20-10, E 20-11, E 20-12

Factory Overhead Budget

The **factory overhead budget** shows the budgeted costs for factory overhead needed to complete the budgeted production for the period. Factory overhead budgets separate variable and fixed overhead costs. This is so that companies better estimate changes in overhead costs as production volume varies.

Exhibit 20.9 shows the factory overhead budget for TSC, which has 3 parts.

① Compute **budgeted *variable* overhead**. This is direct labor hours from Exhibit 20.8 multiplied by the variable overhead rate per direct labor hour, or 177.5 × $10 for October.

② Compute **budgeted *fixed* overhead**. For TSC, *fixed overhead* consists entirely of depreciation on manufacturing equipment. From Exhibit 20.3, this is $18,000 per year [($200,000 – $20,000)/10 years], or $1,500 per month ($18,000/12 months).

③ Compute **budgeted *total* overhead** as the total of parts 1 and 2.

EXHIBIT 20.9

Factory Overhead Budget

	TORONTO STICKS COMPANY Factory Overhead Budget	October	November	December
	Direct labor hours needed*	177.5	335	237.5
1. Variable overhead	Variable overhead rate per direct labor hour	× $ 10	× $ 10	× $ 10
	Budgeted variable overhead	1,775	3,350	2,375
2. Fixed overhead	Budgeted fixed overhead	1,500	1,500	1,500
3. Total overhead	Budgeted total factory overhead	$3,275	$4,850	$3,875

*From direct labor budget in Exhibit 20.8.

The budget in Exhibit 20.9 is condensed in that we do not list the individual line items making up variable overhead and fixed overhead. Variable cost line items commonly include indirect materials, indirect labor, factory utilities, and maintenance of manufacturing equipment. Fixed cost line items commonly include factory supervisor salaries, factory depreciation, and factory property taxes. We cover overhead budgets in detail in the next chapter.

Budgeted Cost of Goods Sold

Once we have the three manufacturing budgets (direct materials, direct labor, and factory overhead), we can compute the **budgeted product cost per unit** and prepare a **cost of goods sold budget**. Exhibit 20.10 summarizes the product cost per unit calculation for TSC. The cost of direct materials is from Exhibit 20.7 and cost of direct labor is page 780 from Exhibit 20.8. The predetermined variable overhead rate is from Exhibit 20.9. To compute product cost per unit for fixed overhead, see that TSC expects to produce on average 1,000 units per month, which means its fixed overhead per unit is $1.50 ($1,500/1,000 units). Total product cost per unit is $17.00.

EXHIBIT 20.10

Budgeted Product Cost per Unit

Budgeted Product Cost	Per Unit
Direct materials (0.5 pound of materials × $20 per pound of materials—Exhibit 20.7)	$10.00
Direct labor (0.25 hour of direct labor × $12 per hour of direct labor—Exhibit 20.8)	3.00
Variable overhead (0.25 direct labor hour × $10 variable overhead rate per direct labor hour—Exhibit 20.9)	2.50
Fixed overhead ($1,500 total fixed overhead per month/1,000 units of expected production per month)	1.50
Total product cost per unit	$17.00

Cost of Goods Sold Budget	
Budgeted sales units	#
× Product cost per unit	$
= Budgeted COGS	$

We then prepare the cost of goods sold budget as follows. We use the budgeted sales units from Exhibit 20.4 multiplied by the budgeted cost per unit from Exhibit 20.10.

TORONTO STICKS COMPANY Cost of Goods Sold Budget	October	November	December	Totals
Budgeted sales units*	1,000	800	1,400	3,200
Budgeted cost per unit	$ 17	$ 17	$ 17	$ 17
Budgeted cost of goods sold	$17,000	$13,600	$23,800	$54,400

*From sales budget in Exhibit 20.4.

Selling Expense Budget

The **selling expense budget** shows the types and amounts of selling expenses expected during the budget period. TSC's selling expense budget is in Exhibit 20.11. Its selling expenses consist of commissions of 10% of total sales paid to sales personnel and a $2,000 monthly salary paid to the sales manager. Sales commissions vary with sales volume, but the sales manager's salary is fixed. Other common selling expenses include advertising and delivery expenses.

EXHIBIT 20.11

Selling Expense Budget

TORONTO STICKS COMPANY Selling Expense Budget	October	November	December	Totals
Budgeted sales*	$60,000	$48,000	$84,000	$192,000
Sales commission of 10%	× 10%	× 10%	× 10%	× 10%
Sales commissions	6,000	4,800	8,400	19,200
Salary for sales manager	2,000	2,000	2,000	6,000
Total selling expenses	$ 8,000	$ 6,800	$10,400	$ 25,200

*From sales budget in Exhibit 20.4.

General and Administrative Expense Budget

The **general and administrative expense budget** reports those expenses expected during the budget period. Exhibit 20.12 shows TSC's general and administrative expense budget. It reports administrative salaries of $4,500 per month. Other common examples of general and

administrative expenses include property taxes, office expenses, and insurance and depreciation on non-manufacturing assets.

EXHIBIT 20.12

General and Administrative Expense Budget

TORONTO STICKS COMPANY General and Administrative Expense Budget	October	November	December	Totals
Administrative salaries	$4,500	$4,500	$4,500	$13,500
Total general and administrative expenses	$4,500	$4,500	$4,500	$13,500

NEED-TO-KNOW 20-4

Selling and General and Administrative Expense Budgets

P1

A manufacturing company budgets sales of $70,000 during July. It pays sales commissions of 5% of sales and also pays the sales manager salary of $3,000 per month. Other monthly costs include depreciation on office equipment ($500), office insurance expense ($200), advertising ($1,000), and an office manager salary of $2,500 per month. Prepare the company's (a) selling expense budget for July and (b) general and administrative expense budget for July.

Solution

a.

Selling Expense Budget	July
Budgeted sales	$70,000
Sales commission of 5%	× 5%
Sales commissions	3,500
Salary for sales manager	3,000
Advertising	1,000
Total selling expenses	$ 7,500

b.

General and Administrative Expense Budget	July
Office manager salary	$2,500
Depreciation on office equipment	500
Insurance on office	200
Total general and administrative expenses	$3,200

Do More: Do More: QS 20-15, QS 20-16

INVESTING AND FINANCING BUDGETS

P2

Prepare a cash budget for a manufacturing company.

Capital Expenditures Budget (Investing Budget)

The **capital expenditures budget** reports expected cash receipts and cash payments related to the sale and purchase of plant assets. The capital expenditures budget is usually prepared after the operating budgets. The process of preparing operating budgets can reveal that the company requires more (or less) plant assets. Following is the capital expenditures budget for TSC. TSC does not plan to dispose of any plant assets through December, but it does plan to buy equipment for $25,000 cash in December.

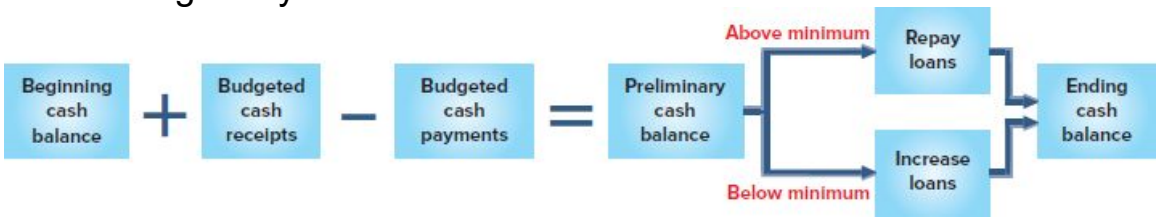
TORONTO STICKS COMPANY Capital Expenditures Budget	October	November	December
Purchase of equipment	$0	$0	$25,000
Total capital expenditures	$0	$0	$25,000

Cash Budget (Financing Budget)

A **cash budget** shows budgeted cash receipts and cash payments during the budget period. Managing cash flows is vital, and a cash budget helps with that task. Most companies set a minimum cash balance to have available. If the cash budget indicates cash is below this minimum, the company can arrange loans. If the cash budget indicates cash is above the minimum, the company can plan to pay off loans. Exhibit 20.13 shows the layout for the cash budget. When preparing a cash budget, add budgeted cash receipts to the beginning cash balance and subtract budgeted cash payments.

EXHIBIT 20.13

Cash Budget Layout



Cash Receipts from Sales Managers use the sales budget and knowledge about how frequently customers pay on credit sales to budget monthly cash receipts. Exhibit 20.14 presents TSC's schedule of budgeted cash receipts. We begin with budgeted sales. Analysis of past sales for TSC indicates that 40% of sales are for cash. The remaining 60% are credit sales; these customers are expected to pay in full in the month following the sales. For example, October's budgeted cash receipts consist of $24,000 from October cash sales ($60,000 × 40%) plus the anticipated collection of $25,200 ($42,000 × 60%) from September credit sales.

EXHIBIT 20.14

Schedule of Cash Receipts from Sales

TORONTO STICKS COMPANY
Schedule of Cash Receipts from Sales

	September	October	November	December
Sales*	$42,000	$60,000	$48,000	$84,000
Cash receipts from:				
Cash sales (40% of current sales)		$24,000†	$19,200	$33,600
Collections of prior period sales (60%)		25,200‡	36,000	28,800
Total cash receipts		$49,200	$55,200	$62,400

*From sales budget in Exhibit 20.4. †$24,000 = 40% × $60,000 ‡$25,200 = 60% × $42,000

Collection of Credit Sales over Several Periods When credit sales take several periods to collect, the collections from prior periods reflect the multi-period collection pattern. For example, if TSC collects credit sales over two months such as 80% of credit sales in the first month after sale and 20% of credit sales in the second month after sale, and cash sales remain at 40% of current sales, then budgeted cash receipts for December follow.

TORONTO STICKS COMPANY
Schedule of Cash Receipts from Sales

	October	November	December
Sales	$60,000	$48,000	$84,000
Cash receipts from:			
Cash sales (40% of current sales)			$33,600*
Collections of 1 period ago sales (60% × $48,000 × 80%)			23,040
Collections of 2 period ago sales (60% × $60,000 × 20%)			7,200
Total cash receipts			$63,840

*$33,600 = 40% × $84,000

Uncollectible Accounts Let's consider uncollectible accounts and assume that 5% of *credit sales* are uncollectible. For the remaining 95% that are collectible, assume TSC collects 80% of credit sales in the first

month after sale and collects 15% of credit sales in the second month after sale. The schedule of cash receipts for December follows.

TORONTO STICKS COMPANY Schedule of Cash Receipts from Sales	October	November	December
Sales	$60,000	$48,000	$84,000
Cash receipts from:			
Cash sales (40% of current sales)			$33,600*
Collections of 1 period ago sales (60% × $48,000 × 80%)			23,040
Collections of 2 period ago sales (60% × $60,000 × 15%)			5,400
Total cash receipts			$62,040

*$33,600 = 40% × $84,000

Cash Payments for Direct Materials Managers prepare a schedule of cash payments for direct materials. To do this, managers must know how direct materials are purchased (with cash or on credit) and, if on credit, when payment is made. TSC's materials purchases are page 783 entirely on credit. It makes full payment in the month following purchases. Using this information, the schedule of cash payments for direct materials is in Exhibit 20.15.

EXHIBIT 20.15

Schedule of Cash Payments for Direct Materials

TORONTO STICKS COMPANY Schedule of Cash Payments for Direct Materials	September	October	November	December
Materials purchases*	$7,060	$10,240	$11,450	$9,700
Cash payments for:				
Current period purchases (0%)		$ 0	$ 0	$ 0
Prior period purchases (100%)		7,060	10,240	11,450
Total cash payments		$ 7,060	$10,240	$11,450

*From direct materials budget in Exhibit 20.7.

Payment of Materials over Several Periods When payment for materials occurs over several periods, the payments for those prior periods reflect the multi-period payment pattern. For example, if TSC pays for 20% of purchases in the month of purchase and pays for 80% of purchases in the month after purchase, then its schedule of cash payments for direct materials follows.

TORONTO STICKS COMPANY Schedule of Cash Payments for Direct Materials				
	September	October	November	December
Materials purchases*	$7,060	$10,240	$11,450	$ 9,700
Cash payments for:				
Current period purchases (20%)		$ 2,048	$ 2,290	$ 1,940†
Prior period purchases (80%)		5,648	8,192	9,160‡
Total cash payments		$ 7,696	$10,482	$11,100

*From direct materials budget in Exhibit 20.7. †$1,940 = 20% × $9,700 ‡$9,160 = 80% × $11,450

Preparing Cash Budget To prepare the cash budget, managers use the cash receipts and cash payments from several budgets and schedules. Exhibit 20.16 shows the cash budget for TSC. The page 784 company begins October with $20,000 in cash (see Exhibit 20.3).
We add $49,200 in cash receipts from customers. We then subtract $43,565 in cash payments for direct materials, direct labor, overhead, selling expenses, general and administrative expenses, and income taxes due and paid in October. A few additional points about TSC's cash budget:

- *Fixed overhead* from depreciation in the factory overhead budget (Exhibit 20.9) does not require a cash payment. Therefore, it is not in the cash budget. Other fixed overhead—such as payments for factory property taxes and insurance—*are* included if they require cash payments.
- It announces plans to pay $3,000 of cash dividends in November.
- It sets a minimum cash balance of $20,000 at each month-end. If TSC borrows cash, it must pay interest at 1% per month.

EXHIBIT 20.16

Cash Budget

TORONTO STICKS COMPANY Cash Budget	October	November	December
Beginning cash balance	$20,000	$20,000	$ 38,881
Add: Cash receipts from sales (Exhibit 20.14)	49,200	55,200	62,400
Total cash available	69,200	75,200	101,281
Less: Cash payments for			
Direct materials (Exhibit 20.15)	7,060	10,240	11,450
Direct labor (Exhibit 20.8)	2,130	4,020	2,850
Variable overhead (Exhibit 20.9)	1,775	3,350	2,375
Sales commissions (Exhibit 20.11)	6,000	4,800	8,400
Sales salaries (Exhibit 20.11)	2,000	2,000	2,000
Administrative salaries (Exhibit 20.12)	4,500	4,500	4,500
Income taxes (Exhibit 20.3)	20,000	0	0
Dividends	0	3,000	0
Interest on loan			
October ($10,000 × 1%)*	100	0	0
November ($4,365 × 1%)†	0	44	0
Purchase of equipment	0	0	25,000
Total cash payments	43,565	31,954	56,575
Preliminary cash balance	$25,635	$43,246	$ 44,706
Loan activity			
Additional loan	$ 0	$ 0	$ 0
Repayment of loan	5,635	4,365	0
Ending cash balance	$20,000	$38,881	$ 44,706
Loan balance, end of month‡	$ 4,365	$ 0	$ 0

*Beginning loan payable balance from Exhibit 20.3. †Rounded to the dollar.
‡Beginning loan balance + New loans – Loan repayments. For October: $10,000 + $0 – $5,635 = $4,365.

Cash

Oct. 1	20,000		
Receipts	49,200		
		43,565	Payments
Prelim. bal.	25,635		
		5,635	Repay loan
Oct. 31	20,000		

Interest on Loan and Loan Activity If the cash balance exceeds $20,000 at month-end, TSC uses the excess to repay loans. If the cash balance is below $20,000 at month-end, TSC takes out a loan for the shortage. Interest on loans is computed as:

$$\text{Cash paid for interest} = \text{Interest rate (\%)} \times \text{Beginning loan balance}$$

Using TSC's interest rate of 1% per month, budgeted cash payments for interest follow and are reported in Exhibit 20.16.

Budgeted cash payments for interest	Interest Rate	Beginning Loan Balance	Interest Cost
October	1%	$10,000	$100
November	1	4,365	44
December	1	0	0

The October 31 preliminary cash balance is $25,635 (before any loan activity). This amount is more than the $20,000 minimum. TSC uses the excess cash of $5,635 ($25,635 – $20,000) to pay off a portion of its loan. Looking at November, TSC's preliminary cash balance is $43,246, and its $23,246 excess is sufficient to pay off its entire loan balance.

Loan Payable

		10,000	Sep. 30
Repay	5,635		
		4,365	Oct. 31
Repay	4,365		
		0	Nov. 30

Had TSC's preliminary cash balance been below the $20,000 minimum in any month, TSC would have borrowed an amount to bring its cash balance up to $20,000. We show an example of this situation in **Need-to-Know 20-7**.

Decision Insight

Cash Cushion Why do some companies maintain a minimum cash balance even when the budget shows extra cash is not needed? For example, **Apple**'s cash and short-term investments balance is over $60 billion. According to Apple's CEO, Tim Cook, the cushion provides "flexibility and security," important in navigating uncertain economic times. A cash cushion enables companies to jump on new ventures or acquisitions that may present themselves. The **Boston Red Sox** keep a cash cushion for its trades involving players with "cash considerations." ■

Adam Glanzman/Getty Images

NEED-TO-KNOW 20-5

Schedule of Cash Receipts; Cash Budget

P2

Part 1

Diaz Co. budgets sales of $80,000 for January and $90,000 for February. Seventy percent of Diaz's sales are for cash, and the remaining 30% are credit sales. All credit sales are collected in the month after sale. December's total sales are $66,667. Prepare the schedule of cash receipts from sales for January and February.

Solution

Schedule of Cash Receipts from Sales	January	February
Sales	$80,000	$90,000
Cash receipts from:		
Cash sales (70% of current sales)	56,000	63,000
Collections of prior period sales (30%)	20,000	24,000
Total cash receipts	$76,000	$87,000

Do More: Do More: QS 20-17, QS 20-18, QS 20-19, E 20-18

Part 2

page 785

Use the following information to prepare a cash budget for the month ended January 31 for Garcia Company. The company requires a minimum $30,000 cash balance at the end of each month. Any preliminary cash balance above $30,000 is used to repay loans (if any). Garcia has a $2,000 loan outstanding at the beginning of January.

a. January 1 cash balance, $30,000

b. Cash receipts from sales, $132,000

c. Cash payments for direct materials, $63,500 (1% of beginning loan balance of $2,000)

d. Cash payments for direct labor, $33,400

e. Cash paid for interest on loan, $20

f. Cash repayment of loan, $2,000

g. Cash paid for overhead, $8,180

Solution

Cash Budget For Month Ended January 31	
Beginning cash balance	$ 30,000
Add: Cash receipts from sales	132,000
Total cash available	162,000
Less: Cash payments for	
Direct materials	63,500
Direct labor	33,400
Overhead	8,180
Interest on loan ($2,000 × 1%)	20
Total cash payments	105,100
Preliminary cash balance	$ 56,900
Loan activity	
Repayment of loan	2,000
Ending cash balance	$ 54,900
Loan balance, end of month	$ 0

Do More: QS 20-24, E 20-17,E 20-20, E 20-21, E 20-22, E 20-23

BUDGETED FINANCIAL STATEMENTS

P3

Prepare budgeted financial statements.

Budgeted Income Statement

Point: Lenders often require potential borrowers to provide cash budgets, budgeted income statements, and budgeted balance sheets.

The **budgeted income statement** shows budgeted sales and expenses for the budget period. TSC's budgeted income statement is in Exhibit 20.17. All information is taken from budgets in this chapter. We predict income tax expense as 40% of the budgeted income before income taxes. These taxes are not payable until next year and are not included on this quarter's cash budget.

EXHIBIT 20.17

Budgeted Income Statement

TORONTO STICKS COMPANY
Budgeted Income Statement
For Three Months Ended December 31

Sales (Exhibit 20.4, 3,200 units @ $60)		$192,000
Cost of goods sold (3,200 units @ $17)*		54,400
Gross profit		137,600
Selling, general, and administrative expenses		
Sales commissions (Exhibit 20.11)	$19,200	
Sales salaries (Exhibit 20.11)	6,000	
Administrative salaries (Exhibit 20.12)	13,500	
Interest expense (Exhibit 20.16)	144	38,844
Income before income taxes		98,756
Income tax expense ($98,756 × 40%)†		39,502
Net income		$ 59,254

*$17 product cost per unit from Exhibit 20.10. †Rounded to the dollar.

page 786

Budgeted Balance Sheet

The **budgeted balance sheet** shows budgeted amounts for assets, liabilities, and equity as of the end of the budget period. TSC's budgeted balance sheet in Exhibit 20.18 is prepared using information from other budgets. Sources of amounts are in notes to the budgeted balance sheet.

EXHIBIT 20.18

Budgeted Balance Sheet

Retained Earnings

		42,870	Sep. 30
		59,254	Net Income
Dividends	3,000		
		99,124	Dec. 31

TORONTO STICKS COMPANY
Budgeted Balance Sheet
December 31

Assets			Liabilities and Equity		
Cash[a]		$ 44,706	Liabilities		
Accounts receivable[b]		50,400	Accounts payable[g]	$ 9,700	
Raw materials inventory[c]		4,950	Income taxes payable[h]	39,502	$ 49,202
Finished goods inventory[d]		13,770	Equity		
Equipment[e]	$225,000		Common stock[i]	150,000	
Less: Accumulated depreciation[f]	40,500	184,500	Retained earnings[j]	99,124	249,124
Total assets		$298,326	Total liabilities and equity		$298,326

[a] Ending balance for December from the cash budget in Exhibit 20.16.
[b] 60% of $84,000 sales budgeted for December from the sales budget in Exhibit 20.4.
[c] 247.5 pounds of materials in ending inventory at $20 per pound from direct materials budget in Exhibit 20.7.
[d] 810 units in budgeted finished goods inventory in Exhibit 20.6 at $17 per unit from Exhibit 20.10.
[e] September 30 balance of $200,000 from the beginning balance sheet in Exhibit 20.3 plus $25,000 of new equipment from the cash budget in Exhibit 20.16.
[f] September 30 balance of $36,000 from the beginning balance sheet in Exhibit 20.3 plus $4,500 depreciation expense from the factory overhead budget in Exhibit 20.9.
[g] Budgeted cost of materials purchases for December from Exhibit 20.7, to be paid in January.
[h] Income tax expense from the budgeted income statement for the fourth quarter in Exhibit 20.17, to be paid in January.
[i] Unchanged from the beginning balance sheet in Exhibit 20.3.
[j] September 30 balance of $42,870 from the beginning balance sheet in Exhibit 20.3 plus budgeted net income of $59,254 from the budgeted income statement in Exhibit 20.17 minus budgeted cash dividends of $3,000 from Exhibit 20.16.

Point: A budgeted retained earnings statement is prepared in NTK 20-6.

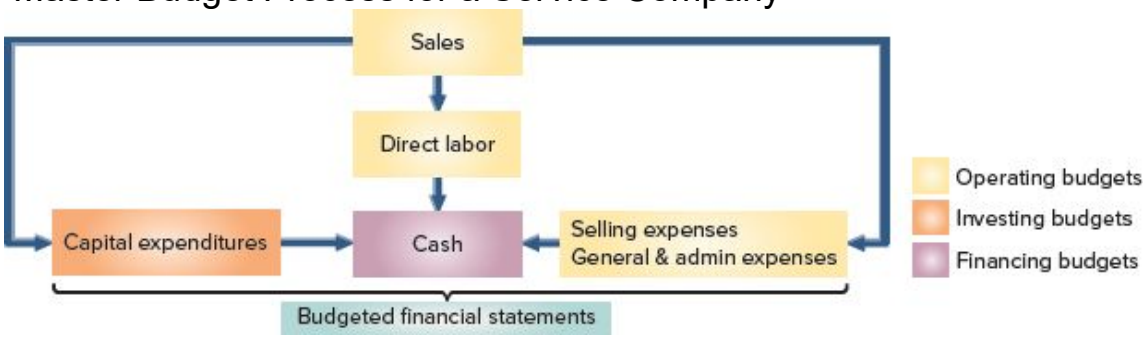
Using the Master Budget Managers use the master budget in several ways.

- *Sensitivity analysis*—Technologies like Excel and enterprise resource planning (ERP) systems enable managers to quickly compute alternative master budgets under different assumptions, allowing them to better plan for and adapt to changing conditions.
- *Planning*—Any stage in the master budgeting process might show results that require new plans. For example, an early version of the cash budget might show too little cash unless payments are reduced. A budgeted income statement might show income below its target, or a budgeted balance sheet might show too much debt from planned equipment purchases. Management can change its plans to aim for better results.
- *Controlling*—Managers compare actual results to budgeted results. Differences between actual and budgeted results are called *variances*. Managers examine variances to identify areas to improve and take corrective action.

Budgeting for Service Companies Service providers also use master budgets; however, because they do not manufacture goods and hold no inventory, they typically need fewer operating budgets than manufacturers do. Exhibit 20.19 shows the master budget process for a service provider.

EXHIBIT 20.19

Master Budget Process for a Service Company



Service providers *do not prepare production, direct materials, or factory overhead budgets*. In addition, because many services such as accounting, banking, and landscaping are labor-intensive, the direct labor budget is especially important. We illustrate a direct labor budget for a service firm in this chapter's Decision Analysis.

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Analytics Insight

Data Pop Online-first brands, which are companies without permanent storefronts, often use data analytics on customer ZIP codes and purchases to determine where and for how long to open their pop-up stores. Pop-up stores stay open only as long as they are profitable, sometimes just weeks or even days. A consulting firm estimates that about 4% of all online sales comes from online-first brands. ■

CORPORATE SOCIAL RESPONSIBILITY

Budgets translate strategic goals into dollars. When setting strategic goals, managers must consider their effects on budgets. **Johnson & Johnson**, a manufacturer of pharmaceuticals, medical devices, and consumer health products, sets goals for both profits and sustainable practices. A recent company report discusses several sustainability goals and strategies, including those in Exhibit 20.20.

EXHIBIT 20.20

Sustainability Goals and Strategies

Sustainability Goal	Strategy to Achieve Goal
Reduce waste by 10%.	Purchase pulping machine to grind and recycle packaging.
Reduce CO_2 emissions by 20%.	Purchase hybrid vehicles.
Reduce water usage by 10%.	Update plumbing, install water recovery systems, employee training.

Several strategies involve asset purchases that will impact the capital expenditures budget. Additional employee training will impact the overhead budget. By reducing waste, increasing recycling, and reducing water usage, the company hopes to reduce some of the costs reflected in the direct materials and overhead budgets. Managers evaluate performance with respect to these goals and make adjustments to budgets.

Nailah Ellis-Brown, founder of this chapter's feature company, **Ellis Island Tropical Tea**, focuses on the "people" aspect of the triple bottom line. For her, that means doing what she can to help the people of Detroit. "My passion is for [Michigan] natives," explains Nailah, "many of whom happen to be black."

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Decision Analysis — Direct Labor Budget and Revenue per Employee

A1

Prepare a direct labor budget for a service firm and analyze revenue per employee.

Direct Labor Budget A direct labor budget is the key budget for a service firm. If an accounting firm underestimates the direct labor hours needed to complete an audit, it might charge too low a price. If the accounting firm overestimates the direct labor hours needed, it might bid too high a price (and lose jobs). Either way, income suffers if direct labor budgets are inaccurate.

The direct labor cost for employees follows.

Exhibit 20.21 shows a direct labor budget for a services job. This firm would use the $6,200 total direct labor cost in determining a price to bid for the job.

EXHIBIT 20.21

Direct Labor Budget for a Services Firm

Direct Labor Budget			
	Direct Labor Hours	Direct Labor Cost per Hour	Direct Labor Cost
Data mining and analysis	40	$30	$1,200
Staff investigative analyst	100	40	4,000
Senior forensic accountant	20	50	1,000
Cost of direct labor			$6,200

Revenue per Employee Services and other types of businesses can assess effectiveness of their workforce using **revenue per employee**, a ratio that measures the revenue generated per employee and is computed as follows:

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$$\text{Revenue per employee} = \frac{\text{Total revenue}}{\text{Total employees}}$$

Revenue per employee is shown below for **Microsoft** and **Hewlett Packard**. Microsoft's revenue per employee increased during the current year, suggesting the company's workforce became more effective in generating revenue. However, current year revenue per employee is higher for its competitor Hewlett Packard.

	Microsoft, Prior Year	Microsoft, Current Year	Hewlett Packard, Current Year
Total revenue	$110,360,000,000	$125,843,000,000	$57,756,000,000
Total employees	131,000	144,000	56,000
Revenue per employee	$ 842,443	$ 873,910	$ 1,031,357

Decision Maker

Environmental Manager You hold the new position of sustainability manager for a chemical company. You are asked to develop a budget for your job and identify job responsibilities. How do you proceed? ■ *Answer:* You are unlikely to have data on this new position to use in preparing your budget. Instead, apply *zero-based budgeting*. Develop a list of this job's necessary activities, then determine the resources needed and their costs. Be sure the listed activities are necessary and the resources are required.

NEED-TO-KNOW 20-6

COMPREHENSIVE 1

Master Budget—Manufacturer

Payne Company's management requests that we prepare its master budget. The budget is to cover the months of April, May, and June. Its balance sheet at March 31 follows.

PAYNE COMPANY
Balance Sheet
March 31

Assets			Liabilities and Equity		
Cash		$ 50,000	Liabilities		
Accounts receivable		175,000	Accounts payable	$ 63,315	
Raw materials inventory (2,425 lbs. @ $12.60)		30,555	Loan payable	12,000	
Finished goods inventory (8,400 units @ $11.45)		96,180	Long-term note payable	200,000	$275,315
Equipment	$480,000		Equity		
Less: Accumulated depreciation	90,000	390,000	Common stock	435,000	
			Retained earnings	31,420	466,420
Total assets		$741,735	Total liabilities and equity		$741,735

Additional Information

a. Sales for March were 10,000 units. Budgeted sales units are 10,500 for April, 9,500 for May, 10,000 for June, and 10,500 for July. The product's selling price is $25 per unit.

b. Company policy calls for month-end finished goods inventory to equal 80% of next month's budgeted unit sales. The March 31 finished goods inventory of 8,400 units complies with the policy.

Company policy also calls for month-end materials inventory to equal 50% of next month's budgeted direct materials needed for production. The March 31 ending materials inventory of 2,425 units complies with the policy. The company expects to have 2,100 units of materials inventory on June 30. Product cost information follows.

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Product Cost	Per Unit
Direct materials (0.5 pound of materials × $12.60 per pound of materials)	$ 6.30
Direct labor (0.25 direct labor hour × $15 per direct labor hour)	3.75
Variable overhead (0.25 direct labor hour × $3.60 variable overhead per direct labor hour)	0.90
Fixed overhead ($5,000 total fixed overhead per month/10,000 expected units of production)*	0.50
Total product cost per unit	$11.45

*Fixed overhead consists entirely of $5,000 of depreciation expense. In determining fixed overhead per unit, the company expects production to normally be 10,000 units per month.

c. Sales commissions of 12% of sales are paid in the month of the sales. The sales manager's monthly salary will be $3,500 in April and $4,000 per month thereafter.

d. Monthly general and administrative expenses include $8,000 for administrative salaries and 0.9% monthly interest on the long-term note payable.

e. The company expects 30% of sales to be for cash and the remaining 70% on credit. Credit sales are collected in full in the month following the sale (none are collected in the month of sale).

f. All direct materials purchases are on credit, and no payables arise from any other transactions. All credit purchases (recorded in accounts payable) are paid in the month following the purchase. Materials cost $12.60 per pound.

g. The minimum ending cash balance for all months is $50,000. If necessary, the company borrows enough cash using a loan to reach the minimum. Loans require an interest payment of 1% at each month-end (before any repayment). If the ending cash balance exceeds the minimum, the excess will be used to repay any loans.

h. Dividends of $100,000 are to be declared and paid in May.

i. No cash payments for income taxes are to be made during the second calendar quarter. Income taxes are budgeted at 35% in the quarter.

j. Equipment purchases for cash of $55,000 are budgeted for June.

k. Fixed overhead consists only of $5,000 per month of depreciation expense on factory equipment.

Required

Prepare the following budgets and schedules for each month of April, May, and June. In addition, compute the three-month total for parts 1, 6 and 7 for use in preparing financial statements.

1. Sales budget.
2. Production budget.
3. Direct materials budget. Round costs of materialspurchases to the nearest dollar.
4. Direct labor budget.
5. Factory overhead budget.
6. Selling expense budget.
7. General and administrative expense budget.
8. Schedule of cash receipts from sales.
9. Schedule of cash payments for direct materials.
10. Cash budget.
11. Budgeted income statement, budgeted statement of retained earnings, and budgeted balance sheet.

SOLUTION

1.

Sales Budget	April	May	June	Quarter
Budgeted sales units	10,500	9,500	10,000	30,000
Selling price per unit	× $ 25	× $ 25	× $ 25	× $ 25
Total budgeted sales	$262,500	$237,500	$250,000	$750,000

2.

Production Budget	April	May	June
Budgeted sales units	10,500	9,500	10,000
Add: Desired ending inventory			
Next period budgeted sales units	9,500	10,000	10,500*
Ratio of inventory to future sales	× 80%	× 80%	× 80%
Desired ending inventory units	7,600	8,000	8,400
Total required units	18,100	17,500	18,400
Less: Beginning inventory units	8,400	7,600	8,000
Units to produce	9,700	9,900	10,400

*Budgeted sales for July (from part *a* of additional information).

3.

Direct Materials Budget	April	May	June
Units to produce (from part 2)	9,700	9,900	10,400
Materials required per unit (pounds)	× 0.5	× 0.5	× 0.5
Materials needed for production (pounds)	4,850	4,950	5,200
Add: Desired ending materials inventory (pounds)	2,475	2,600	2,100*
Total materials required (pounds)	7,325	7,550	7,300
Less: Beginning materials inventory (pounds)	2,425*	2,475	2,600
Materials to purchase (pounds)	4,900	5,075	4,700
Materials cost per pound	$ 12.60	$ 12.60	$ 12.60
Cost of direct materials purchases	$61,740	$63,945	$59,220

*From part *b* of additional information.

4.

Direct Labor Budget	April	May	June
Units to produce (from part 2)	9,700	9,900	10,400
Direct labor hours required per unit	× 0.25	× 0.25	× 0.25
Direct labor hours needed	2,425	2,475	2,600
Direct labor cost per hour	$ 15	$ 15	$ 15
Cost of direct labor	$36,375	$37,125	$39,000

5.

Factory Overhead Budget	April	May	June
Direct labor hours needed (from part 4)	2,425	2,475	2,600
Variable overhead rate per direct labor hour*	× $ 3.60	× $ 3.60	× $ 3.60
Budgeted variable overhead	8,730	8,910	9,360
Budgeted fixed overhead†	5,000	5,000	5,000
Budgeted total factory overhead	$13,730	$13,910	$14,360

*From parts *b* and *k* of additional information. †From part *k* of additional information.

6.

Selling Expense Budget	April	May	June	Quarter
Budgeted sales (from part 1)	$262,500	$237,500	$250,000	$750,000
Sales commissions of 12%	× 12%	× 12%	× 12%	× 12%
Sales commissions	31,500	28,500	30,000	90,000
Salary for sales manager	3,500	4,000	4,000	11,500
Total selling expenses	$ 35,000	$ 32,500	$ 34,000	$101,500

7.

General and Administrative Expense Budget	April	May	June	Quarter
Administrative salaries	$8,000	$8,000	$8,000	$24,000
Interest on long-term note payable (0.9% × $200,000)	1,800	1,800	1,800	5,400
Total general and administrative expenses	$9,800	$9,800	$9,800	$29,400

8.

Schedule of Cash Receipts from Sales	April	May	June
Sales (from part 1)	$262,500	$237,500	$250,000
Cash receipts from:			
Cash sales (30% of current sales)	$ 78,750	$ 71,250	$ 75,000
Collections of prior period sales (70%)	175,000*	183,750	166,250
Total cash receipts	$253,750	$255,000	$ 241,250

*Credit sales from March (10,000 units × $25 price × 70% on credit).

9.

Schedule of Cash Payments for Direct Materials	April	May	June
Materials purchases (from part 3)	$61,740	$63,945	$59,220
Cash payments for:			
Current period purchases (0%)	$ 0	$ 0	$ 0
Prior period purchases (100%)	63,315*	61,740	63,945
Total cash payments	$63,315	$61,740	$63,945

*100% of prior period purchases equals Accounts Payable balance from March 31 balance sheet (see part *f*).

10.

Cash Budget	April	May	June
Beginning cash balance	$ 50,000	$138,410	$ 143,335
Add: Cash receipts from sales (part 8)	253,750	255,000	241,250
Total cash available	303,750	393,410	384,585
Less: Cash payments for			
Direct materials (part 9)	63,315	61,740	63,945
Direct labor (part 4)	36,375	37,125	39,000
Variable overhead (part 5)	8,730	8,910	9,360
Sales commissions (part 6)	31,500	28,500	30,000
Sales salaries (part 6)	3,500	4,000	4,000
Administrative salaries (part 7)	8,000	8,000	8,000
Dividends	0	100,000	0
Interest on long-term note (part 7)	1,800	1,800	1,800
Interest on loan			
April ($12,000 × 1%)	120	0	0
Purchase of equipment	0	0	55,000
Total cash payments	153,340	250,075	211,105
Preliminary cash balance	150,410	143,335	173,480
Loan activity			
Additional loan	$ 0	$ 0	$ 0
Repayment of loan	12,000	0	0
Ending cash balance	$138,410	$143,335	$ 173,480
Loan balance, end of month	$ 0	$ 0	$ 0

11.

PAYNE COMPANY
Budgeted Income Statement
For Quarter Ended June 30

Sales (part 1)		$750,000
Cost of goods sold (30,000 units @ $11.45)		343,500
Gross profit		406,500
Selling, general, and administrative expenses		
Sales commissions (part 6)	$90,000	
Sales salaries (part 6)	11,500	
Administrative salaries (part 7)	24,000	
Interest on long-term note (part 7)	5,400	
Interest on loan (part 10)	120	131,020
Income before income taxes		275,480
Income taxes (275,480 × 35%)		96,418
Net income		$179,062

PAYNE COMPANY
Budgeted Statement of Retained Earnings
For Quarter Ended June 30

Retained earnings, March 31	$ 31,420
Net income	179,062
	210,482
Less: Cash dividends (part 10)	100,000
Retained earnings, June 30	$110,482

PAYNE COMPANY
Budgeted Balance Sheet
June 30

Assets			Liabilities and Equity		
Cash (part 10)		$173,480	Liabilities		
Accounts receivable (70% × $250,000; see part 8)		175,000	Accounts payable (part 9)	$ 59,220	
Raw materials inventory (2,100 pounds* @ $12.60)		26,460	Income taxes payable	96,418	
Finished goods inventory (8,400 units @ $11.45)		96,180	Long-term note payable (Mar. 31 bal.)	200,000	$355,638
Equipment (Mar. 31 bal. plus purchase)	$535,000		Equity		
Less: Accumulated depreciation (Mar. 31 bal. plus depreciation expense)	105,000	430,000	Common stock	435,000	
			Retained earnings	110,482	545,482
Total assets		$901,120	Total liabilities and equity		$901,120

NEED-TO-KNOW 20-7

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COMPREHENSIVE 2

Appendix: Master Budget—Merchandiser

Wild Wood Company's management prepares its master budget using the following information. The budget covers the months of April, May, and June. Wild Wood is a merchandiser.

WILD WOOD COMPANY
Balance Sheet
March 31

Assets			Liabilities and Equity		
Cash		$ 50,000	Liabilities		
Accounts receivable		175,000	Accounts payable	$162,000	
Merchandise inventory (8,800 units × $15)		132,000	Loan payable	12,000	
Equipment	$480,000		Long-term note payable	200,000	$374,000
Less: Accumulated depreciation	90,000	390,000	Equity		
			Common stock	235,000	
			Retained earnings	138,000	373,000
Total assets		$747,000	Total liabilities and equity		$747,000

Additional Information

a. Sales for March were 10,000 units. Each month's sales units are expected to exceed the prior month's sales units by 10%. The product's selling price is $25 per unit.

b. Company policy calls for a given month's ending merchandise inventory to equal 80% of next month's budgeted unit sales. The March 31 merchandise inventory of 8,800 units complies with the policy. The purchase price is $15 per unit.

c. Sales commissions of 12% of sales are paid in the month of the sales. The sales manager's monthly salary will be $3,500 in April and $4,000 per month thereafter.

d. Monthly general and administrative expenses include $8,000 of administrative salaries, $5,000 of depreciation, and 0.9% monthly interest on the long-term note payable.

e. The company expects 30% of sales to be for cash and the remaining 70% on credit. Credit sales are collected in full in the month following the sale (none are collected in the month of the sale).

f. All merchandise purchases are on credit, and no payables arise from any other transactions. All credit purchases (recorded in accounts payable) are paid in the month following the purchase.

g. The minimum ending cash balance for all months is $50,000. If necessary, the company borrows enough cash using a loan to reach the minimum. Loans require an interest payment of 1% at each month-end (before any repayment). If the ending cash balance exceeds the minimum, the excess will be used to repay any loans.

h. Dividends of $80,000 are to be declared and paid in May.

i. Income taxes are budgeted at 30% in the quarter. No cash payments for income taxes are to be made during the second calendar quarter.

j. Equipment purchases for cash of $55,000 are scheduled for June.

Required

Prepare the following budgets and schedules for each month of April, May, and June. In addition, compute the three-month total for parts 1, 3, and 4 for use in preparing financial statements.

1. Sales budget, including budgeted sales for July.

2. Merchandise purchases budget.

3. Selling expense budget.

4. General and administrative expense budget.

5. Schedule of cash receipts from sales.

6. Schedule of cash payments for merchandise purchases.

7. Cash budget.

8. Budgeted income statement, budgeted statement of retained earnings, and budgeted balance sheet.

SOLUTION

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1.

Calculation of Unit Sales	April	May	June	July
Prior period unit sales	10,000	11,000	12,100	13,310
Plus 10% growth	1,000	1,100	1,210	1,331
Budgeted sales units	11,000	12,100	13,310	14,641

Sales Budget	April	May	June	Quarter
Budgeted sales units	11,000	12,100	13,310	36,410
Selling price per unit	× $ 25	× $ 25	× $ 25	× $ 25
Total budgeted sales	$275,000	$302,500	$332,750	$910,250

2.

Merchandise Purchases Budget	April	May	June
Budgeted sales units	11,000	12,100	13,310
Add: Desired ending inventory			
Next period budgeted sales units	12,100	13,310	14,641
Ratio of inventory to future sales	× 80%	× 80%	× 80%
Desired ending inventory units	9,680	10,648	11,713
Total required units	20,680	22,748	25,023
Less: Beginning inventory units	8,800	9,680	10,648
Units to purchase	11,880	13,068	14,375
Cost per unit	$ 15	$ 15	$ 15
Cost of merchandise purchases	$178,200	$196,020	$215,625

3.

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Selling Expense Budget	April	May	June	Quarter
Budgeted sales (part 1)	$275,000	$302,500	$332,750	$910,250
Sales commissions of 12%	× 12%	× 12%	× 12%	× 12%
Sales commissions	33,000	36,300	39,930	109,230
Salary for sales manager	3,500	4,000	4,000	11,500
Total selling expenses	$ 36,500	$ 40,300	$ 43,930	$120,730

4.

General and Administrative Expense Budget	April	May	June	Quarter
Administrative salaries	$ 8,000	$ 8,000	$ 8,000	$24,000
Depreciation expense	5,000	5,000	5,000	15,000
Interest on long-term note payable (0.9% × $200,000)	1,800	1,800	1,800	5,400
Total general and administrative expenses	$14,800	$14,800	$14,800	$44,400

5.

Schedule of Cash Receipts from Sales	April	May	June
Sales (part 1)	$275,000	$302,500	$332,750
Cash receipts from:			
Cash sales (30% of current sales)	$ 82,500	$ 90,750	$ 99,825
Collections of prior period sales (70%)	175,000*	192,500	211,750
Total cash receipts	$257,500	$283,250	$311,575

*70% of credit sales from March (10,000 units × $25 price × 70% on credit).

6.

Schedule of Cash Payments for Merchandise Purchases	April	May	June
Merchandise purchases (part 2)	$178,200	$196,020	$215,625
Cash payments for:			
Current period purchases (0%)	$ 0	$ 0	$ 0
Prior period purchases (100%)	162,000*	178,200	196,020
Total cash payments	$162,000	$178,200	$196,020

*100% of prior-period purchases equals Accounts Payable balance from March 31 balance sheet (see part *f*).

7.

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Cash Budget	April	May	June
Beginning cash balance	$ 50,000	$ 87,080	$ 62,030
Add: Cash receipts from sales (part 5)	257,500	283,250	311,575
Total cash available	307,500	370,330	373,605
Less: Cash payments for			
Merchandise purchases (part 6)	162,000	178,200	196,020
Sales commissions (part 3)	33,000	36,300	39,930
Sales salaries (part 3)	3,500	4,000	4,000
Administrative salaries (part 4)	8,000	8,000	8,000
Interest on long-term note (part 4)	1,800	1,800	1,800
Dividends	0	80,000	0
Purchase of equipment	0	0	55,000
Interest on loan			
April ($12,000 × 1%)	120	0	0
Total cash payments	208,420	308,300	304,750
Preliminary cash balance	99,080	62,030	68,855
Loan activity			
Additional loan	$ 0	$ 0	$ 0
Repayment of loan	12,000	0	0
Ending cash balance	$ 87,080	$ 62,030	$ 68,855
Loan balance, end of month	$ 0	$ 0	$ 0

8.

WILD WOOD COMPANY
Budgeted Income Statement
For Quarter Ended June 30

Sales (part 1)		$910,250
Cost of goods sold (36,410 units @ $15)		546,150
Gross profit		364,100
Selling, general, and administrative expenses		
Sales commissions (part 3)	$109,230	
Sales salaries (part 3)	11,500	
Administrative salaries (part 4)	24,000	
Depreciation (part 4)	15,000	
Interest on long-term note (part 4)	5,400	
Interest on loan (part 7)	120	165,250
Income before income taxes		198,850
Income taxes (198,850 × 30%)		59,655
Net income		$139,195

WILD WOOD COMPANY
Budgeted Statement of Retained Earnings
For Quarter Ended June 30

Beginning retained earnings (Mar. 31 bal.)	$138,000
Net income	139,195
	277,195
Less: Cash dividends (part 7)	80,000
Ending retained earnings	$197,195

WILD WOOD COMPANY
Budgeted Balance Sheet
June 30

Assets			Liabilities and Equity		
Cash (part 7)		$ 68,855	Liabilities		
Accounts receivable (70% of June Sales)		232,925	Accounts payable (part 6)	$215,625	
Inventory (11,713 units @ $15 each)		175,695	Income taxes payable	59,655	
			Long-term note payable (Mar. 31 bal.)	200,000	$475,280
Equipment (Mar. 31 bal. plus purchase)	$535,000		Equity		
Less: Accumulated depreciation (Mar. 31 bal. plus depreciation expense)	105,000	430,000	Common stock (Mar. 31 bal.)	235,000	
			Retained earnings	197,195	432,195
Total assets		$907,475	Total liabilities and equity		907,475

APPENDIX

20A Merchandise Purchases Budget

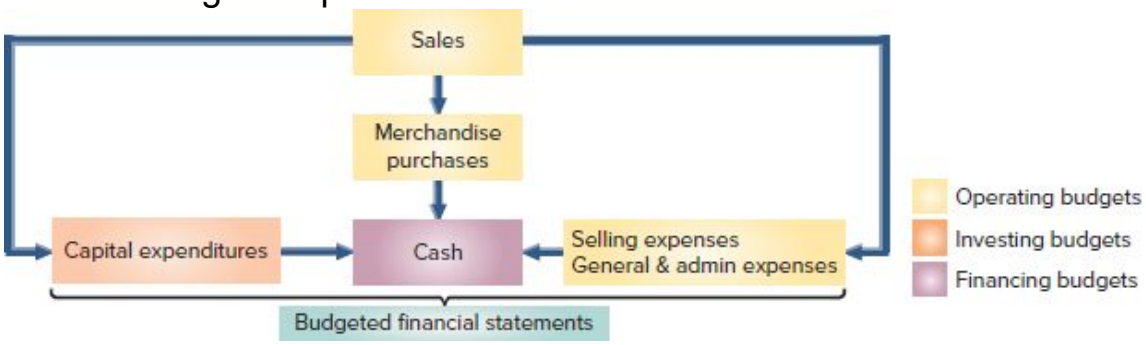
P4

Prepare each component of a master budget for a merchandising company.

Exhibit 20A.1 shows the master budget process for a merchandiser. Unlike a manufacturing company, a merchandiser prepares a merchandise purchases budget rather than a production budget. In addition, a merchandiser does not prepare direct materials, direct labor, or factory overhead budgets. We show the merchandise purchases budget for Hockey Den (HD), a retailer of hockey sticks.

EXHIBIT 20A.1

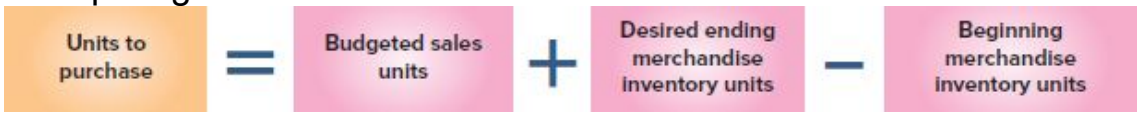
Master Budget Sequence—Merchandiser



Preparing the Merchandise Purchases Budget A merchandiser usually expresses a **merchandise purchases budget** in both units and dollars. Exhibit 20A.2 shows the layout for this budget. If only one product is involved, we can compute the number of dollars of inventory to be purchased for the budget by multiplying the units to be purchased by the cost per unit.

EXHIBIT 20A.2

Computing Units to Purchase



A merchandise purchases budget for HD is in Exhibit 20A.3, which consists of 3 parts.

1. **Budgeted sales units**. HD predicts unit sales as follows: October, 1,000; November, 800; December, 1,400; and January, 900.
2. **Desired ending inventory units**. Starting with October, HD set a policy that ending inventory units should equal 90% of next month's budgeted sales. For example, inventory units at the end of October should equal 90% of November's budgeted sales units.
3. **Cost of merchandise purchases**. HD expects the per unit purchase cost of $60 to remain unchanged through the budgeting period. Given 1,010 units are in inventory at September 30, HD can prepare the merchandise purchases budget shown in Exhibit 20A.3.

EXHIBIT 20A.3

Merchandise Purchases Budget

	HOCKEY DEN Merchandise Purchases Budget	October	November	December
1	Budgeted sales units	1,000	800	1,400
	Add: Desired ending inventory			
	Next period budgeted sales units	800	1,400	900
	Ratio of inventory to future sales	× 90%	× 90%	× 90%
2	Desired ending inventory units	720	1,260	810
	Total required units	1,720	2,060	2,210
	Less: Beginning inventory units	1,010	720	1,260
	Units to purchase	710	1,340	950
	Cost per unit	$ 60	$ 60	$ 60
3	Cost of merchandise purchases	$42,600	$80,400	$57,000

Schedule of Cash Payments for Merchandise Purchases

Using the budgeted cost of merchandise purchases from Exhibit 20A.3, and given September purchases of $50,000, Hockey Den's schedule of cash payments for merchandise is in Exhibit 20A.4. HD pays 40% of a month's purchases in the month of purchase, and the remaining 60% is paid in the month after purchase.

EXHIBIT 20A.4

Schedule of Cash Payments for Merchandise Purchases

HOCKEY DEN Schedule of Cash Payments for Merchandise Purchases	October	November	December
Merchandise purchases (from Exhibit 20A.3)	$42,600	$80,400	$57,000
Cash payments for:			
Current period purchases (40%)	$17,040	$32,160	$22,800
Prior period purchases (60%)	30,000*	25,560	48,240
Total cash payments for merchandise purchases	$47,040	$57,720	$71,040

*60% of prior period purchases equals the prior period Accounts Payable balance for this company.

Other Master Budget Differences—Merchandiser vs. Manufacturer In addition to preparing a merchandise purchases budget instead of production, direct materials, direct labor, and overhead budgets, other key differences in master budgets for merchandisers include:

- All depreciation expense is included in the general and administrative expense budget of the merchandiser. For the manufacturer, depreciation on manufacturing assets is included in the factory overhead budget and treated as a product cost; depreciation on nonmanufacturing assets is included in the general and administrative expense budget.
- The budgeted balance sheet for the merchandiser will report only one asset for inventory. The balance sheet for the manufacturer will typically report three inventory assets: raw materials, work in process, and finished goods.

See **Need-to-Know 20-7** for illustration of a complete master budget, including budgeted financial statements, for a merchandising company.

NEED-TO-KNOW 20-8

Merchandise Purchases Budget

P4

In preparing monthly budgets, a merchandiser budgeted sales of 120 units for July and 140 units for August. Management wants each month's ending inventory in units to be 60% of next month's sales units. The June 30 inventory consists of 72 units. The merchandise cost per unit is $50. Prepare the merchandise purchases budget for July.

Solution

Merchandise Purchases Budget	July
Budgeted sales units	120
Add: Desired ending inventory	
Next period budgeted sales units	140
Ratio of inventory to future sales	× 60%
Desired ending inventory units	84
Total required units	204
Less: Beginning inventory units	72
Units to purchase	132
Cost per unit	$ 50
Cost of merchandise purchases	$6,600

Do More: QS 20-28, QS 20-29, QS 20-30, E 20-25

Summary: Cheat Sheet

BUDGET PROCESS

Budget: Formal statement of plans expressed in dollars and/or units.

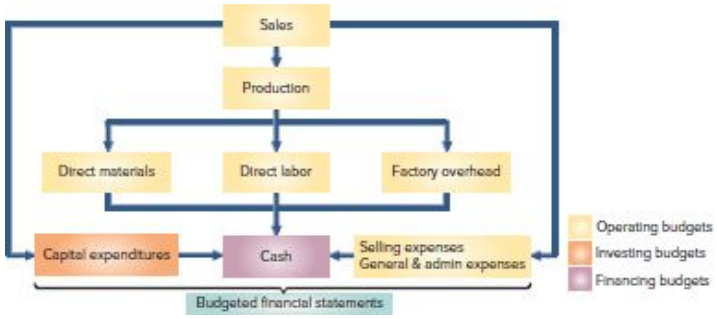
Budgeting benefits: Plan, control, coordinate, communicate, and motivate.

Budgeting guidelines:

1. Employees affected should help prepare (*participatory budgeting*).
2. Goals should be challenging but attainable.
3. Chance to explain differences between actual and budgeted amounts.

OPERATING BUDGETS

Master Budget Components



Sales budget

Budgeted sales $ = Budgeted sales units × Selling price per unit

Sales Budget	October
Budgeted sales units	1,000
Selling price per unit	× $ 60
Total budgeted sales	$60,000

Production Budget

Production Budget	October
Budgeted sales units	1,000
Add: Desired ending inventory	
Next period budgeted sales units	800
Ratio of inventory to future sales	× 90%
Desired ending inventory units	720
Total required units	1,720
Less: Beginning inventory units	1,010
Units to produce	710

Direct Materials Budget

page 798

Direct Materials Budget	October
Units to produce	710
Materials required per unit (pounds)	× 0.5
Materials needed for production (pounds)	355
Add: Desired ending materials inventory (pounds)	335
Total materials required (pounds)	690
Less: Beginning materials inventory (pounds)	178
Materials to purchase (pounds)	512
Materials cost per pound	$ 20
Cost of direct materials purchases	$10,240

Direct Labor Budget

Direct Labor Budget	October
Units to produce	710
Direct labor hours required per unit	× 0.25
Direct labor hours needed	177.5
Direct labor cost per hour	$ 12
Cost of direct labor	$2,130

Overhead Budget

Factory Overhead Budget	October
Direct labor hours needed	177.5
Variable overhead rate per direct labor hour	× $ 10
Budgeted variable overhead	1,775
Budgeted fixed overhead	1,500
Budgeted total factory overhead	$3,275

Cost of Goods Sold Budget

Cost of Goods Sold Budget	October
Budgeted sales units	1,000
Budgeted cost per unit	$ 17
Budgeted cost of goods sold	$17,000

Selling Expense Budget

Selling Expense Budget	October
Budgeted sales	$60,000
Sales commission of 10%	× 10%
Sales commissions	6,000
Salary for sales manager	2,000
Total selling expenses	$ 8,000

General and Administrative Expense Budget

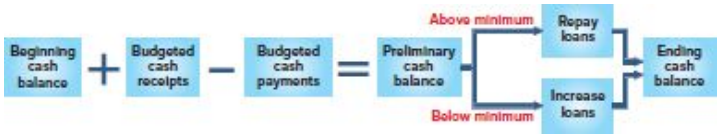
General and Administrative Expense Budget	October
Administrative salaries	$4,500
Total general and administrative expenses	$4,500

INVESTING AND FINANCING BUDGETS

Capital Expenditures Budget

Capital Expenditures Budget	October	November	December
Purchase of equipment	$0	$0	$25,000
Total capital expenditures	$0	$0	$25,000

Cash Budget Layout



Schedule of Cash Receipts from Sales

Schedule of Cash Receipts from Sales	September	October
Sales	$42,000	$60,000
Cash receipts from:		
Cash sales (40% of current sales)		$24,000
Collections of prior period sales (60%)		25,200
Total cash receipts		$49,200

Schedule of Cash Payments for Direct Materials

Schedule of Cash Payments for Direct Materials	September	October
Materials purchases	$7,060	$10,240
Cash payments for:		
Current period purchases (0%)		$ 0
Prior period purchases (100%)		7,060
Total cash payments		$ 7,060

Cash Budget

Cash Budget	October
Beginning cash balance	$20,000
Add: Cash receipts from sales (Exhibit 20.14)	49,200
Total cash available	69,200
Less: Cash payments for	
Direct materials (Exhibit 20.15)	7,060
Direct labor (Exhibit 20.8)	2,130
Variable overhead (Exhibit 20.9)	1,775
Sales commissions (Exhibit 20.11)	6,000
Sales salaries (Exhibit 20.11)	2,000
Administrative salaries (Exhibit 20.12)	4,500
Income taxes (Exhibit 20.3)	20,000
Dividends	0
Interest on loan	
October ($10,000 × 1%)	100
Purchase of equipment	0
Total cash payments	43,565
Preliminary cash balance	$25,635
Loan activity	
Additional loan	$ 0
Repayment of loan	5,635
Ending cash balance	$20,000
Loan balance, end of month	$ 4,365

BUDGETED FINANCIAL STATEMENTS

Budgeted income statement

Budgeted Income Statement		
Sales (Exhibit 20.4, 3,200 units @ $60)		$192,000
Cost of goods sold (3,200 units @ $17)		54,400
Gross profit		137,600
Selling, general, and administrative expenses		
Sales commissions (Exhibit 20.11)	$19,200	
Sales salaries (Exhibit 20.11)	6,000	
Administrative salaries (Exhibit 20.12)	13,500	
Interest expense (Exhibit 20.16)	144	38,844
Income before income taxes		98,756
Income tax expense ($98,756 × 40%)		39,502
Net income		$ 59,254

Budgeted balance sheet

Budgeted Balance Sheet

Assets			Liabilities and Equity		
Cash		$ 44,706	Liabilities		
Accounts receivable		50,400	Accounts payable	$ 9,700	
Raw materials inventory		4,950	Income taxes payable	39,502	$ 49,202
Finished goods inventory		13,770	Equity		
Equipment	$225,000		Common stock	150,000	
Less: Accumulated depreciation	40,500	184,500	Retained earnings	99,124	249,124
Total assets		$298,326	Total liabilities and equity		$298,326

Key Terms

Budget (773)

Budgetary control (773)

Budgeted balance sheet (786)

Budgeted income statement (785)

Budgeting (773)

Capital expenditures budget (781)

Cash budget (781)

Continuous budgeting (774)

Cost of goods sold budget (779)

Direct labor budget (778)

Direct materials budget (777)

Factory overhead budget (779)

General and administrative expense budget (780)

Master budget (775)

Merchandise purchases budget (795)

Production budget (776)

Revenue per employee (788)

Rolling budget (774)

Safety stock (776)

Sales budget (776)

Selling expense budget (780)

Zero-based budgeting (775)

Multiple Choice Quiz

1. A plan that reports the units to produce by a manufacturing company during the budget period is called a
   - **a.** Sales budget.
   - **b.** Cash budget.
   - **c.** Production budget.
   - **d.** Manufacturing budget.
   - **e.** Capital expenditures budget.
2. The following sales are budgeted for the next four months.

	April	May	June	July
Budgeted sales units . . .	480	560	600	480

   Each month's ending inventory of finished goods should be 30% of the next month's sales. The budgeted production for May is
   - **a.** 572 units.
   - **b.** 560 units.
   - **c.** 548 units.
   - **d.** 600 units.
   - **e.** 180 units.
3. A store has the following budgeted sales for the next three months.

	July	August	September
Budgeted sales	$180,000	$220,000	$240,000

   Cash sales are 25% of total sales and all credit sales are expected to be collected in the month following the sale. The total amount of cash expected to be received from customers in September is

a. $240,000.

b. $225,000.

d. $165,000.

c. $60,000.

e. $220,000.

4. A plan that shows the expected cash inflows and cash outflows during the budget period, including receipts from loans needed to maintain a minimum cash balance or repayments of such loans, is called

a. A rolling budget.

b. An income statement.

c. A balance sheet.

d. A cash budget.

e. An operating budget.

5[A]. A hardware store has budgeted cost of sales of $36,000 for its power tool department in July. Management wants to have $7,000 in tool inventory at the end of July. Its beginning inventory of tools is budgeted to be $6,000. What is the budgeted dollar amount of merchandise purchases?

a. $36,000

b. $43,000

c. $42,000

d. $35,000

e. $37,000

ANSWERS TO MULTIPLE CHOICE QUIZ

1. c

2. a; 560 units + (0.30 × 600 units) – (0.30 × 560 units) = 572 units

3. b; Cash collected = 25% of Sept sales + 75% of August sales = (0.25 × $240,000) + (0.75 × $220,000) = $225,000

4. d

5. e; Budgeted purchases = $36,000 + $7,000 – $6,000 = $37,000

Superscript letter A denotes assignments based on Appendix 20A.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

connect

QUICK STUDY

QS 20-1

Budget motivation

C1

For each of the following indicate *yes* if the item is an important budgeting guideline or *no* if it is not.

1. Employees should have the opportunity to explain differences from budgeted amounts.

2. Budgets should include budgetary slack.

3. Employees impacted by a budget should be consulted when it is prepared.

4. Goals in a budget should be set low so targets can always be reached.

5. Budgetary goals should be attainable.

QS 20-2

Budgeting benefits

C1

For each of the following indicate *yes* if it describes a potential benefit of budgeting or *no* if it describes a potential negative outcome of budgeting.

1. Budgets help coordinate activities across departments.

2. A budget forces managers to spend time planning for the future.

3. Some employees might overstate expenses in budgets.

4. Budgets can lead to excessive pressure to meet budgeted results.

5. Budgets can provide incentives for good performance.

QS 20-3

Sales budget **P1**

Grace manufactures and sells miniature digital cameras for $250 each. Sales in May were 1,000 units, and management forecasts 4% growth in unit sales each month. (*a*) Determine the budgeted sales units of cameras for June. (*b*) Prepare the sales budget for June.

QS 20-4

Sales budget **P1**

Scora Inc. sells a single product for $50 per unit. Budgeted sales units for the next three months follow. Prepare a sales budget for the months of January, February, and March.

	January	February	March
Budgeted sales units	1,200	2,000	1,600

QS 20-5

Production budget **P1**

Zahn Co. budgets sales of 220 units in May and 240 units in June. Each month's ending inventory should be 25% of the next month's sales. The April 30 ending finished goods inventory is 55 units. Prepare the production budget for May.

QS 20-6

Manufacturing: Production budget

P1

Champ Inc. budgets the following sales in units for the coming two months. Each month's ending inventory of finished units should be 60% of the next month's sales. The April 30 finished goods inventory is 108 units. Prepare the production budget for May.

	May	June
Budgeted sales units	180	200

QS 20-7

Manufacturing: Production budget

P1

Atlantic Surf manufactures surfboards. The company's budgeted sales units for the next three months is shown below. Company policy is to maintain finished goods inventory equal (in units) to 40% of the next month's unit sales. As of June 30, the company has 1,600 finished surfboards in inventory. Prepare the production budget for the months of July and August.

	July	August	September
Budgeted sales units	4,000	6,500	3,500

QS 20-8

Manufacturing: Production budget

P1

Forrest Company manufactures phone chargers and has a policy that ending inventory should equal 10% of the next month's budgeted unit sales. October's ending inventory equals 40,000 units. November and December sales are budgeted to be 400,000 units and 350,000 units, respectively. Prepare the production budget for November.

QS 20-9

Manufacturing: Direct materials budget

P1

Miami Solar manufactures solar panels for industrial use. The company budgets production of 5,000 units (solar panels) in July and 5,300 units in August. Each unit requires 3 pounds of direct materials, which cost $6 per pound. The company's policy is to maintain direct materials inventory equal to 30% of the next month's direct materials requirement. As of June 30, the company has 4,500 pounds of direct materials in inventory. Prepare the direct materials budget for July.

QS 20-10

Manufacturing: Direct labor budget **P1**

Miami Solar budgets production of 5,000 solar panels in July. Each unit requires 4 hours of direct labor at a rate of $16 per hour. Prepare a direct labor budget for July.

QS 20-11

Manufacturing: Factory overhead budget **P1**

Miami Solar budgets production of 5,300 solar panels for August. Each unit requires 4 hours of direct labor at a rate of $16 per hour. The company applies variable overhead at the rate of $12 per direct labor hour. Budgeted fixed factory overhead is $180,000 per month. Prepare a factory overhead budget for August.

QS 20-12

Manufacturing: Direct materials budget **P1**

Zortek Corp. budgets production of 400 units in January and 200 units in February. Each finished unit requires five pounds of material Z, which costs $2 per pound. Each month's ending inventory of material Z should be 40% of the following month's budgeted production. The January 1 inventory has 800 pounds of material Z. Prepare a direct materials budget for January.

QS 20-13

Manufacturing: Direct labor budget **P1**

Tora Co. plans to produce 1,020 units in July. Each unit requires two hours of direct labor. The direct labor rate is $20 per hour. Prepare a direct labor budget for July.

QS 20-14

Manufacturing: Factory overhead budget **P1**

Hockey Pro budgets 320 hours of direct labor during May. The company applies variable overhead at the rate of $18 per direct labor hour.

Budgeted fixed overhead equals $46,000 per month. Prepare a factory overhead budget for May.

QS 20-15

Selling expense budget **P1**

Zilly Co. budgets sales of $400,000 for June. Zilly pays a sales manager a monthly salary of $6,000 and a commission of 8% of that month's sales dollars. Prepare a selling expense budget for June.

QS 20-16

Selling expense budget

P1

X-Tel budgets sales of $60,000 for April, $100,000 for May, and $80,000 for June. Sales commissions are 10% of sales dollars and the company pays a sales manager a salary of $6,000 per month. Sales commissions and salaries are paid in the month incurred. Prepare a selling expense budget for April, May, and June.

QS 20-17

Schedule of cash receipts **P2**

Liza's budgets sales of $40,000 for May and $52,000 for June. Assume 60% of Liza's sales are for cash. The remaining 40% are credit sales; credit customers pay the entire amount owed in the month following the sale. Prepare the schedule of cash receipts from sales for June.

QS 20-18

Schedule of cash receipts **P2**

X-Tel budgets sales of $60,000 for April, $100,000 for May, and $80,000 for June. Sales are 40% cash and 60% on credit. All credit sales are collected in the month following the sale. Total sales for March were $25,000. Prepare a schedule of cash receipts from sales for April, May, and June.

QS 20-19

Schedule of cash receipts **P2**

Music World reports the following budgeted sales: August, $150,000; and September, $170,000. Cash sales are 40% of total sales, and all credit sales are collected in the month following the sale. Prepare a schedule of cash receipts from sales for September.

QS 20-20

Schedule of cash receipts with uncollectibles

P2

The Guitar Shoppe reports the following budgeted sales: August, $150,000; and September, $170,000. For its total sales, 40% are immediately collected in cash, 55% are credit sales and collected in the month following sale, and the remaining 5% are written off as uncollectible. Prepare a schedule of cash receipts from sales for September.

QS 20-21

Schedule of cash receipts with uncollectibles

P2

Wells Company reports the following budgeted sales: September, $55,000; October, $66,000; and November, $80,000. All sales are on credit, and 5% of those credit sales are budgeted as uncollectible. Collection of the remaining 95% of credit sales are budgeted as follows: 60% in the first month after sale and 35% in the second month after sale. Prepare a schedule of cash receipts from sales for November.

QS 20-22

Computing budgeted accounts receivable

P2

Kingston budgets total sales for June and July of $420,000 and $398,000, respectively. Cash sales are 60% of total sales. Of the credit sales, 20% are collected in the month of sale, 70% are collected during the first month

after the sale, and the remaining 10% are collected in the second month after the sale. Determine the amount of accounts receivable reported on the company's budgeted balance sheet as of July 31. *Hint:* Determine the percent of June and July sales that are uncollected at July 31.

QS 20-23

Cash budget

P2

Santos Co. is preparing a cash budget for February. The company has $20,000 cash at the beginning of February and budgets $75,000 in cash receipts from sales and $100,250 in cash payments during February. Prepare the cash budget for February assuming the company maintains a $5,000 minimum cash balance and will take a loan if necessary to maintain this balance. The company has no loans outstanding on February 1.

QS 20-24

Manufacturing: Cash budget

P2

Use the following information to prepare a cash budget for March for Gado Company.

a. Beginning cash balance on March 1, $72,000.

b. Cash receipts from sales, $300,000.

c. Cash payments for direct materials, $140,000.

d. Cash payments for direct labor, $80,000.

e. Cash payments for overhead, $45,000.

f. Cash payments for sales commissions, $7,000.

g. Cash payments for interest, $200 (1% of beginning loan balance of $20,000).

h. Cash repayment of loan, $20,000.

QS 20-25

Budgeted financial statements

P3

Following are selected accounts for a manufacturing company. For each account, indicate whether it will appear on a budgeted income statement or a budgeted balance sheet. If an item will not appear on either budgeted financial statement, label it neither.

Sales	_____	Interest expense on loan	_____
Office salaries expense	_____	Cash dividends paid	_____
Accumulated depreciation	_____	Accounts payable	_____
Sales commissions expense	_____	Cost of goods sold	_____

QS 20-26[A]

Merchandising: Schedule of cash payments **P4**

Garda purchased $600,000 of merchandise in August and budgets merchandise purchases of $720,000 in September. Merchandise purchases are paid as follows: 25% in the month of purchase and 75% in the month after the purchase. Prepare a schedule of cash payments for merchandise purchases for September.

QS 20-27[A]

Merchandising: Schedule of cash payments

P4

Torres Co. budgets merchandise purchases of $15,800 in January, $18,600 in February, and $20,200 in March. For those purchases, 40% of purchases are paid in the month of purchase and 60% are paid in the month after the purchase. The company purchased $25,000 of merchandise in December. Prepare a schedule of cash payments for merchandise for the months of January, February, and March.

QS 20-28[A]

Merchandising: Merchandise purchases budget **P4**

Raider-X Company budgets sales of 18,000 units for April and 20,000 units for May. Beginning inventory on April 1 is 3,600 units, and the

company wants to have 20% of next month's unit sales in inventory at the end of each month. The merchandise cost per unit is $2. Prepare a merchandise purchases budget for the month of April.

QS 20-29[A]

Merchandising: Merchandise purchases budget **P4**

Lexi Company budgets unit sales of 1,040,000 in April, 1,220,000 in May, 980,000 in June, and 1,020,000 in July. Beginning inventory on April 1 is 312,000 units, and the company wants to have 30% of next month's unit sales in inventory at the end of each month. The merchandise cost per unit is $0.50. Prepare a merchandise purchases budget for the months of April, May, and June.

QS 20-30[A]

Merchandising: Computing merchandise purchases

P4

Montel Company's July sales budget shows sales of $600,000. The company budgets beginning merchandise inventory of $50,000 and ending merchandise inventory of $40,000 for July. Cost of goods sold is 60% of sales. Determine the budgeted cost of merchandise purchases for July. *Hint:* Use the relation (Beg. Inventory + Purchases − Cost of Goods Sold = End. Inventory) to solve for purchases.

EXERCISES

Exercise 20-1

Budget language

C1

Match the definitions 1 through 6 with the phrase *a* through *f*.

a. Participatory budgeting

b. Cash budget

c. Master budget

d. Budgetary slack

e. Sales budget

f. Budgeted income statement

1. Helps determine financing needs. page 802

2. The usual starting point in the master budget process.

3. A report that shows predicted revenues and expenses for a budgeting period.

4. A budgetary cushion used to meet performance targets.

5. A comprehensive plan that consists of several budgets that are linked.

6. Employees affected by a budget help in preparing it.

Exercise 20-2

Revising budgeted sales **P1**

MM Co. budgets sales of $30,000 for May. MM's production manager discovered a way to use more sustainable packaging. As a result, MM's product will receive better placement on store shelves and May sales are predicted to increase by 8%. Compute budgeted sales for May assuming MM switches to this more sustainable packaging.

Exercise 20-3

Manufacturing: Production budget

P1

Ruiz Co. provides the following budgeted sales for the next four months. The company wants to end each month with ending finished goods inventory equal to 25% of next month's budgeted unit sales. Finished goods inventory on April 1 is 125 units. Prepare a production budget for the months of April, May, and June.

	April	May	June	July
Budgeted sales units . . .	500	580	540	620

Exercise 20-4

Manufacturing: Production budget **P1**

Blue Wave Co. budgets the following unit sales for the next four months: September, 4,000 units; October, 5,000 units; November, 7,000 units; and December, 7,600 units. The company's policy is to maintain finished goods inventory equal to 60% of the next month's unit sales. At the end of August, the company had 2,400 finished units in inventory. Prepare a production budget for each of the months of September, October, and November.

Exercise 20-5

Manufacturing: Production budget

P1

Tyler Co. budgets the following unit sales for the next four months: April, 3,000 units; May, 4,000 units; June, 6,000 units; and July, 2,000 units. The company's policy is to maintain finished goods inventory equal to 30% of the next month's unit sales. At the end of March, the company had 900 finished units in inventory. Prepare a production budget for each of the months of April, May, and June.

Exercise 20-6

Manufacturing: Production budget

P1

Electro Company manufactures transmissions for electric cars. Management reports ending finished goods inventory for the first quarter at 90,000 units. The following unit sales are budgeted during the rest of the year: second quarter, 450,000 units; third quarter, 525,000 units; and fourth quarter, 475,000 units. Company policy calls for the ending finished goods inventory of a quarter to equal 20% of the next quarter's budgeted unit sales. Prepare a production budget for both the second and third quarters that shows the number of transmissions to manufacture.

Exercise 20-7

Manufacturing: Direct materials budget

P1

Rida Inc. is preparing its direct materials budget for the second quarter. It budgets production of 240,000 units in the second quarter and 52,500 units in the third quarter. Each unit requires 0.60 pound of direct material, priced at $175 per pound. The company plans to end each quarter with an ending inventory of this material equal to 30% of next quarter's budgeted direct materials required. Raw material inventory is 43,200 pounds at the beginning of the second quarter. Prepare a direct materials budget for the second quarter.

Exercise 20-8

Manufacturing: Direct materials budget

P1

Zira Co. reports the following production budget for the next four months. Each finished unit requires five pounds of direct materials, and the company wants to end each month with direct materials inventory equal to 30% of next month's production needs. Beginning direct materials inventory for April was 683 pounds. Direct materials cost $4 per pound. Prepare a direct materials budget for April, May, and June.

	April	May	June	July
Units to produce.....	455	570	560	540

Exercise 20-9

Manufacturing: Direct materials budget

P1

Ramos Co. provides the following budgeted production for the next four months.

	April	May	June	July
Units to produce.....	442	570	544	540

Each finished unit requires 5 pounds of direct materials. The company wants to end each month with direct materials inventory equal to 30% of next month's production needs. Beginning direct materials inventory for April was 663 pounds. Direct materials cost $2 per pound. Prepare a direct materials budget for April, May, and June.

Exercise 20-10

Manufacturing: Direct materials budget **P1**

Electro Company budgets production of 450,000 electric panels in the second quarter and 520,000 electric panels in the third quarter. Each panel requires 0.80 pound of direct material at a cost of $1.70 per pound. The company aims to end each quarter with an ending inventory of this material equal to 20% of next quarter's budgeted materials requirements. Beginning inventory of this material is 72,000 pounds. Prepare a direct materials budget for the second quarter.

Exercise 20-11

Manufacturing: Direct labor budget **P1**

The production budget for Manner Company shows units to produce as follows: July, 620; August, 680; and September, 540. Each unit produced requires two hours of direct labor. The direct labor rate is budgeted at $20 per hour in July and August, but is budgeted to be $21 per hour in September. Prepare a direct labor budget for the months July, August, and September.

Exercise 20-12

Manufacturing: Direct labor budget **P1**

Branson Belts makes handcrafted belts. The company budgets production of 4,500 belts during the second quarter. Each belt requires 4 direct labor hours, at a cost of $17 per hour. Prepare a direct labor budget for the second quarter.

Exercise 20-13

Manufacturing: Direct labor and factory overhead budgets **P1**

Addison Co. budgets production of 2,400 units during the second quarter. Information on its direct labor and its variable and fixed overhead is shown below. For the second quarter, prepare (1) a direct labor budget and (2) a factory overhead budget.

Direct labor . . .	Each finished unit requires 4 direct labor hours, at a cost of $20 per hour.	Variable overhead . .	Budgeted at the rate of $11 per direct labor hour.
		Fixed overhead	Budgeted at $450,000 per quarter.

Exercise 20-14

Manufacturing: Direct labor and factory overhead budgets **P1**

Ramos Co. provides the following (partial) production budget for the next three months. Each finished unit requires 0.50 hour of direct labor at the rate of $16 per hour. The company budgets variable overhead at the rate of $20 per direct labor hour and budgets fixed overhead of $8,000 per month. Prepare (1) a direct labor budget and (2) a factory overhead budget for April, May, and June.

Production Budget	April	May	June
Units to produce	442	570	544

Exercise 20-15

Manufacturing: Direct materials, direct labor, and overhead budgets

P1

MCO Leather manufactures leather purses. Each purse requires 2 pounds of direct materials at a cost of $4 per pound and 0.8 direct labor hour at a rate of $16 per hour. Variable overhead is budgeted at a rate of $2 per direct labor hour. Budgeted fixed overhead is $10,000 per month. The company's policy is to end each month with direct materials inventory equal to 40% of the next month's direct materials requirement. At the end of August the company had 3,680 pounds of direct materials in inventory. The company's production budget reports the following. Prepare budgets for September and October for (1) direct materials, (2) direct labor, and (3) factory overhead.

Production Budget	September	October	November
Units to produce	4,600	6,200	5,800

Exercise 20-16

Manufacturing: Direct materials, direct labor, and overhead budgets

P1

Garden Yeti manufactures garden sculptures. Each sculpture requires 8 pounds of direct materials at a cost of $3 per pound and 0.5 direct labor hour at a rate of $18 per hour. Variable overhead is budgeted at a rate of $3 per direct labor hour. Budgeted fixed overhead is $4,000 per month. The company's policy is to maintain direct materials inventory equal to 20% of the next month's direct materials requirement. At the end of February the company had 5,280 pounds of direct materials in inventory. The company's production budget reports the following. Prepare budgets for March and April for (1) direct materials, (2) direct labor, and (3) factory overhead.

Production Budget	March	April	May
Units to produce	3,300	4,600	4,800

Exercise 20-17

Preparation of cash budgets (for three periods)

P2

Kayak Co. budgeted the following cash receipts (excluding cash receipts from loans received) and cash payments (excluding cash payments for loan principal and interest payments) for the first three months of next year.

	Cash Receipts	Cash Payments
January	$525,000	$475,000
February	400,000	350,000
March	450,000	525,000

Kayak requires a minimum cash balance of $30,000 at each month-end. Loans taken to meet this requirement charge 1% interest per month, paid at each month-end. The interest is computed based on the beginning balance of the loan for the month. Any preliminary cash balance above $30,000 is used to repay loans at month-end. The company has a cash balance of $30,000 and a loan balance of $60,000 at January 1. Prepare monthly cash budgets for January, February, and March.

Exercise 20-18

Schedule of cash receipts

P2

Jasper Company has 70% of its sales on credit and 30% for cash. All credit sales are collected in full in the first month following the sale. The company budgets sales of $525,000 for April, $535,000 for May, and $560,000 for June. Total sales for March are $500,000. Prepare a schedule of cash receipts from sales for April, May, and June.

Exercise 20-19

Schedule of cash payments

P2

Zisk Co. purchases direct materials on credit. Budgeted purchases are April, $80,000; May, $110,000; and June, $120,000. Cash payments for purchases are: 70% in the month of purchase and 30% in the first month after purchase. Purchases for March are $70,000. Prepare a schedule of cash payments for direct materials for April, May, and June.

Exercise 20-20

Cash budget

P2

Karim Corp. requires a minimum $8,000 cash balance. Loans taken to meet this requirement cost 1% interest per month (paid at the end of each month). Any preliminary cash balance above $8,000 is used to repay loans at month-end. The cash balance on July 1 is $8,400, and the company has no outstanding loans. Budgeted cash receipts (other than for loans received) and budgeted cash payments (other than for loan or interest payments) follow. Prepare a cash budget for July, August, and September. Round interest payments to the nearest dollar.

	July	August	September
Cash receipts	$20,000	$26,000	$40,000
Cash payments	28,000	30,000	22,000

Exercise 20-21

Cash budget

P2

Foyert Corp. requires a minimum $30,000 cash balance. Loans taken to meet this requirement cost 1% interest per month (paid at the end of each month). Any preliminary cash balance above $30,000 is used to repay loans at month-end. The cash balance on October 1 is $30,000, and the company has an outstanding loan of $10,000. Budgeted cash receipts (other than for loans received) and budgeted cash payments (other than for loan or interest payments) follow. Prepare a cash budget for October, November, and December. Round interest payments to the nearest dollar.

	October	November	December
Cash receipts	$110,000	$80,000	$100,000
Cash payments	120,000	75,000	80,000

Exercise 20-22

Manufacturing: Cash budget **P2**

Use the following information to prepare the September cash budget for PTO Co. Ignore the "Loan activity" section of the budget.

a. Beginning cash balance, September 1, $40,000.

b. Budgeted cash receipts from September sales, $255,000.

c. Direct materials are purchased on credit. Purchase amounts are August (actual), $80,000; and September (budgeted), $110,000. Payments for direct materials follow: 65% in the month of purchase and 35% in the first month after purchase.

d. Budgeted cash payments for direct labor in September, $40,000.

e. Budgeted depreciation expense for September, $4,000.

f. Budgeted cash payment for dividends in September, $20,000.

g. Budgeted cash payment for income taxes in September, $10,000.

h. Budgeted cash payment for loan interest in September, $1,000.

Exercise 20-23

Manufacturing: Cash budget **P2**

Motors Corp. manufactures motors for dirt bikes. The company requires a minimum $30,000 cash balance at each month-end. If necessary, the company borrows to meet this requirement at a cost of 2% interest per month (paid at the end of each month). Any preliminary cash balance above $30,000 at month-end is used to repay loans. The cash balance on July 1 is $34,000, and the company has no outstanding loans. Budgeted cash receipts and budgeted cash payments (other than for interest on the loan and loan activity) follow. Prepare a cash budget for July, August, and September.

	July	August	September
Cash receipts	$ 85,000	$111,000	$150,000
Cash payments	113,000	99,900	127,400

Exercise 20-24

Budgeted income statement **P3**

Fortune Inc. is preparing its master budget for the first quarter. The company sells a single product at a price of $25 per unit. Sales (in units) are budgeted at 150,000 for the first quarter. Cost of goods sold is $14 per unit. Other expense information for the first quarter follows. Prepare a budgeted income statement for the first quarter ended March 31. Round expense amounts to the dollar.

Sales commissions	8% of sales dollars	Rent	$ 42,000 per quarter
Advertising	$562,500 per quarter	Office salaries	$ 225,000 per quarter
Interest	1.25% quarterly on $250,000 note payable	Depreciation	$120,000 per quarter
Tax rate	30%		

Exercise 20-25[A]

Merchandising: Merchandise purchases budgets

P4

Walker Company prepares monthly budgets. Company policy is to end each month with merchandise inventory equal to 15% of budgeted unit sales for the following month. Budgeted sales and merchandise purchases for the next three months follow. Beginning inventory on July 1 is 27,000 units. The company budgets sales of 200,000 units in October.

The merchandise cost per unit is $2. Prepare the merchandise purchases budgets for the months of July, August, and September.

	July	August	September
Budgeted sales units	180,000	315,000	270,000

Exercise 20-26[A]

Merchandising: Computing budgeted merchandise purchases from accounts payable **P4**

Ahmed Company purchases all merchandise on credit. It recently budgeted the month-end accounts payable balances below. Cash payments on accounts payable during each month are expected to be June, $1,490,000; July, $1,425,000; and August, $1,495,000. Use the information to compute the budgeted merchandise purchases for June, July, and August. *Hint:* Use the relation (Beg. Accounts Payable + Purchases on Credit − Payments on Accounts Payable = End. Accounts Payable) to solve for budgeted purchases.

	May 31	June 30	July 31	August 31
Accounts payable	$150,000	$200,000	$235,000	$195,000

Check June purchases, $1,540,000

Exercise 20-27[A]

Merchandising:

Preparing a cash budget

P4

Use the following information to prepare the July cash budget for Acco Co. Ignore the “Loan activity” section of the budget.

a. Beginning cash balance on July 1: $50,000.

b. Budgeted cash receipts from sales: 30% is collected in the month of sale, 50% in the next month, and 20% in the second month after sale. Sales amounts are May (actual), $1,720,000; June (actual), $1,200,000; and July (budgeted), $1,400,000.

c. Budgeted cash payments on merchandise purchases: 60% in the month of purchase and 40% in the month following purchase. Purchase amounts are June (actual), $700,000; and July (budgeted), $750,000.

d. Budgeted cash payments for salaries in July: $275,000.

e. Budgeted cash payments for sales commissions for July: $200,000.

f. Budgeted cash payment for income taxes in July: $80,000.

g. Budgeted cash payment for loan interest in July: $6,600.

Exercise 20-28[A]

Merchandising: Preparing a budgeted income statement

P4

Lamonte Co. reports the following budgeted December 31 adjusted trial balance. Prepare the budgeted income statement for the current year ended December 31. Ignore income taxes.

	Debit	Credit
Cash	$ 50,000	
Accounts receivable	120,000	
Merchandise inventory	64,000	
Equipment	125,000	
Accumulated depreciation—Equipment		$ 25,000
Accounts payable		34,000
Loan payable		22,000
Common stock		200,000
Retained earnings (beginning year balance)		58,000
Sales		520,000
Cost of goods sold	360,000	
Loan interest expense	8,000	
Depreciation expense	10,000	
Salaries expense	122,000	
Totals	$859,000	$859,000

Exercise 20-29[A]

Merchandising: Preparing a budgeted balance sheet

P4

Use the budgeted information in Exercise 20-28, and the ending year balance of Retained Earnings of $78,000 on December 31, to prepare

Lamonte Co.'s budgeted balance sheet as of December 31.

Exercise 20-30[A]

Merchandising: Schedule of cash payments for merchandise purchases

P4

Hardy Co. reports budgeted merchandise purchases below. For those purchases, 40% of a month's purchases is paid in the month of purchase, and 60% is paid in the first month after purchase. Prepare the schedule of cash payments for merchandise purchases for September and October.

	August	September	October
Budgeted merchandise purchases	$194,400	$183,600	$157,200

Exercise 20-31[A]

Merchandising: Cash budget and schedule of cash receipts

P4

Castor Inc. is preparing its master budget. Budgeted sales and cash payments for merchandise purchases for the next three months follow.

Budgeted	April	May	June
Sales	$32,000	$40,000	$24,000
Cash payments for merchandise purchases	20,200	16,800	17,200

Sales are 50% cash and 50% on credit. Sales in March were $24,000. All credit sales are collected in the month following the sale. The March 31 balance sheet includes balances of $12,000 in cash and $2,000 in loans payable. A minimum cash balance of $12,000 is required. Loans are obtained at the end of any month when the preliminary cash balance is below $12,000. Interest is 1% per month based on the beginning-of-the-month loan balance and is paid at each month-end. If a preliminary cash balance above $12,000 at month-end exists, loans are repaid from the excess. Expenses are paid in the month incurred and include sales commissions (10% of sales), shipping (2% of sales), office salaries ($5,000 per month), and rent ($3,000 per month). (*a*) Prepare a schedule of cash receipts from sales for April, May, and June.

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(*b*) Prepare a cash budget for each of April, May, and June (round interest payments to the nearest dollar).

Exercise 20-32[A]

Merchandising: Cash budget and schedule of cash receipts

P4

Kelsey is preparing its master budget. Budgeted sales and cash payments for merchandise purchases for the next three months follow.

Budgeted	July	August	September
Sales	$64,000	$80,000	$48,000
Cash payments for merchandise purchases	40,400	33,600	34,400

Sales are 20% cash and 80% on credit. Sales in June were $56,250. All credit sales are collected in the month following the sale. The June 30 balance sheet includes balances of $15,000 in cash and $5,000 in loans payable. A minimum cash balance of $15,000 is required. Loans are obtained at the end of any month when the preliminary cash balance is below $15,000. Interest is 1% per month based on the beginning-of-the-month loan balance and is paid at each month-end. If a preliminary cash balance above $15,000 at month-end exists, loans are repaid from the excess. Expenses are paid in the month incurred and consist of sales commissions (10% of sales), office salaries ($4,000 per month), and rent ($6,500 per month). (1) Prepare a schedule of cash receipts from sales for July, August, and September. (2) Prepare a cash budget for July, August, and September. (Round interest payments to the nearest dollar.)

Exercise 20-33[A]

Merchandising: Budgeted balance sheet

P4

Prepare a budgeted balance sheet at March 31 using the following information from Zimmer Company.

a. The cash budget for March shows an ending loan balance of $10,000 and an ending cash balance of $50,000.

b. The sales budget for March shows sales of $140,000. Accounts receivable at the end of March are budgeted to be 70% of March sales.

c. The merchandise purchases budget shows that $89,000 in merchandise will be purchased on credit in March. Purchases on credit are paid 100% in the month following the purchase.

d. Ending merchandise inventory for March is budgeted to be 600 units at a cost of $35 each.

e. Income taxes payable of $26,000 are budgeted at the end of March.

f. Accounting records at the end of March show budgeted equipment of $84,000 with accumulated depreciation of $47,000.

g. Common stock of $25,000 and retained earnings of $56,000 are budgeted at the end of March.

Exercise 20-34

Direct labor budget for a service company

A1

Render CPA is preparing direct labor budgets for the current year. The partners budget billable hours for the year as follows:

Data entry	2,200 hours	Tax	4,300 hours
Auditing	4,800 hours	Consulting	750 hours

The company budgets $15 per hour to data-entry clerks, $30 per hour to audit personnel, $40 per hour to tax personnel, and $50 per hour to consulting personnel. Prepare a direct labor budget for this service company for the year.

PROBLEM SET A

Problem 20-1A

Manufacturing: Preparing production, materials, labor, and overhead budgets

P1

Black Diamond Company produces snowboards. Each snowboard requires 2 pounds of carbon fiber. Management reports that 5,000 snowboards and 6,000 pounds of carbon fiber are in inventory at the beginning of the third quarter, and that 150,000 snowboards are budgeted to be sold during the third quarter. Management wants to end the third quarter with 3,500 snowboards and 4,000 pounds of carbon fiber in inventory. Carbon fiber costs $15 per pound. Each snowboard requires 0.5 hour of direct labor at $20 per hour. Variable overhead is budgeted at the rate of $8 per direct labor hour. The company budgets fixed overhead of $1,782,000 for the quarter.

Check (1) Units to produce, 148,500

Required

1. Prepare the production budget for the third quarter. *Hint:* Desired ending inventory units are given.
2. Prepare the direct materials budget for the third quarter.
3. Prepare the direct labor budget for the third quarter.
4. Prepare the factory overhead budget for the third quarter.

Problem 20-2A

Manufacturing: Cash budget and schedule of cash payments

P2

Built-Tight is preparing its master budget. Budgeted sales and cash payments follow.

	July	August	September
Budgeted sales	$64,000	$80,000	$48,000
Budgeted cash payments for			
Direct materials	16,160	13,440	13,760
Direct labor	4,040	3,360	3,440
Overhead	20,200	16,800	17,200

Sales to customers are 20% cash and 80% on credit. Sales in June were $56,250. All credit sales are collected in the month following the sale. The June 30 balance sheet includes balances of $15,000 in cash and $5,000 in loans payable. A minimum cash balance of $15,000 is required. Loans are obtained at the end of any month when the preliminary cash balance

is below $15,000. Interest is 1% per month based on the beginning-of-the-month loan balance and is paid at each month-end. Any preliminary cash balance above $15,000 is used to repay loans at month-end. Expenses are paid in the month incurred and consist of sales commissions (10% of sales), office salaries ($4,000 per month), and rent ($6,500 per month).

1. Prepare a schedule of cash receipts for the months of July, August, and September.
2. Prepare a cash budget for the months of July, August, and September. Round interest payments to the dollar.

Problem 20-3A

Manufacturing: Preparation and analysis of budgeted income statements

P3

Merline Manufacturing makes its product for $75 per unit and sells it for $150 per unit. The sales staff receives a commission of 10% of sales. Its December income statement follows.

MERLINE MANUFACTURING
Income Statement
For Month Ended December 31

Sales		$2,250,000
Cost of goods sold		1,125,000
Gross profit		1,125,000
Selling, general, and administrative expenses		
Sales commissions (10%)	$225,000	
Advertising	250,000	
Office rent	30,000	
Administrative salaries	45,000	
Depreciation—Office equipment	50,000	
Office insurance	10,000	610,000
Net income		$ 515,000

Management expects December's results to be repeated in January, February, and March without any changes in strategy. page 809
Management, however, has an alternative plan. It believes that if the unit selling price is reduced to $125 per unit and advertising is increased to $287,500 per month, sales units will be 16,500 for January, 18,150 for February, and 19,965 for March. The cost of its product will remain at $75 per unit, the sales staff will continue to earn a 10% commission, and the remaining expenses will stay the same.

Required

1. Prepare budgeted income statements for each of the months of January, February, and March that show results from implementing the proposed plan. Use a three-column format, with one column for each month. Ignore income taxes.

Analysis Component

2. For the proposed plan, is income in March budgeted to be higher than income in December?

Problem 20-4A

Manufacturing: Preparation of a complete master budget

P1 P2 P3

The management of Zigby Manufacturing prepared the following balance sheet for March 31.

ZIGBY MANUFACTURING
Balance Sheet
March 31

Assets			Liabilities and Equity		
Cash		$ 40,000	Liabilities		
Accounts receivable		344,400	Accounts payable	$201,000	
Raw materials inventory		98,500	Loan payable	12,000	
Finished goods inventory		325,540	Long-term note payable	500,000	$ 713,000
Equipment	$ 600,000		Equity		
Less: Accumulated depreciation	150,000	450,000	Common stock	335,000	
			Retained earnings	210,440	545,440
Total assets		$1,258,440	Total liabilities and equity		$1,258,440

To prepare a master budget for April, May, and June, management gathers the following information.

a. Sales for March total 20,500 units. Budgeted sales in units follow: April, 20,500; May, 19,500; June, 20,000; and July, 20,500. The product's selling price is $24.00 per unit and its total product cost is $19.85 per unit.

b. Raw materials inventory consists solely of direct materials that cost $20 per pound. Company policy calls for a given month's ending materials inventory to equal 50% of the next month's direct materials requirements. The March 31 raw materials inventory is 4,925 pounds.

The budgeted June 30 ending raw materials inventory is 4,000 pounds. Each finished unit requires 0.50 pound of direct materials.

c. Company policy calls for a given month's ending finished goods inventory to equal 80% of the next month's budgeted unit sales. The March 31 finished goods inventory is 16,400 units.

d. Each finished unit requires 0.50 hour of direct labor at a rate of $15 per hour.

e. The predetermined variable overhead rate is $2.70 per direct labor hour. Depreciation of $20,000 per month is the only fixed factory overhead item.

f. Sales commissions of 8% of sales are paid in the month of the sales. The sales manager's monthly salary is $3,000.

g. Monthly general and administrative expenses include $12,000 for administrative salaries and 0.9% monthly interest on the long-term note payable.

h. The company budgets 30% of sales to be for cash and the remaining 70% on credit. Credit sales are collected in full in the month following the sale (no credit sales are collected in the month of sale).

i. All raw materials purchases are on credit, and accounts payable are solely tied to raw materials purchases. Raw materials purchases are fully paid in the next month (none are paid in the month of purchase).

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j. The minimum ending cash balance for all months is $40,000. If necessary, the company borrows enough cash using a loan to reach the minimum. Loans require an interest payment of 1% at each month-end (before any repayment). If the month-end preliminary cash balance exceeds the minimum, the excess will be used to repay any loans.

k. Dividends of $10,000 are budgeted to be declared and paid in May.

l. No cash payments for income taxes are budgeted in the second calendar quarter. Income tax will be assessed at 35% in the quarter and budgeted to be paid in the third calendar quarter.

m. Equipment purchases of $100,000 are budgeted for the last day of June.

Required

Prepare the following budgets for the months of April, May, and June, except as noted below.

1. Sales budget.
2. Production budget.
3. Direct materials budget.
4. Direct labor budget.
5. Factory overhead budget.
6. Selling expense budget.
7. General and administrative expense budget.
8. Schedule of cash receipts.
9. Schedule of cash payments for direct materials.
10. Cash budget.
11. Budgeted income statement for second quarter (not monthly).
12. Budgeted balance sheet at June 30.

Check (2) Units to produce: April, 19,700; May, 19,900 (3) Cost of direct materials purchases: April, $198,000 (10) Ending cash balance: April, $85,675; May, $129,420 (12) Budgeted total assets: June 30, $1,292,620

Problem 20-5A[A]

Merchandising: Preparation of merchandise purchases budgets for three products

P4

Keggler's Supply is a merchandiser of three different products. Beginning inventories for March are footwear, 20,000 units; sports gear, 80,000 units; and apparel, 50,000 units. Management believes each of these inventories is too high and begins a new policy that ending inventory in any month should equal 30% of the budgeted sales units for the following month. Budgeted sales units for March, April, May, and June follow.

Budgeted Sales Units	March	April	May	June
Footwear	15,000	25,000	32,000	35,000
Sports gear	70,000	90,000	95,000	90,000
Apparel	40,000	38,000	37,000	25,000

Required

Prepare a merchandise purchases budget (in units only) for *each product* for the months of March, April, and May.

Check March budgeted purchases: Footwear, 2,500; Sports gear, 17,000; Apparel, 1,400

Problem 20-6A[A]

Merchandising: Preparation of cash budgets for three periods

P4

Oneida Company's operations began in August. August sales were $215,000 and purchases were $125,000. The beginning cash balance for September is $5,000. Oneida's owner approaches the bank for a $100,000 loan to be made on September 2 and repaid on November 30. The bank's loan officer asks the owner to prepare monthly cash budgets. Its budgeted sales, merchandise purchases, and cash payments for other expenses for the next three months follow.

Budgeted	September	October	November
Sales	$250,000	$375,000	$400,000
Merchandise purchases	240,000	225,000	200,000
Cash payments			
Salaries	30,000	30,000	30,000
Rent	10,000	10,000	10,000
Insurance	4,000	4,000	4,000
Repayment of loan			100,000
Interest on loan	1,000	1,000	1,000

All sales are on credit where 70% of credit sales are collected in the month following the sale, and the remaining 30% collected in the second month following the sale. All merchandise is purchased on credit; 80% of the balance is paid in the month following a purchase, and the remaining 20% is paid in the second month.

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Required

Prepare the following for the months of September, October, and November.

1. Schedule of cash receipts from sales.
2. Schedule of cash payments for direct materials.
3. Cash budget.

Problem 20-7A[A]

Merchandising: Preparation of cash budgets with supporting purchases budgets

P4

Aztec Company sells its product for $180 per unit. Its actual and budgeted sales follow.

	May (Actual)	June (Budget)	July (Budget)	August (Budget)
Sales units	2,000	6,000	5,000	3,800
Sales dollars	$360,000	$1,080,000	$900,000	$684,000

All sales are on credit. Collections are as follows: 30% is collected in the month of the sale, and the remaining 70% is collected in the month following the sale. Merchandise purchases cost $110 per unit. For those purchases, 60% is paid in the month of purchase and the other 40% is paid in the month following purchase. The company has a policy to maintain an ending monthly inventory of 20% of the next month's unit sales. The May 31 actual inventory level of 1,200 units is consistent with this policy. Selling and administrative expenses of $110,000 per month are paid in cash. The company's minimum cash balance at month-end is $100,000. Loans are obtained at the end of any month when the preliminary cash balance is below $100,000. Any preliminary cash balance above $100,000 is used to repay loans at month-end. This loan has a 1% monthly interest rate. On May 31, the loan balance is $25,000, and the company's cash balance is $100,000. Round amounts to the nearest dollar.

Required

1. Prepare a schedule of cash receipts from sales for each of the months of June and July.
2. Prepare the merchandise purchases budget for June and July.

3. Prepare a schedule of cash payments for merchandise purchases for June and July. Assume May's budgeted merchandise purchases is $308,000.

4. Prepare a cash budget for June and July, including any loan activity and interest expense. Compute the loan balance at the end of each month.

Check (1) Cash receipts: June, $576,000

(4) Budgeted ending loan balance: June, $65,250; July, $0

Problem 20-8A[A]

Merchandising: Preparation of a complete master budget **P4**

Dimsdale Sports, a merchandising company, reports the following balance sheet at December 31.

DIMSDALE SPORTS COMPANY
Balance Sheet
December 31

Assets			Liabilities and Equity		
Cash		$ 36,000	Liabilities		
Accounts receivable		525,000	Accounts payable	$360,000	
Inventory		150,000	Loan payable	15,000	
			Taxes payable (due March 15)	90,000	$ 465,000
Equipment	$540,000		Equity		
Less: Accumulated depreciation	67,500	472,500	Common stock	472,500	
			Retained earnings	246,000	718,500
Total assets		$1,183,500	Total liabilities and equity		$1,183,500

To prepare a master budget for January, February, and March, page 812 use the following information.

a. The company's single product is purchased for $30 per unit and resold for $55 per unit. The inventory level of 5,000 units on December 31 is more than management's desired level, which is 20% of the next month's budgeted sales units. Budgeted sales are January, 7,000 units; February, 9,000 units; March, 11,000 units; and April, 10,000 units. All sales are on credit.

b. Cash receipts from sales are budgeted as follows: January, $221,250; February, $697,000; March, $489,500.

c. Cash payments for merchandise purchases are budgeted as follows: January, $80,000; February, $302,800; March, $147,600.

d. Sales commissions equal to 20% of sales dollars are paid each month. Sales salaries (excluding commissions) are $5,000 per month.

e. General and administrative salaries are $12,000 per month. Maintenance expense equals $2,000 per month and is paid in cash.

f. New equipment purchases are budgeted as follows: January, $36,000; February, $96,000; and March, $28,800. Budgeted depreciation expense is January, $6,000; February, $7,000; and March, $7,300.

g. The company budgets a land purchase at the end of March at a cost of $150,000, which will be paid with cash on the last day of the month.

h. The company has an agreement with its bank to obtain additional loans as needed. The interest rate is 1% per month and interest is paid at each month-end based on the beginning-month balance. Partial or full payments on these loans are made on the last day of the month. The company maintains a minimum ending cash balance of $25,000 at the end of each month.

i. The income tax rate for the company is 40%. Income taxes on the first quarter's income will not be paid until April 15.

Required

Prepare a master budget for the months of January, February, and March that has the following budgets (round amounts to the nearest dollar).

1. Sales budgets.

2. Merchandise purchases budgets.

3. Selling expense budgets.

4. General and administrative expense budgets. *Hint:* Depreciation is included in the general and administrative budget for merchandisers.

5. Capital expenditures budgets.

6. Cash budgets.

7. Budgeted income statement for entire quarter (not monthly) ended March 31.

8. Budgeted balance sheet as of March 31.

Check (2) Budgeted purchases: Jan., $114,000; Feb., $282,000

(6) Ending cash bal.: Jan., $30,100; Feb., $210,300

(8) Budgeted total assets at March 31, $1,568,650

connect

PROBLEM SET B

Problem 20-1B

Manufacturing: Preparing production, materials, labor, and overhead budgets

P1

NSA Company produces baseball bats. Each bat requires 3 pounds of aluminum alloy. Management reports that 8,000 bats and 15,000 pounds of aluminum alloy are in inventory at the beginning of the second quarter, and that 250,000 bats are budgeted to be sold during the second quarter. Management wants to end the second quarter with 6,000 finished bats and 12,000 pounds of aluminum alloy in inventory. Aluminum alloy costs $4 per pound. Each bat requires 0.5 hour of direct labor at $18 per hour. Variable overhead is budgeted at the rate of $12 per direct labor hour. The company budgets fixed overhead of $1,776,000 for the quarter.

Required

1. Prepare the production budget for the second quarter. *Hint:* Desired ending inventory units are given.
2. Prepare the direct materials budget for the second quarter.
3. Prepare the direct labor budget for the second quarter.
4. Prepare the factory overhead budget for the second quarter.

Check (1) Units to produce, 248,000

Problem 20-2B

Manufacturing: Cash budget and schedule of cash payments

P2

A1 Manufacturing is preparing its master budget. Budgeted sales and cash payments follow.

	July	August	September
Budgeted sales	$63,400	$80,600	$48,600
Budgeted cash payments for			
Direct materials	12,480	9,900	10,140
Direct labor	10,400	8,250	8,450
Overhead	18,720	14,850	15,210

Sales to customers are 20% cash and 80% on credit. Sales in June were $58,750. All credit sales are collected in the month following the sale. The June 30 balance sheet includes balances of $12,900 in cash and $2,600 in loans payable. A minimum cash balance of $12,900 is required. Loans are obtained at the end of any month when the preliminary cash balance is below $12,900. Interest is 1% per month based on the beginning-of-the-month loan balance and is paid at each month-end. Any preliminary cash balance above $12,900 is used to repay loans at month-end. Expenses are paid in the month incurred and consist of sales commissions (10% of sales), office salaries ($4,600 per month), and rent ($7,100 per month).

1. Prepare a schedule of cash receipts for the months of July, August, and September.
2. Prepare a cash budget for the months of July, August, and September. Round interest payments to the dollar.

Problem 20-3B

Manufacturing: Preparation and analysis of budgeted income statements

P3

HOG Company makes its product for $60 per unit and sells it for $130 per unit. The sales staff receives a commission of 10% of sales. Its June income statement follows.

HOG Company Income Statement For Month Ended June 30		
Sales		$1,300,000
Cost of goods sold		600,000
Gross profit		700,000
Selling, general, and administrative expenses		
Sales commissions (10%)	$130,000	
Advertising	200,000	
Office rent	24,000	
Administrative salaries	40,000	
Depreciation—Office equipment	50,000	
Office insurance	12,000	456,000
Net income		$ 244,000

Management expects June's results to be repeated in July, August, and September without any changes in strategy. Management, however, has another plan. It believes that if the unit selling price is reduced to $115 per unit and advertising is increased to $250,000 per month, sales units will be 11,000 for July, 12,100 for August, and 13,310 for September. The cost of its product will remain at $60 per unit, the sales staff will continue to earn a 10% commission, and the remaining expenses will stay the same.

Required

1. Prepare budgeted income statements for each of the months of July, August, and September that show results from implementing the proposed plan. Use a three-column format, with one column for each month. Ignore income taxes.

Check Budgeted net income: July, $102,500

Analysis Component

2. For the proposed plan, is income in September budgeted to be higher than income in June?

Problem 20-4B

Manufacturing: Preparation of a complete master budget

P1 P2 P3

The management of Nabar Manufacturing prepared the following balance sheet for June 30.

NABAR MANUFACTURING
Balance Sheet
June 30

Assets			Liabilities and Equity		
Cash		$ 40,000	Liabilities		
Accounts receivable		248,920	Accounts payable	$ 51,400	
Raw materials inventory		35,000	Income taxes payable	10,000	
Finished goods inventory		241,080	Loan payable	24,000	
			Long-term note payable	300,000	$ 385,400
Equipment	$720,000		Equity		
Less: Accumulated depreciation	240,000	480,000	Common stock	600,000	
			Retained earnings	59,600	659,600
Total assets		$1,045,000	Total liabilities and equity		$1,045,000

To prepare a master budget for July, August, and September, use the following information.

a. Sales were 20,000 units in June. Budgeted sales in units follow: July, 21,000; August, 19,000; September, 20,000; and October, 24,000. The product's selling price is $17 per unit and its total product cost is $14.35 per unit.

b. Company policy calls for a given month's ending finished goods inventory to equal 70% of the next month's budgeted unit sales. The June 30 finished goods inventory is 16,800 units.

c. Raw materials inventory consists solely of direct materials that cost $8 per pound. Company policy calls for a given month's ending materials inventory to equal 20% of the next month's direct materials requirements. The June 30 raw materials inventory is 4,375 pounds. The budgeted September 30 ending raw materials inventory is 1,980 pounds. Each finished unit requires 0.50 pound of direct materials.

d. Each finished unit requires 0.50 hour of direct labor at a rate of $16 per hour.

e. The predetermined variable overhead rate is $2.70 per direct labor hour. Depreciation of $20,000 per month is the only fixed factory overhead item.

f. Monthly general and administrative expenses include $9,000 administrative salaries and 0.9% monthly interest on the long-term note payable.

g. Sales commissions of 10% of sales are paid in the month of the sales. The sales manager's monthly salary is $3,500.

h. The company budgets 30% of sales to be for cash and the remaining 70% on credit. Credit sales are collected in full in the month following the sale (no credit sales are collected in the month of sale).

i. All raw materials purchases are on credit, and accounts payable are solely tied to raw materials purchases. Raw materials purchases are fully paid in the next month (none are paid in the month of purchase).

j. Dividends of $20,000 are budgeted to be declared and paid in August.

k. Income Taxes Payable at June 30 are budgeted to be paid in July. Income tax expense will be assessed at 35% in the quarter and budgeted to be paid in October.

l. Equipment purchases of $100,000 are budgeted for the last day of September.

m. The minimum ending cash balance for all months is $40,000. If necessary, the company borrows enough cash using a loan to reach the minimum. Loans require an interest payment of 1% at each month-end (before any repayment). If the month-end preliminary cash balance exceeds the minimum, the excess will be used to repay any loans.

Check (2) Units to produce: July, 17,500; August, 19,700 (3) Cost of direct materials purchases: July, $50,760 (10) Ending cash balance: July, $95,855; August, $140,200 (12) Budgeted total assets: Sep. 30, $1,054,920

Required

Prepare the following budgets for the months of July, August, and September, except as noted below.

1. Sales budget.

2. Production budget.

3. Direct materials budget.

4. Direct labor budget.

5. Factory overhead budget.

6. Selling expense budget.

7. General and administrative expense budget.

8. Schedule of cash receipts from sales.

9. Schedule of cash payments for direct materials.

10. Cash budget.

11. Budgeted income statement for entire quarter (not monthly).

12. Budgeted balance sheet at September 30.

Problem 20-5B[A]

Merchandising: Preparation of merchandise purchases budgets for three products

P4

H20 Sports is a merchandiser of three different products. Beginning inventories for April are water skis, 40,000 units; tow ropes, 90,000 units; and life jackets, 150,000 units. Management believes inventory levels are too high for all three products and begins a new policy that ending inventory in any month should equal 10% of the budgeted sales units for the following month. Budgeted sales units for April, May, June, and July follow.

Budgeted Sales Units	April	May	June	July
Water skis	70,000	90,000	130,000	100,000
Tow ropes	100,000	90,000	110,000	100,000
Life jackets	160,000	190,000	200,000	120,000

Required

Prepare a merchandise purchases budget (in units only) for *each product* for the months of April, May, and June.

Check April budgeted purchases: Water skis, 39,000; Tow ropes, 19,000; Life jackets, 29,000

Problem 20-6B[A]

Merchandising: Preparation of cash budgets for three periods

P4

Sony Stereo began operations in March. March sales were $180,000 and purchases were $100,000. The beginning cash balance for April is $3,000.

Sony's owner approaches the bank for an $80,000 loan to be made on April 2 and repaid on June 30. The bank's loan officer asks the owner to prepare monthly cash budgets. Its budgeted sales, merchandise purchases, and cash payments for other expenses for the next three months follow.

Budgeted	April	May	June
Sales	$220,000	$300,000	$380,000
Merchandise purchases	210,000	180,000	220,000
Cash payments			
Salaries	16,000	17,000	18,000
Rent	36,000	36,000	36,000
Insurance	2,000	2,000	2,000
Repayment of loan			80,000
Interest on loan	800	800	800

All sales are on credit where 90% of credit sales are collected in the month following the sale, and the remaining 10% is collected in the second month following the sale. All merchandise is purchased on credit; 80% of the balance is paid in the month following a purchase, and the remaining 20% is paid in the second month.

Required

Prepare the following for the months of April, May, and June.

1. Schedule of cash receipts from sales.
2. Schedule of cash payments for direct materials.
3. Cash budget.

Problem 20-7B[A]

Merchandising: Preparation of cash budgets with supporting purchases budgets

P4

Connick Company sells its product for $22 per unit. Its actual and budgeted sales follow.

	February (Actual)	March (Budget)	April (Budget)	May (Budget)
Sales units	22,500	19,000	18,750	21,000
Sales dollars	$495,000	$418,000	$412,500	$462,000

All sales are on credit where 40% is collected in the month of the sale, and the remaining 60% is collected in the month following the sale.

Merchandise purchases cost $12 per unit. For those purchases, 30% is paid in the month of purchase and the other 70% is paid in the month following purchase. The company has a policy to maintain an ending monthly inventory of 20% of the next month's unit sales. The February 28 actual inventory level of 3,800 units is consistent with this policy. Selling and administrative expenses of $160,000 per month are paid in cash. The company's minimum cash balance for month-end is $50,000. Loans are obtained at the end of any month when the preliminary cash balance is below $50,000. Any preliminary cash balance above $50,000 is used to repay loans at month-end. This loan has a 1% monthly interest rate. At February 28, the loan balance is $12,000, and the company's cash balance is $50,000.

Check (1) Cash receipts: March, $464,200.

Required

1. Prepare a schedule of cash receipts from sales for each of the months of March and April.
2. Prepare the merchandise purchases budget for March and April. page 816
3. Prepare a schedule of cash payments for merchandise purchases for March and April. Assume budgeted merchandise purchases of $261,600 for February.
4. Prepare a cash budget for March and April, including any loan activity and interest expense. Compute the loan balance at the end of each month.

(4) Ending cash balance: March, $90,740.

Problem 20-8B[A]

Merchandising: Preparation of a complete master budget

P4

Isle Corp., a merchandising company, reports the following balance sheet at December 31.

ISLE CORPORATION
Balance Sheet
December 31

Assets			Liabilities and Equity		
Cash		$ 36,000	Liabilities		
Accounts receivable		525,000	Accounts payable	$360,000	
Inventory		150,000	Loan payable	15,000	
			Taxes payable (due March 15)	90,000	$ 465,000
Equipment	$540,000		Equity		
Less: Accumulated depreciation	67,500	472,500	Common stock	472,500	
			Retained earnings	246,000	718,500
Total assets		$1,183,500	Total liabilities and equity		$1,183,500

To prepare a master budget for January, February, and March, use the following information.

a. The company's single product is purchased for $30 per unit and resold for $45 per unit. The inventory level of 5,000 units on December 31 is more than management's desired level, which is 25% of the next month's budgeted sales units. Budgeted sales are January, 6,000 units; February, 8,000 units; March, 10,000 units; and April, 9,000 units. All sales are on credit.

b. Cash receipts from sales are budgeted as follows: January, $382,500; February, $421,500; March, $355,500.

c. Cash payments for merchandise purchases are budgeted as follows: January, $72,000; February, $306,000; March, $123,000.

d. Sales commissions equal to 20% of sales dollars are paid each month. Sales salaries (excluding commissions) are $7,500 per month.

e. General and administrative salaries are $12,000 per month. Maintenance expense equals $3,000 per month and is paid in cash.

f. New equipment purchases are budgeted as follows: January, $72,000; February, $96,000; and March, $28,800. Budgeted depreciation expense is January, $6,375; February, $7,375; and March, $7,675.

g. The company budgets a land purchase at the end of March at a cost of $150,000, which will be paid with cash on March 31.

h. The company has a contract with its bank to obtain additional loans as needed. The interest rate is 1% per month, and interest is paid at each month-end based on the beginning-month balance. Partial or full payments on these loans are made on the last day of the month. The

company maintains a minimum ending cash balance of $36,000 at the end of each month.

i. The income tax rate for the company is 40%. Income taxes on the first quarter's income will not be paid until April 15.

Required

Prepare a master budget for the months of January, February, and March that has the following budgets (round amounts to the nearest dollar).

1. Sales budgets.

2. Merchandise purchases budgets.

3. Selling expense budgets.

4. General and administrative expense budgets.*Hint:* Depreciation is included in the general and administrative budget for merchandisers.

5. Capital expenditures budgets.

6. Cash budgets.

7. Budgeted income statement for entire quarter (not monthly) ended March 31.

8. Budgeted balance sheet as of March 31.

Check (2) Budgeted purchases: Jan., $90,000; Feb., $255,000 (6) Ending cash bal.: Jan., $182,850; Feb., $107,850 (8) Budgeted total assets at March 31, $1,346,875

SERIAL PROBLEM

Business Solutions

P3

Alexander Image/Shutterstock

This serial problem began in Chapter 1 and continues through most of the book. If previous chapter segments were not completed, the serial problem can begin at this point.

SP 20 Santana Rey expects second quarter 2022 net income of **Business Solutions**'s line of computer furniture to be the same as the first quarter's net income (reported below) without any changes in strategy. Sales were 120 desk units (sales price of $1,250) and 60 chairs (sales price of $500).

BUSINESS SOLUTIONS—Computer Furniture Segment
Segment Income Statement*
For Quarter Ended March 31, 2022

Sales†		$180,000
Cost of goods sold‡		105,000
Gross profit		75,000
Selling, general, and administrative expenses		
Sales commissions (10%)	$18,000	
Advertising expenses	9,000	
General and administrative expenses	18,000	45,000
Net income		$ 30,000

*Reflects activity only related to the computer furniture segment.
†Sales: (120 desks × $1,250) + (60 chairs × $500) = $180,000.
‡Cost of goods sold: (120 desks × $750) + (60 chairs × $250) = $105,000.

Santana believes that sales will total 156 desks and 105 chairs for the next quarter *if* selling prices are reduced to $1,150 for desks and $450 for chairs and advertising expenses are increased to $12,000 for the quarter. Product costs per unit and amounts of all other expenses will not change.

Required

1. Prepare a budgeted income statement for the computer furniture segment for the quarter ended June 30, 2022, that shows the results from implementing the proposed changes.
2. Do the proposed changes increase or decrease budgeted net income for the quarter?

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments (1) do not require instructors to know Tableau, (2) are accessible to introductory students, (3) do not require Tableau software, and (4) run in **Connect**. All are auto-gradable.

Tableau DA 20-1 Quick Study, Prepare direct materials budget, **P1**—similar to QS 20-12.

Tableau DA 20-2 Exercise, Prepare direct materials budget, **P1**—similar to Exercise 20-8.

Tableau DA 20-3 Mini-case, Prepare direct labor and factory overhead budgets and analyze strategies, **P1**—similar to Exercise 20-13.

Accounting Analysis connect

COMPANY ANALYSIS

A1

AA 20-1 Apple provides customer service and device repair through its AppleCare program. In preparing its monthly master budget, assume Apple's AppleCare division reports the data below.

	Total Employees	Direct Labor Rate per Hour
Support specialists	5,000	$20
Customer relations specialists	3,200	24
Repair technicians	1,400	28

Required

Prepare a direct labor budget for the AppleCare division for the month. Assume each employee works 150 hours per month.

COMPARATIVE ANALYSIS

A1

AA 20-2 Data below are from recent annual reports for **Apple** and **Google**.

	Apple		Google	
	Current Year	Prior Year	Current Year	Prior Year
Total revenue	$260,174,000,000	$265,595,000,000	$161,857,000,000	$136,819,000,000
Total employees	137,000	132,000	118,899	99,000

Required

1. Compute revenue per employee for both Apple and Google for the current year. Round answers to the nearest dollar.
2. Using revenue per employee from part 1, which company's workforce was more effective at generating revenues in the current year?
3. Was its workforce more effective at generating revenues in the current year versus the prior year for (*a*) Apple and (*b*) Google?

EXTENDED ANALYSIS

A1

AA 20-3 Data below are from recent annual reports for **Samsung**, **Apple**, and **Google**.

	Samsung		Apple	Google
	Current Year	Prior Year	Current Year	Current Year
Total revenue	$197,690,938,000	$209,163,262,000	$260,174,000,000	$161,857,000,000
Total employees	98,753	101,546	137,000	118,899

Required

1. Compute revenue per employee for Samsung for the current year and the prior year.
2. Using revenue per employee, did Samsung's workforce become more effective in generating revenues in the current year versus the prior year?

3. Which company, Apple, Google, or Samsung, was most effective at generating revenue in the current year based on revenue per employee?

Discussion Questions

1. Identify at least three benefits of budgeting in helping managers plan and control a business.
2. How does a budget benefit management in its control function?
3. What is the benefit of continuous budgeting?
4. Identify three common time horizons for short-term planning and budgets.
5. Why should each department participate in preparing its own budget?
6. How does budgeting help management coordinate and plan business activities?
7. Why is the sales budget so important to the budgeting process?
8. What is a selling expense budget? What is a capital expenditures budget?
9. Identify at least two potential negative outcomes of budgeting.
10. **Google** prepares cash budgets. What is a cash budget? Why must operating budgets and the capital expenditures budget be prepared before the cash budget?

GOOGLE

11. **Apple** regularly uses budgets. What is the difference between a production budget and a manufacturing budget?

APPLE

12. How can managers use the master budget in controlling operations?
13. Explain how the budgeting process for service companies differs from that for manufacturers.
14. Certified Management Accountants must understand budgeting. Access the **Institute of Management Accountants** website

(imanet.org), click on the "CMA Certification" tab, and select "Taking the Exam." Scroll down and select "Review the Most Recent Content Specifications Outline." Search for "budgeting methodologies." (*a*) List the budgeting methodologies that are covered on the CMA exam. Search for "annual profit plan." (*b*) List the types of budgets covered on the CMA exam.

15. **Coca-Cola** redesigned its bottle to reduce its use of glass, thus lowering its bottle's weight and CO_2 emissions. Which budgets in the company's master budget will this redesign impact?

Beyond the Numbers

page 819

ETHICS CHALLENGE

C1

BTN 20-1 The budget process and budgets themselves can impact management actions, both positively and negatively. For instance, a common practice among not-for-profit organizations and government agencies is for management to spend any amounts remaining in a budget at the end of the budget period, a practice often called "use it or lose it." The view is that if a department manager does not spend the budgeted amount, top management will reduce next year's budget by the amount not spent. To avoid losing budget dollars, department managers often spend all budgeted amounts regardless of the value added to products or services. All of us pay for the costs associated with this budget system.

Required

Write a half-page report to a local not-for-profit organization or government agency offering a solution to the "use it or lose it" budgeting problem.

COMMUNICATING IN PRACTICE

C1

BTN 20-2 The sales budget is usually the first and most crucial of the component budgets in a master budget because all other budgets usually rely on it for planning purposes.

Required

Assume that your company's sales staff provides information on expected sales and selling prices for items making up the sales budget. Prepare a one-page memorandum to your supervisor outlining concerns with the sales staff's input in the sales budget when its compensation is at least partly tied to these budgets. More generally, explain the importance of assessing any potential bias in information provided to the budget process.

TEAMWORK IN ACTION

A1

BTN 20-3 Your team is to prepare a budget report outlining the costs of attending college (full-time) for the next two semesters (30 hours) or three quarters (45 hours). This budget's focus is solely on attending college; do not include personal items in the team's budget. Your budget must include tuition, books, supplies, club fees, food, housing, and all costs associated with travel to and from college. Include a list of any assumptions you use in completing the budget. Be prepared to present your budget in class.

ENTREPRENEURIAL DECISION

C1

BTN 20-4 **Ellis Island Tropical Tea** manufactures and sells tea. Founder Nailah Ellis-Brown stresses the importance of planning and budgeting for business success.

Required

1. How can budgeting help Nailah efficiently develop and operate her business?
2. Nailah hopes to further expand her business. How is a master budget useful in expanding a business's operations?

21 Flexible Budgets and Standard Costs

page 820

Chapter Preview

FIXED AND FLEXIBLE BUDGETS

P1 Fixed budget

Flexible budget

Analyzing variances

NTK 21-1

STANDARD COSTING

C1 Standard costs

Setting standard costs

P2 Variance analysis

NTK 21-2

MATERIALS AND LABOR VARIANCES

P3 Variance formulas

Materials variances

Labor variances

NTK 21-3, 21-4

OVERHEAD STANDARDS AND VARIANCES

P4 Flexible overhead budget

Standard overhead rate

Overhead variances

A1 Sales variances

NTK 21-5

Learning Objectives

CONCEPTUAL

C1 Define *standard costs* and explain how standard cost information is useful.

ANALYTICAL

A1 Analyze changes in sales from expected amounts.

PROCEDURAL

P1 Prepare a flexible budget and interpret a flexible budget performance report.

P2 Compute the total cost variance.

P3 Compute direct materials and direct labor variances.

P4 Compute overhead controllable and volume variances.

P5 *Appendix 21A*—Compute overhead spending and efficiency variances.

P6 *Appendix 21A*—Prepare journal entries for standard costs and account for price and quantity variances.

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Have a Fit

"Let your belief drive opportunity"—**JESSICA MURPHY**

BOSTON—Shoppers know there are no standard clothing sizes, a source of frustration to them and of sales returns to retailers. "Sizing is poorly defined and not standardized," argues Christopher Moore, chief analytics officer at **True Fit**, a retail software company. True Fit co-founders Jessica Murphy, Romney Evans, and Bill Adler are determined to solve this problem with data.

True Fit combines customer orders and personal preferences with manufacturers' data on clothing style, fit, and size. The resulting "Fashion Genome" includes data from over 170 million users, 250 retailers, and 17,000 brands.

"We apply machine-learning algorithms to crunch tons of data from billions of transactions and generate customer recommendations," explains Romney. As a result, customers buy more and return less.

Beyond personalized recommendations, True Fit determines standards for how much its activities should cost. Growing rapidly—sales increased by nearly 75% this past year—company managers must budget and control direct labor and overhead costs. *Flexible budgets*, which reflect budgeted costs at multiple sales levels, are used

to analyze differences, or *variances*, between actual and budgeted costs.

"Believe . . . and persevere," implores Jessica. "From day one I was determined to solve this."

Courtesy of True Fit

Sources: *True Fit website*, January 2021; *Forbes*, June 2018; *True Fit* blog, February 2019, March 2019; *PR Newswire*, March 2019; *Datainnovation.org*, October 2014

FIXED AND FLEXIBLE BUDGETS

P1

Prepare a flexible budget and interpret a flexible budget performance report.

Managers use budgets to control operations and see that planned objectives are met. **Budget reports** compare budgeted results to actual results. These reports can be prepared at any time and for any period. Three common periods for a budget report are a month, quarter, and year.

From the previous chapter, a *master budget* is based on a predicted level of activity, such as sales volume, for the budget period. There are two options in preparing a master budget: *fixed budgeting* or *flexible budgeting*.

- **Fixed budget**, also called a *static budget*, is based on one predicted amount of sales or other activity measure.
- **Flexible budget**, also called a *variable budget*, is based on more than one amount of sales or other activity measure.

Exhibit 21.1 shows fixed and flexible budgets, prepared in a contribution margin format, for a guitar manufacturer.

EXHIBIT 21.1

Fixed versus Flexible Budgets (condensed)

Fixed Budget (one activity level)	
Sales (in units)	100
Sales ($800 per unit)	$80,000
Variable costs ($360 per unit)	36,000
Contribution margin	44,000
Fixed costs	20,000
Income	$24,000

Flexible Budget (three activity levels)			
Sales (in units)	100	120	140
Sales ($800 per unit)	$80,000	$96,000	$112,000
Variable costs ($360 per unit)	36,000	43,200	50,400
Contribution margin	44,000	52,800	61,600
Fixed costs	20,000	20,000	20,000
Income	$24,000	$32,800	$ 41,600

Exhibit 21.1 shows that the company budgets $24,000 of income if it produces and sells 100 guitars. The fixed budget is useful in evaluating how well the company controlled costs only in the case when exactly 100 guitars are sold. A flexible budget is useful for any sales level (three examples are shown in Exhibit 21.1). A fixed budget is less useful the more the actual activity level differs from the fixed budget activity level.

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Fixed Budget Performance Report

One use of a budget is to compare actual results with planned activities. A *performance report* shows budgeted amounts, actual amounts, and variances. A **variance** is the difference between budgeted and actual amounts.

Exhibit 21.2 shows a **fixed budget performance report**, a report that compares actual results with the results expected under a fixed budget. January's fixed budget for the guitar maker is based on 100 units, but 140 units were actually sold. The far-right column shows the variances between the budgeted and actual dollar amounts for each budget item. We use the letters *F* and *U* to identify variances.

F = **Favorable variance** A favorable variance is when actual income is *higher* than budgeted income. It is also when actual revenue is higher than budgeted revenue, or when actual cost is lower than budgeted cost.

F = **Unfavorable variance** An unfavorable variance is when actual income is *lower* than budgeted income. It is also when actual revenue is lower than budgeted revenue, or when actual cost is higher than budgeted cost.

EXHIBIT 21.2

Fixed Budget Performance Report

Fixed Budget Performance Report

For Month Ended January 31	Fixed Budget	Actual Results	Variances*
Sales (in units)	100	140	
Sales (in dollars)	$80,000	$105,000	$25,000 F
Variable costs	36,000	54,600	18,600 U
Contribution margin	$44,000	50,400	6,400 F
Fixed costs	20,000	20,400	400 U
Income	$24,000	$ 30,000	$ 6,000 F

Budget Reports for Evaluation Managers use budget reports to monitor and control operations. A fixed budget report is limited because it is not an *apples-to-apples* comparison based on similar levels of activity. In Exhibit 21.2 the budgeted amounts use 100 units of activity, but 140 units were actually sold.

Point: Budget reports are often used to determine bonuses of managers.

Flexible Budget Reports

Management uses a flexible budget both before and after the period's activities are complete.

Purpose of Flexible Budgets

- A flexible budget prepared **before** the period begins is often based on several levels of activity. Budgets for different levels provide a "what-if" analysis that often includes best-case and worst-case

activity levels. This allows management to make adjustments to increase profits or decrease losses.

- A flexible budget prepared **after** the period ends helps evaluate performance. It is an apples-to-apples comparison because *budgeted activity level equals actual activity level*. Comparisons of actual results with budgeted performance at the same activity level are more likely to reveal the real causes of any variances. Managers then focus attention on problems resulting in unfavorable variances and opportunities resulting in favorable variances.

Preparation of Flexible Budgets To prepare a flexible budget we follow three steps, as explained here and applied in Exhibit 21.3.

Point: Total variable cost changes in proportion to a change in activity level. Total fixed cost remains unchanged.

1. **Identify activity levels**. Management often uses units sold as the activity driver. For SolCel, all units produced are sold. Management prepares flexible budgets at three unit sales levels: 10,000, 12,000 and 14,000.
2. **Identify costs and classify them as fixed or variable**. page 823 SolCel's management classifies four costs as variable and three as fixed. Variable and fixed cost items are *not* the same for every company.
3. **Compute budgeted sales**. Sales price per unit × Units of activity.

   Compute budgeted variable costs. Variable costs per unit × Units of activity.

   Compute budgeted fixed costs. Fixed costs are constant at each activity level.

   Compute budgeted income. Sales − Variable costs − Fixed costs.

The flexible budgets in Exhibit 21.3 show that sales and total variable costs increase as the activity level increases, but total fixed costs stay

unchanged.

EXHIBIT 21.3

Flexible Budgets (prepared before period begins)

SOLCEL
Flexible Budgets

For Month Ended January 31	Variable Amount per Unit	Total Fixed Cost	Flexible Budget for Unit Sales of 10,000	12,000	14,000
Sales	$10.00		$100,000	$120,000	$140,000
Variable costs					
Direct materials	1.00		10,000	12,000	14,000
Direct labor	1.50		15,000	18,000	21,000
Indirect materials	0.20		2,000	2,400	2,800
Sales commissions	2.10		21,000	25,200	29,400
Total variable costs	4.80		48,000	57,600	67,200
Contribution margin	$ 5.20		$ 52,000	$ 62,400	$ 72,800
Fixed costs					
Depreciation—Machinery		$28,000	28,000	28,000	28,000
Supervisory salaries		11,000	11,000	11,000	11,000
Insurance		1,000	1,000	1,000	1,000
Total fixed costs		$40,000	40,000	40,000	40,000
Income			$ 12,000	$ 22,400	$ 32,800

Variable: Amounts equal Budgeted unit sales × Variable amount per unit

Fixed: Amounts constant at all sales levels

Flexible Budget Equation for Total Budgeted Costs Flexible budgets can be prepared at any activity level. To compute total budgeted costs we use the **flexible budget equation**.

Total budgeted costs = Total fixed costs + (Total variable cost per unit × Units of activity)

Using this equation, management can quickly compare actual costs to budgeted costs at any activity level. For example, if 12,000 units are produced and sold, then:

Total budgeted costs = $40,000 total fixed costs + ($4.80 total variable cost per unit × 12,000 units of activity)

Total budgeted costs = $97,600

Flexible Budget Performance Report SolCel's actual sales volume for January was 12,000 units. A **flexible budget performance report** compares actual performance and budgeted performance *based on actual activity level*. This report directs management's attention to actual amounts that differ greatly from budgeted amounts. Exhibit 21.4 shows SolCel's flexible budget performance report based on 12,000 units produced and sold for January.

Analyzing Variances Management uses the flexible budget performance report to investigate variances and evaluate performance. Management often focuses on large variances. Exhibit 21.4 shows a $5,000 favorable variance in dollar sales. Because actual and budgeted sales volumes are both 12,000 units, the $5,000 favorable sales variance must have resulted from a higher-than-expected selling price. Management would like to determine if the conditions that resulted in higher selling prices will continue.

page 824

EXHIBIT 21.4

Flexible Budget Performance Report (prepared after period ends)

SOLCEL
Flexible Budget Performance Report

For Month Ended January 31	Flexible Budget (12,000 units)	Actual Results (12,000 units)	Variances
Sales	$120,000	$125,000	$5,000 F
Variable costs			
Direct materials	12,000	13,000	1,000 U
Direct labor	18,000	20,000	2,000 U
Indirect materials	2,400	2,100	300 F
Sales commissions	25,200	24,300	900 F
Total variable costs	57,600	59,400	1,800 U
Contribution margin	62,400	65,600	3,200 F
Fixed costs			
Depreciation—Machinery	28,000	28,000	0
Supervisory salaries	11,000	11,000	0
Insurance	1,000	1,200	200 U
Total fixed costs	40,000	40,200	200 U
Income	$ 22,400	$ 25,400	$3,000 F

Both the direct materials ($1,000 U) and direct labor ($2,000 U) variances are relatively large and unfavorable. On the other hand, a relatively large favorable variance is observed for sales commissions

($900 F). Management will try to determine the causes for these variances, both favorable and unfavorable, and make changes to operations if needed.

Decision Maker

Manager The head of the consulting division of your financial services firm complains about the unfavorable variances on the division's performance reports. "We worked on more consulting assignments than planned. It's not surprising our costs are higher than expected. This report characterizes our work as *poor*!" How do you respond? ■ *Answer:* Comparing actual results with a fixed budget is not useful in determining whether the division was more or less efficient. If the division worked on more assignments than expected, some costs will certainly increase. You should prepare a flexible budget using the actual number of consulting assignments and then compare actual performance to the flexible budget.

NEED-TO-KNOW 21-1

Flexible Budget Performance Report

P1

Part A. A manufacturing company reports the following fixed budget and actual results for the past year. The fixed budget uses a selling price of $40 per unit and variable costs of $8 per unit. Prepare a flexible budget performance report for the past year. Label variances as favorable (F) or unfavorable (U).

	Fixed Budget (20,000 units)	Actual Results (24,000 units)
Sales	$800,000	$972,000
Variable costs	160,000	240,000
Fixed costs	500,000	490,000

Solution

Flexible Budget Performance Report			
For Year Ended December 31	Flexible Budget (24,000 units)	Actual Results (24,000 units)	Variances
Sales	$960,000*	$972,000	$12,000 F
Variable costs	192,000†	240,000	48,000 U
Contribution margin	768,000	732,000	36,000 U
Fixed costs	500,000	490,000	10,000 F
Income	$268,000	$242,000	$26,000 U

*24,000 × $40 †24,000 × $8

Part B. A manufacturer reports the following for May when it produced and sold 8,000 units. Prepare a flexible budget performance report at the activity level of 8,000 units. Compute variances and label them as favorable (F) or unfavorable (U). page 825

	Flexible Budget		
	Variable Amount per Unit	Total Fixed Cost	Actual Results
Sales	$12.00		$93,750
Direct materials	4.00		27,250
Direct labor	2.50		21,125
Indirect materials	0.30		2,150
Utilities	0.20		2,125
Depreciation—Machinery		$6,000	6,000
Supervisory salaries		8,000	8,300

Solution

Flexible Budget Performance Report			
For Month Ended May 31	Flexible Budget (8,000 Units)	Actual Results (8,000 Units)	Variances
Sales	$96,000	$93,750	$2,250 U
Variable costs			
Direct materials	32,000	27,250	4,750 F
Direct labor	20,000	21,125	1,125 U
Indirect materials	2,400	2,150	250 F
Utilities	1,600	2,125	525 U
Total variable costs	56,000	52,650	3,350 F
Contribution margin	40,000	41,100	1,100 F
Fixed costs			
Depreciation—Machinery	6,000	6,000	0
Supervisory salaries	8,000	8,300	300 U
Total fixed costs	14,000	14,300	300 U
Income	$26,000	$26,800	$ 800 F

Do More: QS 21-1, QS 21-2, QS 21-3, QS 21-4, E 21-3, E 21-4, E 21-5, E 21-6

STANDARD COSTING

C1

Define *standard costs* and explain how standard cost information is useful.

We next show how *standard costs* can be used in a flexible budgeting system to enable management to better understand the reasons for variances.

Standard Costs

Standard costs are preset costs for delivering a product or service under normal conditions. Manufacturing companies commonly use standard costing for direct materials, direct labor, and overhead costs. Production managers and engineers often determine the production requirements for one unit of product, and accountants put those requirements into dollars.

When actual costs vary from standard costs, management identifies the reason and takes corrective actions. **Management by exception** means that managers focus attention on the most significant differences between actual costs and standard costs.

Budgets are prepared using standard costs. If the standard direct materials cost is $2 per unit and expected production is 50,000 units, the total budgeted direct materials cost is $100,000.

Service companies also use standard costs. For example, while quality medical service is crucial, efficiency in providing that service is

key to controlling medical costs. The use of budgeting and standard costing is effective in controlling costs, especially overhead.

Setting Standard Costs

Standards for direct labor are set by *time and motion* studies that show the direct labor hours required under normal operations. Standards for direct materials are set by studying the quantity, grade, and cost of each material used. Overhead standards are set by studying the resources needed to support production activities. Standards should be challenging but attainable and should acknowledge machine breakdowns, material waste, and idle time.

Illustration of Setting Standard Costs Let's look at wooden baseball bats manufactured by ProBat. Its engineers have determined that manufacturing each finished bat requires 2 pounds of high-grade wood. They also expect some loss of material in the process because of inefficiencies and waste. This results in adding an *allowance* of 0.2 pound, making the standard requirement 2.2 pounds of wood for each bat.

The 2 pound portion is called an *ideal standard;* it is the quantity of direct material required if the process is 100% efficient without any loss or waste. The standard of 2.2 pounds is known as the *practical standard*, the quantity of direct material required under normal operations. The standard direct labor rate should include allowances for employee breaks, cleanup, and machine downtime. Most companies use practical rather than ideal standards.

ProBat must develop standard quantities and standard prices. For overhead, ProBat must consider the activities that drive overhead costs. ProBat's standard costs follow.

Direct materials The purchasing department sets a standard price of $10 per pound for high-grade wood. The purchasing department considers the quality of materials, economic conditions, supply factors (shortages and excesses), and discounts.

Direct labor Two hours of direct labor are required to manufacture a bat. The direct labor rate is $15 per hour. This rate includes wages, taxes, and benefits.

Overhead ProBat applies overhead at the rate of $5 per direct labor hour (DLH).

The standard costs of direct materials, direct labor, and overhead for one bat are shown in Exhibit 21.5 in a *standard cost card*.

EXHIBIT 21.5

Standard Cost Card

STANDARD COST CARD			
Inputs	Standard Quantity or Hours	Standard Price or Rate	Standard Cost per Unit
Direct materials	2.2 pounds	$10 per pound	$22
Direct labor	2.0 DLH	$15 per DLH	30
Overhead	2.0 DLH	$5 per DLH	10
Total			$62

Cost Variance Analysis

P2

Compute the total cost variance.

A **cost variance**, or simply *variance*, is the difference between actual and standard cost. A cost variance can be favorable (F) or unfavorable (U).

- If actual cost is less than standard cost, the variance is favorable (F).
- If actual cost is greater than standard cost, the variance is unfavorable (U).

Exhibit 21.6 shows the flow of events in **variance analysis:** (1) preparing a standard cost performance report, (2) computing and analyzing variances, (3) identifying questions and their answers, and (4) taking corrective and strategic actions.

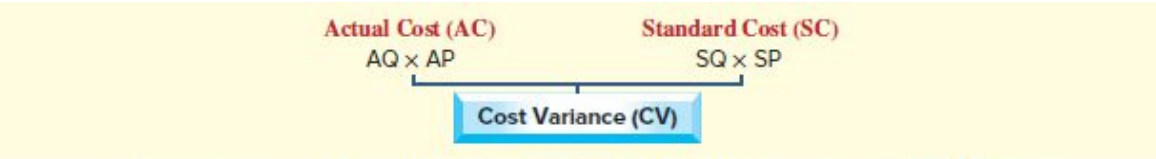
EXHIBIT 21.6

Variance Analysis

Cost Variance Computation Exhibit 21.7 shows a general formula for computing a cost variance (CV). page 827

EXHIBIT 21.7

Cost Variance Formula*



*AQ is actual quantity; AP is actual price; SQ is standard quantity allowed for actual output; SP is standard price.

Actual quantity (AQ) is the actual direct material or direct labor used (input) to manufacture the actual quantity of output for the period. *Standard quantity* (SQ) is the standard input expected for the actual quantity of output. *Actual price* (AP) is the actual amount paid to acquire

the actual direct material or direct labor used for the period. SP is the *standard price* of direct material or direct labor.

Illustration Applying Standard Costs Let's compute the total cost variance for G-Max, a manufacturer of golf equipment and accessories. G-Max set the following standard cost per unit for one of its clubheads.

Inputs	Standard Quantity	Standard Price	Standard Cost per Unit
Direct materials	0.5 lb.	$20 per lb.	$10
Direct labor	0.5 DLH	$32 per DLH	16
Overhead	0.5 DLH	$10 per DLH	5
Total			$31

G-Max produced and sold 3,500 clubheads in May. Budgeted cost, which equals the standard cost per unit multiplied by the number of units produced, is $108,500, computed as $31 standard cost per unit × 3,500 units. Using the cost card above, we compute the amounts for all three inputs for the 3,500 units as follows:

Budgeted Cost (3,500 units)	
Direct materials (0.5 lb. × $20 per lb. × 3,500 units)	$ 35,000
Direct labor (0.5 DLH × $32 per DLH × 3,500 units)	56,000
Overhead (0.5 DLH × $10 per DLH × 3,500 units)	17,500
Budgeted standard cost	**$108,500**

Management reports the actual cost to produce these 3,500 units in May is $112,050. This is more than the $108,500 budgeted cost. The $3,550 cost variance is unfavorable.

Actual cost	$112,050
Budgeted (standard) cost	108,500
Cost variance	**$ 3,550 U**

ColorBlind Images/Blend Images LLC2

Decision Maker

Measuring Up In the spirit of continuous improvement, competitors compare their processes and performance standards against benchmarks established by industry leaders. Service companies that use **benchmarking** include **Jiffy Lube**, **All Tune and Lube**, and **SpeeDee Oil Change and Auto Service**. ■

NEED-TO-KNOW 21-2

Cost Variances

P2

A manufacturer reports the following standards. The company produces 1,200 units and incurs actual total costs of $135,000 this period. Prepare the standard cost card, and then compute the budgeted standard cost and the cost variance. Label the variance as favorable (F) or unfavorable (U).

Standard Quantity and Price per Unit	
Direct materials	2.0 lbs. × $25 per lb.
Direct labor	1.5 DLH × $18 per DLH
Overhead	1.5 DLH × $22 per DLH

Solution

Inputs	Standard Quantity	Standard Price	Standard Cost per Unit
Direct materials	2.0 lbs.	$25 per lb.	$ 50
Direct labor	1.5 DLH	$18 per DLH	27
Overhead	1.5 DLH	$22 per DLH	33
Total			$110

Budgeted Cost (1,200 units)	
Direct materials (2 lbs. × $25 per lb. × 1,200 units)	$ 60,000
Direct labor (1.5 DLH × $18 per DLH × 1,200 units)	32,400
Overhead (1.5 DLH × $22 per DLH × 1,200 units)	39,600
Budgeted standard cost	**$132,000**

Total Cost Variance	
Actual cost	$135,000
Budgeted (standard) cost[1]	132,000
Cost variance	$ 3,000 U

[1] 1,200 units × $110 standard cost.

Do More: Do More: QS 21-6, E 21-8

DIRECT MATERIALS AND DIRECT LABOR VARIANCES

P3

Compute direct materials and direct labor variances.

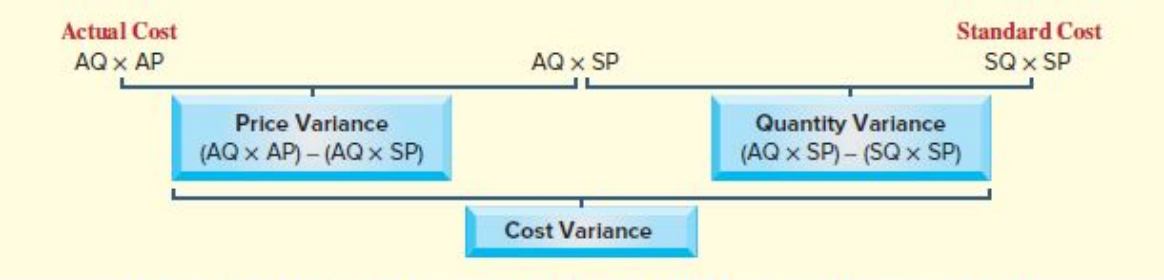
Two factors explain direct materials and direct labor variances.

1. **Price variance**. Difference between actual *price* per unit of input and standard price per unit of input results in a **price** (or rate) **variance**.
2. **Quantity variance**. Difference between actual *quantity* of input used and standard quantity of input that should have been used results in a **quantity** (or efficiency) **variance**.

Formulas for the price variance and quantity variance are in Exhibit 21.8.

EXHIBIT 21.8

Price Variance and Quantity Variance Formulas*



*AQ is actual quantity; AP is actual price; SP is standard price; SQ is standard quantity allowed for actual output.

Managers sometimes find it useful to use alternative formulas for price and quantity variances, as in Exhibit 21.9. Results from applying the formulas in Exhibits 21.8 and 21.9 are identical.

EXHIBIT 21.9

Alternative Price Variance and Quantity Variance Formulas

Price Variance (PV) = [**Actual Price** (AP) − **Standard Price** (SP)] × **Actual Quantity** (AQ)

Quantity Variance (QV) = [**Actual Quantity** (AQ) − **Standard Quantity** (SQ)] × **Standard Price** (SP)

page 829

Direct Materials Variances

G-Max produced and sold 3,500 units in May and it used 1,800 pounds of direct materials (titanium) at a cost of $21 per pound. Actual cost of

its direct materials is $37,800; see top row in table below.

Its materials standard shows that it should have used 1,750 pounds of direct materials to produce 3,500 units (0.5 lb. per unit). Using the standard cost of $20 per lb., we get the standard cost of $35,000 for 3,500 units; see second row in table below. Its direct materials variance is $2,800 U.

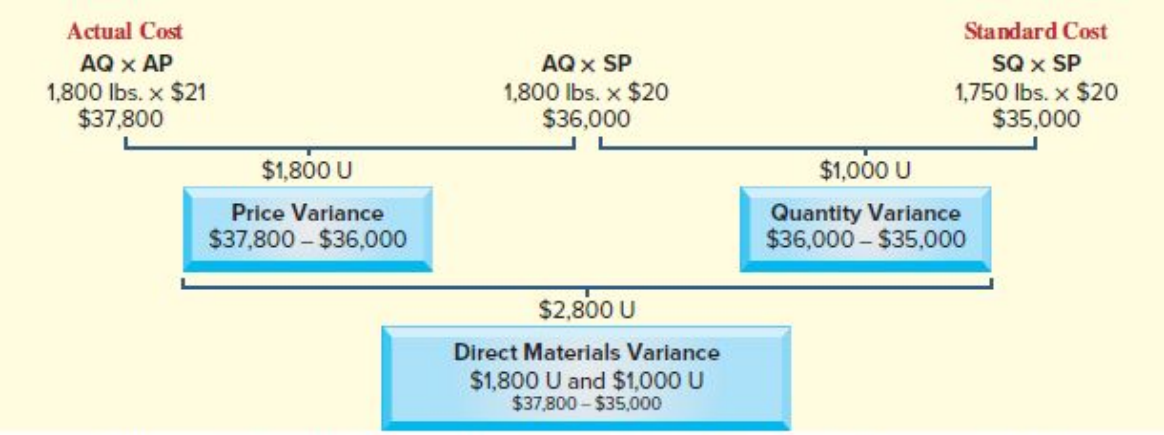
Direct Materials	Quantity		Price per Unit	Cost
Actual quantity and price	1,800 lbs.	×	$21 per lb.	= $37,800
Standard quantity and price	1,750 lbs.	×	$20 per lb.	= 35,000
Direct materials variance				= $ 2,800 U

To identify the causes of this $2,800 U variance, we drill down into the materials price and quantity variances in Exhibit 21.10. The $1,800 unfavorable *price* variance results from paying $1 more per pound than the standard price, then multiplied by the actual 1,800 lbs. purchased and used. The $1,000 unfavorable *quantity* variance results from using 50 pounds more of material than the standard quantity, then multiplied by the $20 per lb. standard cost.

Kristjan Maack//Nordic Photos/Getty Images

EXHIBIT 21.10

Direct Materials Price and Quantity Variances*



*AQ is actual quantity; AP is actual price; SP is standard price; SQ is standard quantity allowed for actual output.

Point: Direct materials price variance is also computed as ($21 − $20) × 1,800 = $1,800. Direct materials quantity variance is also computed as (1,800 − 1,750) × $20 = $1,000.

Evaluating Direct Materials Variances The *purchasing department* is responsible for the price paid for materials. The purchasing manager might have negotiated poor prices, or purchased higher-quality materials.

The *production department* is responsible for the quantity of direct material used. The production department might have used more than the standard amount of material because low-quality material caused excessive waste. In this case, the purchasing manager must explain why inferior materials were acquired. However, if that waste was due to inefficiencies, not poor-quality materials, the production manager must explain why. In sum, variance analysis along with corrective action can improve future performance.

NEED-TO-KNOW 21-3

Direct Materials Price and Quantity Variances

P3

A manufacturing company reports the following for one of its products. Compute the direct materials (a) price variance and (b) quantity variance, and identify each as favorable or unfavorable.

Standard direct materials quantity and price per unit	8 pounds @ $6 per pound
Actual direct materials quantity and price	83,000 pounds @ $5.80 per pound
Actual units produced and sold	10,000 units

Solution

page 830

a. Price variance = (Actual quantity × Actual price) − (Actual quantity × Standard price)
= (83,000 × $5.80) − (83,000 × $6) = **$16,600 F**

b. Quantity variance = (Actual quantity × Standard price) − (Standard quantity* × Standard price)
= (83,000 × $6) − (80,000 × $6) = **$18,000 U**
*Standard quantity = 10,000 units × 8 standard pounds per unit = 80,000 pounds.

Do More: QS 21-8, E 21-9, E 21-13

Direct Labor Variances

G-Max used 1,700 direct labor hours at a cost of $33 per hour in May. Actual cost of its direct labor is $56,100; see top row in table below.

G-Max should have used 1,750 direct labor hours to produce 3,500 units (0.5 DLH per unit). Using the standard cost of $32 per DLH, we get the standard cost of $56,000 for 3,500 units; see second row in table below. Its direct labor variance is $100 U.

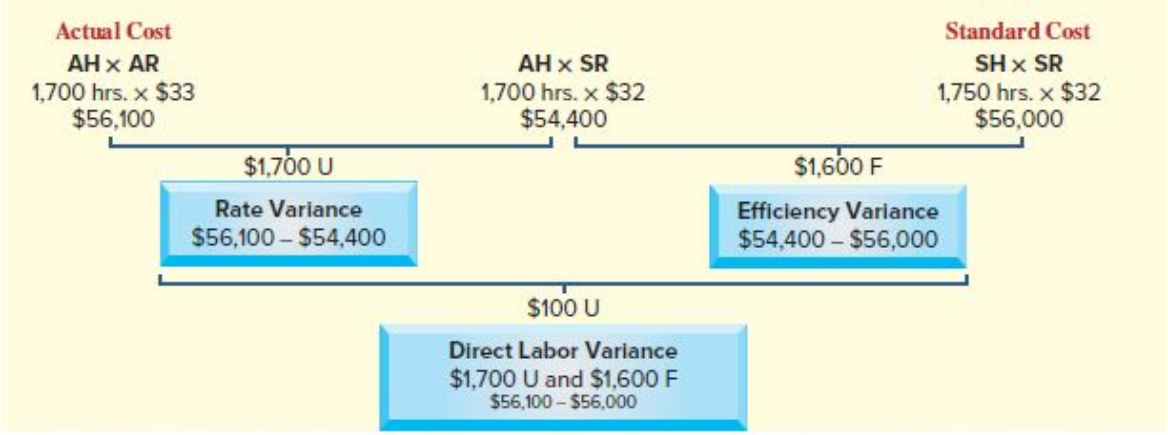
Direct Labor	Quantity	Rate per Hour	Cost
Actual quantity and rate	1,700 hrs.	× $33 per DLH	= $56,100
Standard quantity and rate	1,750 hrs.*	× $32 per DLH	= 56,000
Direct labor variance			= $ 100 U

*Standard quantity = 3,500 units × 0.5 standard DLH per unit.

Actual direct labor cost is $100 over the standard, which might suggest no concern. A closer look reveals a problem. The direct labor variance can be divided into price and quantity variances, called *rate* and *efficiency* variances. Exhibit 21.11 shows the $100 total unfavorable labor variance results from a $1,600 favorable efficiency variance and a $1,700 unfavorable rate variance.

EXHIBIT 21.11

Direct Labor Rate and Efficiency Variances*



*We use hours (H) for quantity (Q) and the wage rate (R) for price (P). Thus: AH is actual direct labor hours; AR is actual wage rate; SH is standard direct labor hours allowed for actual output; SR is standard wage rate.

Point: Direct labor efficiency variance is also computed as(1,700 – 1,750) × $32 = $1,600. Direct labor rate variance is also computed as ($33 − $32) × 1,700 = $1,700.

Evaluating Direct Labor Variances To produce 3,500 units, G-Max should use 1,750 direct labor hours (3,500 units × 0.5 standard DLH per unit). The $1,600 F *efficiency variance* results from using 50 fewer direct labor hours (1,700 actual DLH − 1,750 standard DLH) than standard for the units produced. The 50 fewer hours at $32 per hour, result in the $1,600 favorable efficiency variance. The production manager should explain how direct labor hours were reduced. If this efficiency can be repeated and transferred to other departments, more savings are possible.

The $1,700 U *rate variance* results from paying a rate that is $1 per hour higher than the standard ($33 actual rate − $32 standard rate). Each of the 1,700 actual direct labor hours used cost $1 more, resulting in the $1,700 unfavorable rate variance. Human resources or the production manager needs to explain why the wage rate is higher than the standard.

One possible explanation of direct labor rate and efficiency variances is the use of workers with different skill levels. Higher-skilled workers might finish the same units in fewer hours but have a higher wage rate. A higher-than-standard labor cost might require an adjustment of the standard, or the use of more lower-skilled workers. Other explanations for direct labor variances are possible. Lower-quality materials, poor employee training, little supervision, equipment

breakdowns, and idle workers due to reduced product demand can lead to unfavorable direct labor efficiency variances.

Analytics Insight

Data Tracking Manufacturers aim to keep their manufacturing processes running smoothly. Sensors placed in machines can be used to track usage and schedule maintenance. A consulting firm estimates such *predictive analytics* can reduce machine breakdowns and downtime by about 25%. **Tesla** uses predictive analytics to solve issues with its production process. ■

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NEED-TO-KNOW 21-4

Direct Labor Rate and Efficiency Variances

P3

The following information is available for a manufacturer. Compute the (a) rate variance and (b) efficiency variance, and label each as favorable (F) or unfavorable (U).

Standard direct labor hours per unit . . .	2 hours	Actual direct labor cost (6,250 hours @ $13.10 per hour) . . .	$81,875
Standard direct labor rate per hour. . . .	$13.00	Actual units produced and sold	3,000 units

Solution

a.

$$\text{Rate variance} = (\text{Actual hours} \times \text{Actual rate}) - (\text{Actual hours} \times \text{Standard rate})$$
$$= (6{,}250 \times \$13.10) - (6{,}250 \times \$13.00) = \$625\ \text{U}$$

b.

$$\text{Efficiency variance} = (\text{Actual hours} \times \text{Standard rate}) - (\text{Standard hours} \times \text{Standard rate})$$
$$= (6{,}250 \times \$13.00) - (6{,}000^{*} \times \$13.00) = \$3{,}250\ \text{U}$$

*Standard hours = 3,000 units × 2 DLH per unit.

Do More: QS 21-11, E 21-10, E 21-16

OVERHEAD STANDARDS AND VARIANCES

P4

Compute overhead controllable and volume variances.

In a standard cost system, managers apply overhead costs to products and services using a *standard overhead rate*. The resulting *standard overhead costs* are the overhead amounts budgeted to occur at a specific activity level. Managers set standards and budgets before each period in a desire to better control, monitor, and assign costs to products and services.

Flexible Overhead Budgets

We begin by showing how to use standard costs to develop flexible overhead budgets. The left two number columns of Exhibit 21.12 show the budgeted variable costs per unit and fixed costs for May. With these variable and fixed overhead costs, G-Max can prepare flexible overhead budgets at different capacity levels (see four rightmost number columns). At its maximum capacity of 100%, G-Max can produce 5,000 clubheads. At 100% capacity, total variable overhead costs are budgeted at $10,000 (5,000 × $2). At 70% of capacity, G-Max can produce 3,500 clubheads (5,000 × 70%). At 70% capacity, total variable overhead costs are budgeted at $7,000 (3,500 × $2). At all capacity levels within the relevant range, fixed overhead costs are budgeted at $12,000 per month.

Standard Overhead Rate

To compute the standard overhead rate, we use a three-step process.

Point: With increased automation, machine hours areincreasingly used in applying overhead instead of labor hours.

Step 1: Determine an Allocation Base The allocation base is a measure of input related to overhead costs. Examples include direct labor hours or machine hours. G-Max uses direct labor hours as an allocation base and has a standard of 0.5 direct labor hour per unit.

Point: According to the Federal Reserve Board, U.S. businesses operate at an average capacity level of 80%.

Step 2: Predict an Activity Level The predicted activity level is not set at 100% of capacity. Difficulties in scheduling work, equipment breakdowns, and low product demand typically cause the activity level to be less than full capacity. G-Max managers predict an 80% activity level for May, or a production volume of 4,000 clubheads. We assume all units produced are sold.

EXHIBIT 21.12

Flexible Overhead Budgets

G-MAX
Flexible Overhead Budgets

For Month Ended May 31	Variable Amount per Unit	Total Fixed Cost	Flexible Budget at Capacity Level of 70%	80%	90%	100%
Production (in units)	1 unit		3,500	4,000	4,500	5,000
Factory overhead						
Variable costs						
Indirect labor	$0.80/unit		$ 2,800	$ 3,200	$ 3,600	$ 4,000
Indirect materials	0.60/unit		2,100	2,400	2,700	3,000
Power and lights	0.40/unit		1,400	1,600	1,800	2,000
Maintenance	0.20/unit		700	800	900	1,000
Total variable overhead costs	$2.00/unit		7,000	8,000	9,000	10,000
Fixed costs (per month)						
Building rent		$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000
Depreciation—Machinery		4,000	4,000	4,000	4,000	4,000
Supervisory salaries		6,000	6,000	6,000	6,000	6,000
Total fixed overhead costs		$12,000	12,000	12,000	12,000	12,000
Total overhead			$19,000	$20,000	$21,000	$22,000

Point: Overhead is applied using a standard of 0.5 DLH per unit.

Fuse/Getty Images

Step 3: Compute the Standard Overhead Rate At the predicted activity level of 4,000 units, the flexible budget in Exhibit 21.12 shows total overhead of $20,000. To make 4,000 units, the standard direct labor hours required are 2,000 DLH, computed as 4,000 units × 0.5 DLH per unit. The standard overhead rate follows and is used to compute overhead cost variances. Standard overhead rate depends on the predicted activity level. We can compute this rate separately for both variable costs and fixed costs (Appendix 21A).

$$\text{Standard overhead rate} = \frac{\text{Budgeted overhead at predicted activity level}}{\text{Standard allocation base at predicted activity level}}$$

$$= \frac{\$20{,}000}{2{,}000 \text{ DLH}} = \$10 \text{ per DLH}$$

Computing Overhead Variances

Standard overhead applied is defined in Exhibit 21.13.

EXHIBIT 21.13

Standard Overhead Applied

$$\text{Standard overhead applied} = \text{Actual production} \times \text{Standard amount of allocation base} \times \text{Standard overhead rate}$$

Standard amount of allocation base is the overhead that page 833 *should have been used*, based on actual production. Recall

that G-Max actually produced 3,500 units, which differs from its predicted activity of 4,000 units. The 3,500 units produced in May *should have used* 1,750 direct labor hours, computed as 3,500 actual units × 0.5 standard DLH per unit. Standard overhead applied is based on actual units produced and equals $17,500 as computed here.

Point: Direct labor hour is abbreviated DLH.

$$\text{Standard overhead applied} = 3{,}500 \text{ units} \times 0.5 \text{ DLH per unit} \times \$10 \text{ per DLH} = \$17{,}500$$

Overhead Variance Actual overhead often differs from the standard overhead applied. The difference between the actual total overhead and the standard overhead applied is the **overhead variance** in Exhibit 21.14.

EXHIBIT 21.14

Total Overhead Variance

$$\text{Overhead variance} = \text{Actual total overhead} - \text{Standard overhead applied}$$

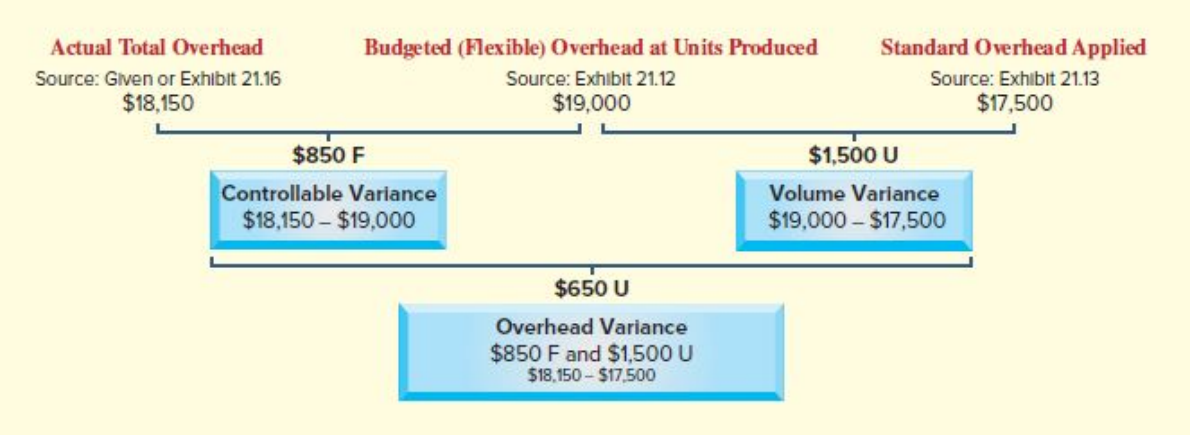
Management reports that actual total overhead in May is $18,150 (given). Using the formula in Exhibit 21.14, total overhead variance is $650, computed as follows. This variance is unfavorable because actual overhead is higher than the standard.

Actual total overhead (given)	$18,150
Standard overhead applied (from above)	17,500
Overhead variance	$ 650 U

Controllable Variance and Volume Variance To understand the factors driving the overhead variance, managers compute *controllable variance* and *volume variance* as in Exhibit 21.15.

EXHIBIT 21.15

Controllable and Volume Variances for Overhead



Controllable Variance **Controllable variance** is computed as follows:

Controllable variance = Actual total overhead – Budgeted (flexible) total overhead at *actual* units produced

Controllable variance is the part of overhead variance under the production manager's control. Actual total overhead is $18,150 (given). Flexible budget total overhead at 3,500 units is $19,000 as page 834 shown in Exhibit 21.12. Controllable variance follows, and it is favorable because actual overhead is less than budgeted overhead.

Controllable Variance	
Actual total overhead (given)	$18,150
Budgeted (flexible) overhead at units produced	19,000
Controllable variance	$ 850 F

Volume Variance A **volume variance** is the difference between budgeted overhead and the standard overhead applied at the actual units produced. It occurs when the company operates at a different capacity level than was predicted. G-Max expected to manufacture 4,000 units, but it only manufactured 3,500 units. The volume variance is usually considered outside the control of the production manager, which is why it's also titled *noncontrollable variance*. Volume variance is computed as follows:

Volume variance = Budgeted overhead – Standard overhead applied

G-Max's budgeted overhead is $19,000 at 3,500 units in Exhibit 21.12. Its standard overhead applied at 3,500 units is $17,500. This

results in the following $1,500 volume variance. The volume variance is unfavorable because G-Max made 500 fewer units than predicted.

Point: Volume variance is also computed as:

Budgeted FOH	$12,000
Standard FOH applied	10,500
Volume variance	$ 1,500 U

Volume Variance	
Budgeted (flexible) overhead at units produced	$19,000
Standard overhead applied (3,500 units × 0.5 DLH per unit × $10 per DLH)*	17,500
Volume variance	**$ 1,500 U**

*Actual units × Standard amount of allocation base × Standard overhead rate.

Overhead Variance Report

To help management isolate the drivers of overhead variance, an *overhead variance report* is prepared. An overhead variance report shows actual overhead costs and how they differ from budgeted amounts. Exhibit 21.16 shows G-Max's overhead variance report.

The listing of individual overhead costs reveals the following sources of the $850 favorable controllable variance: (1) Actual costs for indirect labor, indirect materials, and maintenance were lower than budgeted. (2) Actual costs for power and lights were higher than budgeted. (3) Fixed supervisory salaries were lower than budgeted. Management uses the overhead variance report to identify controllable overhead costs to investigate.

The $1,500 unfavorable volume variance means the company did not reach its predicted activity level. While 80% of manufacturing capacity was budgeted, only 70% was used. Management needs to know why the actual level of production differs from the predicted level. The reasons for failing to meet the predicted production level are often due to factors such as customer demand that are beyond the production manager's control. The bottom line for this report is the $650 U total overhead variance.

Appendix 21A describes an expanded analysis of overhead variances.

EXHIBIT 21.16

Overhead Variance Report

G-MAX
Overhead Variance Report
For Month Ended May 31

Production Level			
Expected	80% of capacity (4,000 units)		
Actual	70% of capacity (3,500 units)		
Controllable Variance	**Flexible Budget**	**Actual Results**	**Variances**
Variable overhead costs			
Indirect labor	$ 2,800	$ 2,375	$ 425 F
Indirect materials	2,100	1,925	175 F
Power and lights	1,400	1,450	50 U
Maintenance	700	600	100 F
Total variable overhead costs	7,000	6,350	650 F
Fixed overhead costs			
Building rent	2,000	2,000	0
Depreciation—Machinery	4,000	4,000	0
Supervisory salaries	6,000	5,800	200 F
Total fixed overhead costs	12,000	11,800	200 F
Total overhead costs	$19,000	$18,150	$ 850 F
Volume Variance			
Budgeted (flexible) overhead			$19,000
Standard overhead applied			17,500
Volume variance			$ 1,500 U
Total overhead variance ($850 F and $1,500 U)			$ 650 U

Point: Both the flexible budget and actual results are based on 3,500 units produced.

NEED-TO-KNOW 21-5

Overhead Variances

P4

A manufacturing company uses standard costs and reports the information below for January. The company uses machine hours (MH) to apply overhead, and the standard is 2 MH per unit, with a standard overhead rate of $4.50 per MH. Compute the total overhead variance, controllable variance, and volume variance for January. Indicate whether each variance is favorable or unfavorable.

Predicted activity level	1,500 units
Budgeted variable overhead rate	$5 per unit (or $2.50 per MH)
Budgeted fixed overhead	$6,000 per month
Actual activity level	1,800 units
Actual total overhead	$15,800

Solution

Overhead variance	
Actual total overhead (given)	$15,800
Standard overhead applied (1,800 units × 2 MH per unit × $4.50 per MH)	16,200
Overhead variance	$ 400 F

Controllable variance	
Actual total overhead (given)	$15,800
Budgeted (flexible) overhead (1,800 units × $5 per unit) + $6,000	15,000
Controllable variance	$ 800 U

Volume variance	
Budgeted (flexible) overhead	$15,000
Standard overhead applied (1,800 units × 2 MH per unit × $4.50 per MH)	16,200
Volume variance	$1,200 F

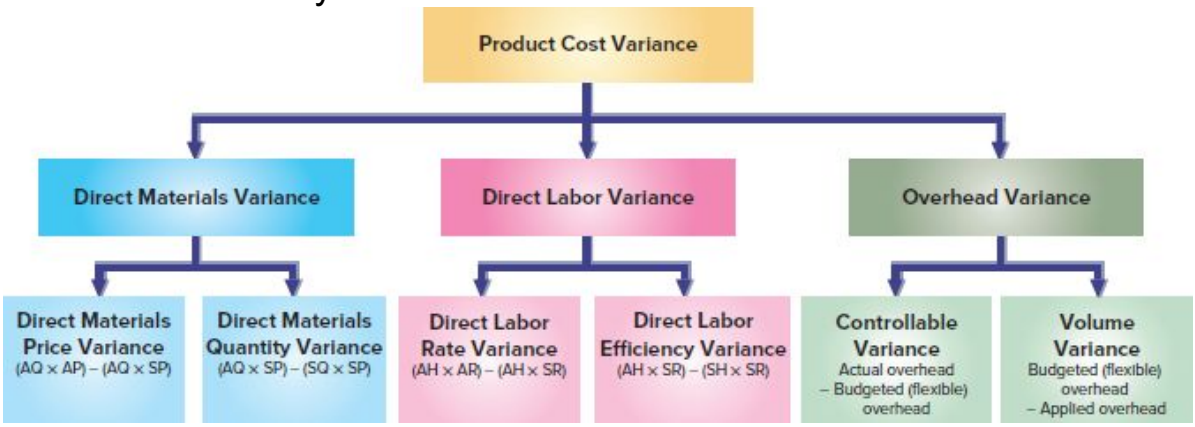
Do More: QS 21-13, QS 21-14, QS 21-15, E 21-17, E 21-19, E 21-20

Summary of Variances Exhibit 21.17 summarizes manufacturing variances. The total cost variance equals the difference between budgeted (standard) costs and actual costs for the three manufacturing costs. Direct materials, direct labor, and overhead variances are each the sum of detailed variances.

page 836

EXHIBIT 21.17

Variance Summary



Standard Costing—Management Considerations Companies consider many factors, both positive and negative, in deciding whether and how to use standard costing. Below we summarize some factors.

Standard Costing Considerations	
Positives	**Negatives**
Provides benchmarks for management by exception.	Standards are costly to develop and keep up-to-date.
Motivates employees to work toward goals.	Variances are not timely for adapting to rapidly changing business conditions.
Useful in the budgeting process.	Employees might not try for continuous improvement.
Isolates reasons for good or bad performance.	

CORPORATE SOCIAL RESPONSIBILITY

The **International Integrated Reporting Council** (IIRC) is a global group of regulators, investors, and accountants that develops methods for integrated reporting. **Integrated reporting** is designed to concisely report how an organization's strategy, performance, sustainability efforts, and governance lead to value creation.

Intel, a maker of computer chips, follows many of the IIRC's recommendations. In its integrated report, Intel links executive pay, in part, to corporate responsibility metrics. For example, 50% of top management's annual cash bonus is based on meeting operating performance targets, including those for corporate responsibility and environmental sustainability. By linking executive pay to sustainability targets, Intel motivates managers to integrate sustainability initiatives with their efforts to make financial profits and increase firm value.

True Fit, this chapter's feature company, uses data and machine-learning to improve the online clothes-shopping experience. According to the company, 40% of online apparel and footwear purchases are returned, as many customers resort to size sampling when buying online. As a result, the supply chain produces considerable unnecessary cardboard and packaging waste and carbon emissions. By reducing customer returns, True Fit increases income and decreases environmental harm.

Decision Analysis Sales Variances

A1

Analyze changes in sales from expected amounts

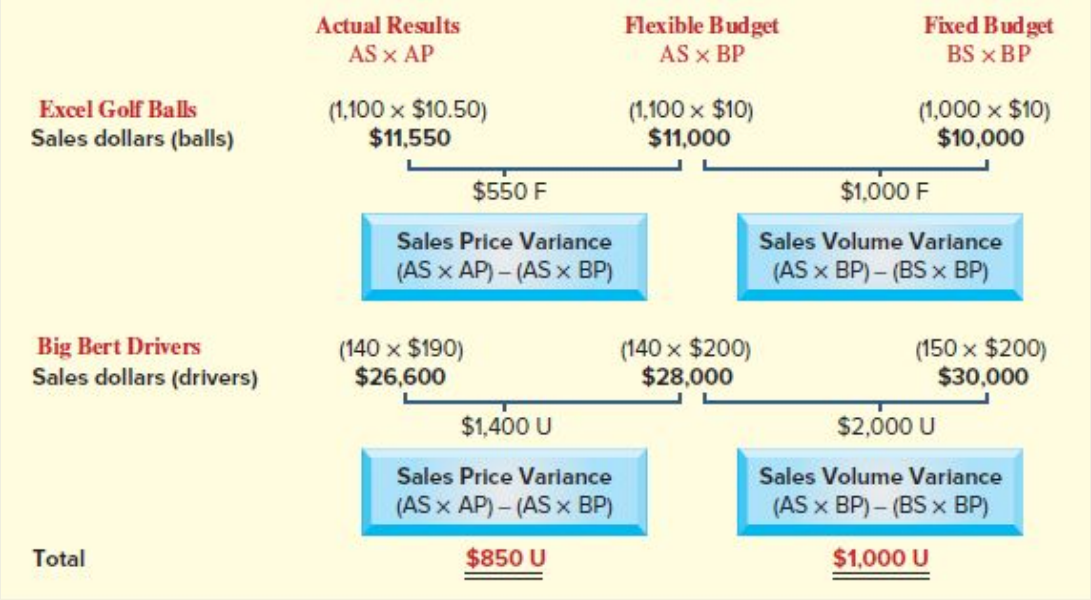
Variance analysis also applies to sales. The budgeted amount of unit sales is the predicted activity level, and the budgeted selling price is treated as a "standard" price. To illustrate, consider the following sales data from G-Max for two of its products, Excel golf balls and Big Bert drivers.

	Budgeted	Actual
Sales of Excel golf balls (units)	1,000 units	1,100 units
Sales price per Excel golf ball	$10	$10.50
Sales of Big Bert drivers (units)	150 units	140 units
Sales price per Big Bert driver	$200	$190

The *sales price variance* and the *sales volume variance* are in Exhibit 21.18. The sales price variance measures the impact of the actual sales price differing from the expected price. The sales volume variance measures the impact of operating at a different capacity level than predicted by the fixed budget. The total sales price page 837 variance is $850 unfavorable, and the total sales volume variance is $1,000 unfavorable. Further analysis of these variances reveals that both the sales price and sales volume variances for Excel golf balls are favorable, while both variances are unfavorable for the Big Bert driver.

EXHIBIT 21.18

Computing Sales Variances*



*AS = actual sales units; AP = actual sales price; BP = budgeted sales price; BS = budgeted sales units (fixed budget).

Managers use sales variances for planning and control. G-Max sold 90 combined total units (both balls and drivers) more than budgeted, yet its total sales price and sales volume variances are unfavorable. The unfavorable sales price variance is due mainly to a decrease in the selling price of Big Bert drivers by $10 per unit. Management must assess whether this price decrease should continue. The unfavorable sales volume variance is due to G-Max selling fewer Big Bert drivers (140) than were budgeted (150). Management must assess whether this decreased demand for Big Bert drivers will persist.

Sales variance analysis depends on management's future sales estimates. Companies often use historical sales growth rates to estimate future sales. To illustrate, **Callaway Golf** reports the following sales data.

Sales ($ millions)	Current year	Prior year
Golf balls	$195.6	$162.5
Woods	304.4	307.9

Sales growth rates can be expressed in percents as shown below for Callaway Golf ($ millions).

$$\text{Sales growth rate} = \frac{\text{Analysis period sales} - \text{Base period sales}}{\text{Base period sales}}$$

$$\text{Sales growth rate, Golf balls} = \frac{\$195.6 - \$162.5}{\$162.5} = 20.4\% \text{ (rounded)}$$

$$\text{Sales growth rate, Woods} = \frac{\$304.4 - \$307.9}{\$307.9} = -1.1\% \text{ (rounded)}$$

Sales growth is over 20% for golf balls but declining by −1.1% for woods. Callaway managers might predict golf ball sales to grow at a 20.4% rate. If they do, estimated golf ball sales in the next year are $235.5 million, computed as $195.6 million × 1.204.

Decision Maker

Sales Manager The current performance report reveals a large favorable sales volume variance but an unfavorable sales price variance. You did not expect a large increase in sales volume. What steps do you take to analyze this situation? ■ *Answer:* The unfavorable sales price variance suggests that actual prices were lower than budgeted prices. As the sales manager, you want to know the reasons for a lower-than-expected price. Perhaps your salespeople lowered the price of certain products by offering quantity discounts. You then might want to know what prompted them to offer the quantity discounts (perhaps competitors were offering discounts). You want to determine if the increased sales volume is due mainly to discounted prices or other factors (such as advertising).

NEED-TO-KNOW 21-6

COMPREHENSIVE

Flexible Budgets and Variance Analysis

Pacific Company provides the following information about its standard costs per unit along with its budgeted and actual results for June. Although the budgeted June volume was 25,000 units produced and sold, the company actually produced and sold 27,000 units.

Point: 0.125 DLH equals 7.5 minutes.

Standard Quantity and Cost	
Direct materials	4 ounces per unit @ $0.31 per ounce
Direct labor	0.125 DLH per unit @ $32 per DLH
Overhead	$21.20 per DLH ($6 variable, $15.20 fixed)

Flexible Budget and Actual Results	Budget (25,000 units)	Actual (27,000 units)
Selling price	$10.00 per unit	$282,420
Variable costs (per unit)		
Direct materials	1.24 per unit	$ 30,800
Direct labor	4.00 per unit	99,900
Indirect materials*	0.25 per unit	9,990
Utilities*	0.50 per unit	16,200
Shipping	0.40 per unit	9,180
Fixed costs (per month)		
Depreciation—Machinery*	$47,500	$ 47,500
Insurance	1,200	1,290
Administrative salaries	10,000	10,060

*Indicates overhead item.

Actual quantity and cost to produce 27,000 units	Actual Cost
Direct materials (110,000 oz. @ $0.28 per oz.)	$30,800
Direct labor (2,700 DLH @ $37.00 per DLH)	99,900
Overhead ($9,990 + $16,200 + $47,500)	73,690

Required

1. Prepare June's flexible budgets showing budgeted sales, costs, and income assuming 20,000, 25,000, 27,000, and 30,000 units produced and sold.
2. Prepare a flexible budget performance report for the actual volume of 27,000 units.
3. Apply variance analysis for direct materials and direct labor.
4. Compute the overhead variance and the controllable and volume variances.

SOLUTION

1.

Flexible Budgets

For Month Ended June 30	Variable Amount per Unit	Total Fixed Cost	Flexible Budget for Unit Sales of 20,000	25,000	27,000	30,000
Sales	$10.00		$200,000	$250,000	$270,000	$300,000
Variable costs						
Direct materials	1.24		24,800	31,000	33,480	37,200
Direct labor	4.00		80,000	100,000	108,000	120,000
Indirect materials	0.25		5,000	6,250	6,750	7,500
Utilities	0.50		10,000	12,500	13,500	15,000
Shipping	0.40		8,000	10,000	10,800	12,000
Total variable costs	6.39		127,800	159,750	172,530	191,700
Contribution margin	$ 3.61		72,200	90,250	97,470	108,300
Fixed costs						
Depreciation—Machinery		$47,500	47,500	47,500	47,500	47,500
Insurance		1,200	1,200	1,200	1,200	1,200
Administrative salaries		10,000	10,000	10,000	10,000	10,000
Total fixed costs		$58,700	58,700	58,700	58,700	58,700
Income			$ 13,500	$ 31,550	$ 38,770	$ 49,600

2.

Flexible Budget Performance Report

For Month Ended June 30	Flexible Budget (27,000 units)	Actual Results (27,000 units)	Variance
Sales (27,000 units)	$270,000	$282,420	$12,420 F
Variable costs			
Direct materials	33,480	30,800	2,680 F
Direct labor	108,000	99,900	8,100 F
Indirect materials	6,750	9,990	3,240 U
Utilities	13,500	16,200	2,700 U
Shipping	10,800	9,180	1,620 F
Total variable costs	172,530	166,070	6,460 F
Contribution margin	97,470	116,350	18,880 F
Fixed costs			
Depreciation—Machinery	47,500	47,500	0
Insurance	1,200	1,290	90 U
Administrative salaries	10,000	10,060	60 U
Total fixed costs	58,700	58,850	150 U
Income	$ 38,770	$ 57,500	$18,730 F

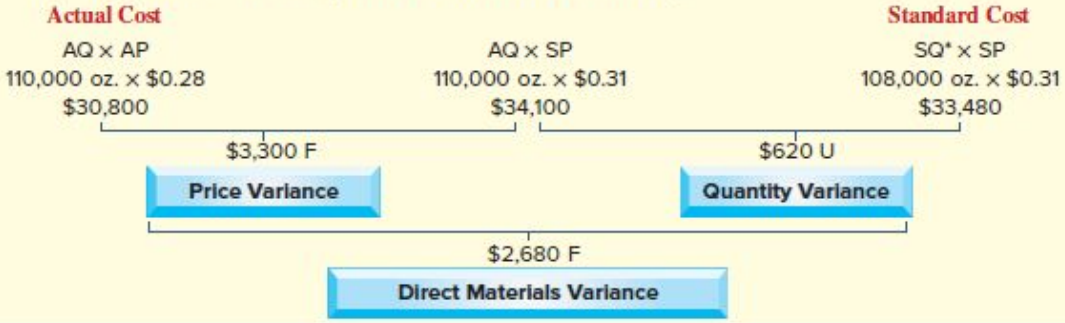
page 839

3. Variance analysis of direct materials and direct labor costs.

Direct materials variances

	Quantity	Price per Unit	Cost
Actual quantity and actual price	110,000 oz.	× $0.28 per oz.	= $30,800
Standard quantity and standard price	108,000 oz.*	× $0.31 per oz.	= 33,480
Direct materials variance			= $ 2,680 F

Price and quantity variances (based on formulas in Exhibit 21.10):



*SQ = 27,000 actual units of output × 4 oz. standard quantity per unit.

Direct labor variances

	Quantity	Rate per Hour	Cost
Actual quantity and actual rate	2,700 hours	× $37 per hour	= $ 99,900
Standard quantity and standard rate	3,375 hours†	× $32 per hour	= 108,000
Direct labor variance			= $ 8,100 F

Rate and efficiency variances (based on formulas in Exhibit 21.11):

†SH = 27,000 actual units of output × 0.125 standard DLH per unit.

4. Overhead variance and the controllable and volume variances. page 840

Actual total overhead (given)	$73,690
Budgeted (flexible) overhead (from part 2: $6,750 ind. mat. + $13,500 util. + $47,500 depr.)†	67,750
Standard overhead applied (27,000 units × 0.125 DLH per unit × $21.20 per DLH)	71,550

†Or (27,000 units × 0.125 DLH per unit × $6 VOH rate per DLH) + $47,500 FOH.

Do More: QS 21-19, QS 21-20, E 21-27, E 21-28

APPENDIX

21A Expanded Overhead Variances and Standard Cost Accounting System

P5

Compute overhead spending and efficiency variances.

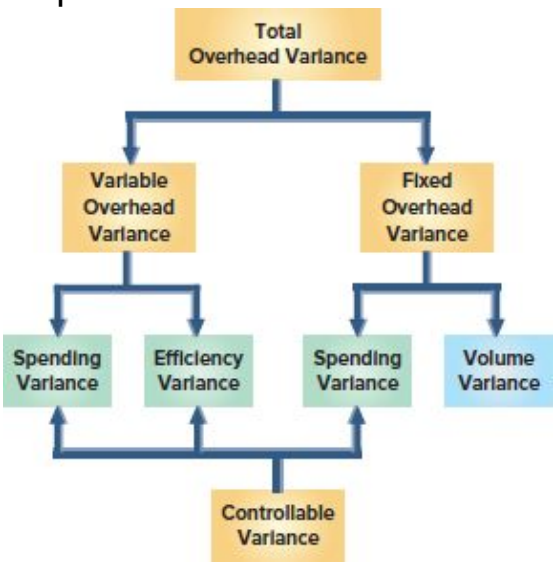
Expanded Overhead Variances

Exhibit 21A.1 shows an expanded framework for analyzing overhead variances consisting of a spending variance and an efficiency variance. This exhibit also shows that controllable variance is the total of the

variable overhead spending variance, the fixed overhead spending variance, and the variable overhead efficiency variance.

EXHIBIT 21A.1

Expanded Framework for Total Overhead Variance



A **spending variance** occurs when management pays an amount different from the standard price to acquire an overhead item. For instance, the actual wage rate paid to indirect labor might be higher than the standard rate. Similarly, actual supervisory salaries might be different than expected.

An **efficiency variance** occurs when standard direct labor hours (the allocation base) expected for actual production differ from the actual direct labor hours used.

Computing Variable and Fixed Overhead Variances Recall the G-Max illustration in the chapter. G-Max produced 3,500 units when 4,000 units were budgeted. Additional data (from Exhibit 21.16) show that actual overhead incurred is $18,150 (the variable portion is $6,350 and the fixed portion is $11,800). Each unit requires 0.5 hour of direct labor.

We can separate the overhead rate into two rates: one for variable overhead (VOH) and one for fixed overhead (FOH). Both rates are computed using numbers in the 80% column from Exhibit 21.12. With this information, we compute overhead variances for both variable overhead and fixed overhead as follows:

$$\text{Variable overhead rate} = \frac{\text{VARIABLE overhead budgeted at predicted activity level}}{\text{Standard allocation base at predicted activity level}} = \frac{\$8{,}000\ \text{VOH}}{2{,}000\ \text{DLH}} = \$4\ \text{per DLH}$$

$$\text{Fixed overhead rate} = \frac{\text{FIXED overhead budgeted at predicted activity level}}{\text{Standard allocation base at predicted activity level}} = \frac{\$12{,}000\ \text{FOH}}{2{,}000\ \text{DLH}} = \$6\ \text{per DLH}$$

Variable Overhead Variance

Actual variable overhead (given in Exhibit 21.16)	$6,350
Standard variable overhead applied (3,500 units × 0.5 standard DLH × $4 VOH rate per DLH)	7,000
Variable overhead variance	$ 650 F

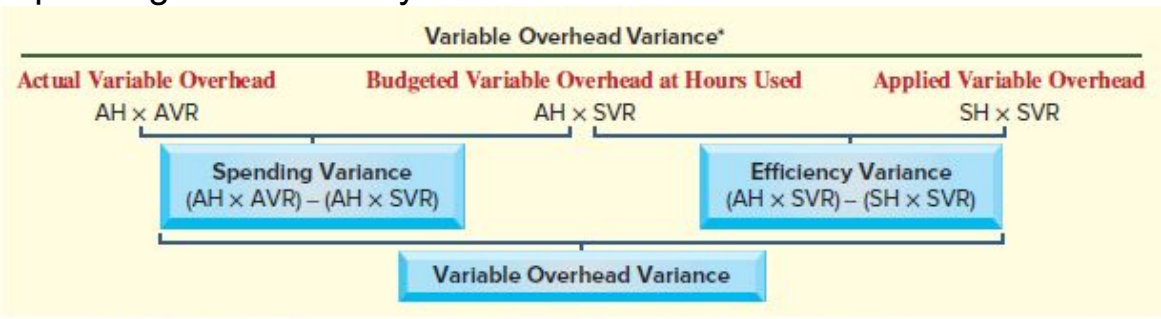
Fixed Overhead Variance

Actual fixed overhead (given in Exhibit 21.16)	$11,800
Standard fixed overhead applied (3,500 units × 0.5 standard DLH × $6 FOH rate per DLH)	10,500
Fixed overhead variance	$ 1,300 U

Expanded Overhead Variance Formulas Exhibit 21A.2 shows formulas to use in computing detailed overhead variances.

EXHIBIT 21A.2

Spending and Efficiency Variances for Overhead



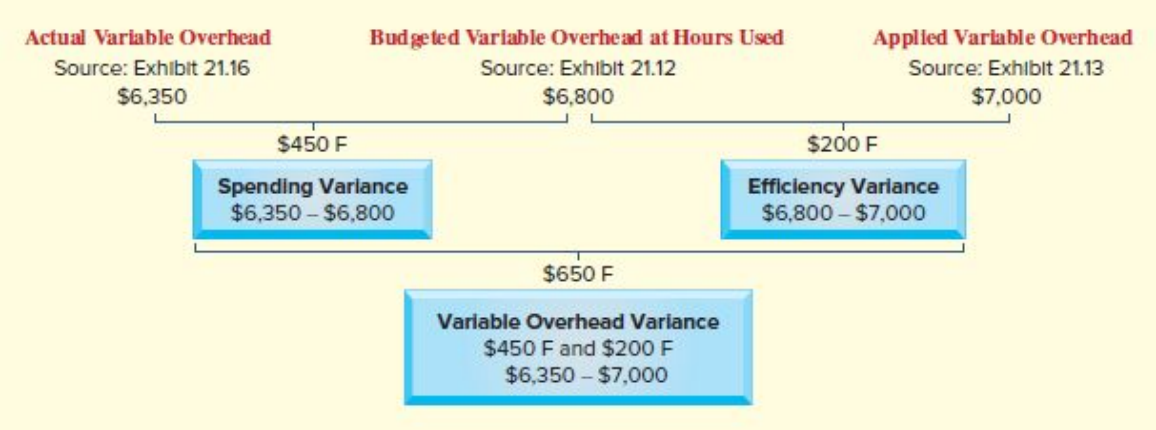
*AH = actual direct labor hours; AVR = actual variable overhead rate; SH = standard direct labor hours; SVR = standard variable overhead rate.

†SH = standard direct labor hours; SFR = standard fixed overhead rate.

Variable Overhead Variances Using these formulas, Exhibit 21A.3 shows the detailed analysis of G-Max's $650 favorable variable overhead variance. G-Max applies overhead based on direct labor hours. It actually used 1,700 direct labor hours to produce 3,500 units. This compares favorably to the standard requirement of 1,750 direct labor hours at 0.5 labor hour per unit. At a standard variable overhead rate of $4.00 per direct labor hour, this should have resulted in variable overhead costs of $6,800 (middle column of Exhibit 21A.3).

EXHIBIT 21A.3

Variable Overhead Spending and Efficiency Variances



G-Max reports actual variable overhead of $6,350, or $450 less than budgeted. This means it has a favorable variable overhead spending variance of $450 ($6,350 – $6,800). G-Max also used 50 fewer direct labor hours than budgeted to make 3,500 units. Thus, G-Max has a favorable variable overhead efficiency variance of $200 ($6,800 – $7,000).

page 842

Fixed Overhead Variances Exhibit 21A.4 provides insight into the causes of G-Max's $1,300 unfavorable fixed overhead variance. G-Max incurred $11,800 in actual fixed overhead; this amount is $200 less than the $12,000 budgeted fixed overhead at the expected production level of 4,000 units (see Exhibit 21.12). This $200 favorable fixed overhead spending variance suggests good control of fixed overhead costs. We showed how to compute the $1,500 unfavorable volume variance in the chapter, and its calculation is repeated in Exhibit 21A.4.

EXHIBIT 21A.4

Fixed Overhead Spending and Volume Variances

Standard Cost Accounting System

P6

Prepare journal entries for standard costs and account for price and quantity variances.

Most standard cost systems record standard costs and variances in accounts. The entries in this section briefly illustrate key aspects of this process for G-Max's standard costs and variances for May.

Direct Materials The first entry records standard direct materials cost of $35,000 in the Work in Process Inventory account. This entry credits Raw Materials Inventory for the actual cost of direct materials used of $37,800. The difference between standard and actual direct materials costs is recorded with debits to two separate direct materials variance accounts (recall Exhibit 21.10). Both direct materials price and quantity variances are recorded as debits because they reflect additional costs *higher* than the standard cost (if actual costs are less than the standard, they are recorded as credits).

May 31	Work in Process Inventory (standard cost)	35,000	
	Direct Materials Price Variance*	**1,800**	
	Direct Materials Quantity Variance	**1,000**	
	Raw Materials Inventory (actual cost)		37,800
	Record direct materials costs and variances.		

*Many companies record the materials price variance when materials are purchased. For simplicity, we record both the materials price and quantity variances when materials are issued to production.

Direct Labor The second entry increases Work in Process Inventory for the standard direct labor cost of $56,000. Actual direct labor cost of

$56,100 is credited to Factory Wages Payable. The difference between standard and actual labor costs is explained by two variances (see Exhibit 21.11). The direct labor rate variance is unfavorable and is debited. The direct labor efficiency variance is favorable and is credited. The direct labor efficiency variance is favorable because it represents a lower cost.

May 31	Work in Process Inventory (standard cost)	56,000	
	Direct Labor Rate Variance	**1,700**	
	Direct Labor Efficiency Variance.....		**1,600**
	Factory Wages Payable (actual cost)		56,100
	Record direct labor costs and variances.		

Overhead The entry to record standard overhead is to debit $17,500 to Work in Process Inventory. Actual overhead costs of $18,150 were debited to Factory Overhead during the period (entries not shown here). Crediting Factory Overhead for $18,150 reduces its balance to zero. To account for the difference between actual and standard overhead costs, the entry includes an $850 credit to the Controllable Variance account and a $1,500 debit to the Volume Variance account.

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May 31	Work in Process Inventory (standard cost)	17,500	
	Volume Variance.....	**1,500**	
	Controllable Variance		**850**
	Factory Overhead		18,150
	Apply overhead at standard rate of $10 per standard direct labor hour (1,750 hours) and record overhead variances.		

The balances of these different variance accounts accumulate until the end of the accounting period. As a result, the unfavorable variances of some months can offset the favorable variances of other months.

These ending variance account balances, which reflect results of the period's various transactions and events, are closed at period-end. If the amounts are *immaterial*, they are added to or subtracted from the balance of the Cost of Goods Sold account. This process is similar to that shown in the job order costing chapter for eliminating an underapplied or overapplied balance in the Factory Overhead account.

Standard Costing Income Statement In addition to budget reports, management can use a standard costing income statement to summarize company performance for a period. A **standard costing**

income statement reports sales and cost of goods sold at their *standard* amounts, and then lists individual sales and cost variances to compute gross profit at *actual* cost. Unfavorable cost variances are *added* to cost of goods sold at standard cost; favorable cost variances are *subtracted* from cost of goods sold at standard cost.

NEED-TO-KNOW 21-7

Part A: Expanded Overhead Variances

P5

Part A: Refer to the information in Need-to-Know 21-6 to answer the requirements.

Required

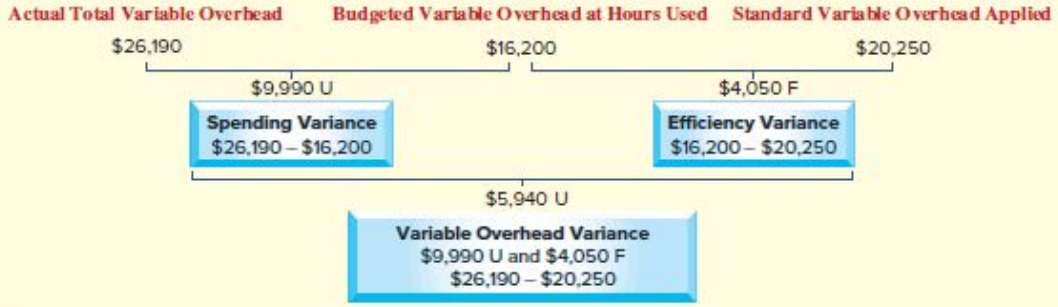
1. Compute the variable overhead spending variance and the variable overhead efficiency variance.
2. Compute the fixed overhead spending variance and the fixed overhead volume variance.

Solution

1. Variable overhead *(indirect materials and utilities)*

Actual total variable overhead ($9,990 + $16,200)	$26,190
Budgeted (flexible) variable overhead at DLH used (2,700 DLH × $6 VOH rate per DLH)	16,200
Standard variable overhead applied (27,000 units × 0.125 DLH per unit × $6 VOH rate per DLH)	20,250

Spending and efficiency variances (based on formulas in Exhibit 21A.2):



2. Fixed overhead *(depreciation on machinery)*

Actual total fixed overhead	$47,500
Budgeted fixed overhead	47,500
Standard fixed overhead applied (27,000 units × 0.125 DLH per unit × $15.20 FOH rate per DLH)	51,300

Spending and volume variances (based on formulas in Exhibit 21A.2):

We can also compute:

Controllable variance: $5,940 U (add both spending variances plus efficiency variance)

Volume variance: 3,800 F (identified above)

Part B: Recording Variances under Standard Costing

page 844

P6

Part B: Prepare journal entries to record direct materials, direct labor, and overhead variances under *standard costing*.

Direct Materials		Direct Labor		Overhead	
Actual cost	$73,200	Actual cost	$38,000	Actual cost	$60,000
Standard cost	75,700	Standard cost	40,000	Standard cost	64,000
Quantity variance	3,800 F	Efficiency variance	1,000 U	Volume variance	1,500 F
Price variance	1,300 U	Rate variance	3,000 F	Controllable variance	2,500 F

Solution

Work in Process Inventory	75,700	
Direct Materials Price Variance	1,300	
Direct Materials Quantity Variance		3,800
Raw Materials Inventory		73,200
Record direct materials and variances.		
Work in Process Inventory	40,000	
Direct Labor Efficiency Variance	1,000	
Direct Labor Rate Variance		3,000
Factory Wages Payable		38,000
Record direct labor and variances.		

Work in Process Inventory	64,000	
Volume Variance		1,500
Controllable Variance		2,500
Factory Overhead		60,000
Record overhead variances.		

Do More: QS 21-18, E 21-14

Summary: Cheat Sheet

FIXED AND FLEXIBLE BUDGETS

Fixed budget: Based on a single activity level.

Flexible budget: Based on several activity levels.

Variance: Difference between budgeted and actual amounts is:
Favorable → Leads to higher income.
Unfavorable → Leads to lower income.

Total budgeted costs = Total fixed costs + (Total variable cost per unit × Units of activity level)

Fixed Budget (one activity level)	
Sales (in units)	100
Sales ($800 per unit)	$80,000
Variable costs ($360 per unit)	36,000
Contribution margin	44,000
Fixed costs	20,000
Income	$24,000

Flexible Budget (three activity levels)			
Sales (in units)	100	120	140
Sales ($800 per unit)	$80,000	$96,000	$112,000
Variable costs ($360 per unit)	36,000	43,200	50,400
Contribution margin	44,000	52,800	61,600
Fixed costs	20,000	20,000	20,000
Income	$24,000	$32,800	$ 41,600

STANDARD COSTING

Standard cost: Preset cost for a product or service.

Management by exception: When managers focus on significant differences between actual costs and standard costs.

STANDARD COST CARD			
Inputs	Standard Quantity or Hours	Standard Price or Rate	Standard Cost per Unit
Direct materials	2.2 pounds	$10 per pound	$22
Direct labor	2.0 DLH	$15 per DLH	30
Overhead	2.0 DLH	$5 per DLH	10
Total			$62

Cost variance: Actual cost < Standard cost → Favorable
Actual cost > Standard cost → Unfavorable

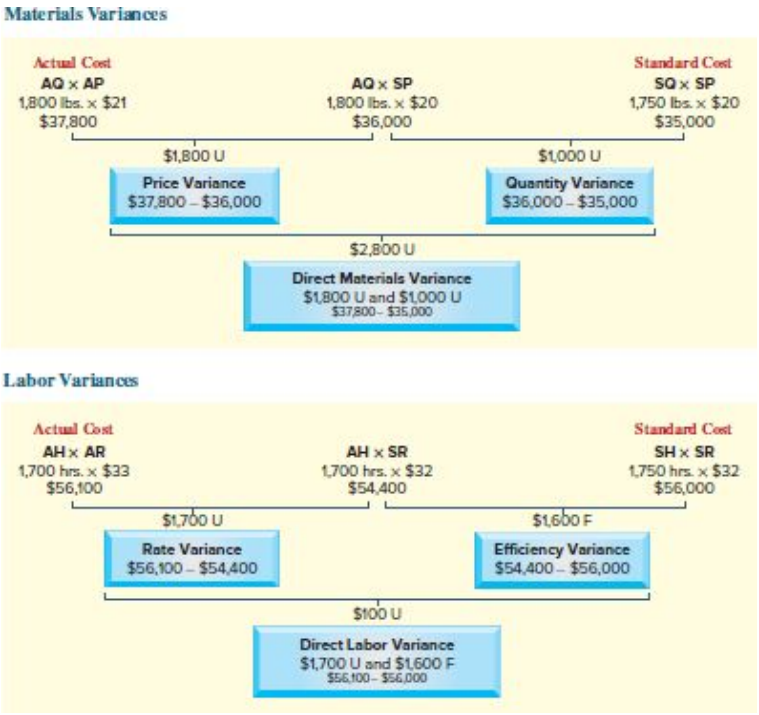
Price variance: $(AQ \times AP) - (AQ \times SP)$

Quantity variance: $(AQ \times SP) - (SQ \times SP)$

AQ = actual quantity, AP = actual price
SQ = standard quantity, SP = standard price

MATERIALS AND LABOR VARIANCES

page 845



OVERHEAD STANDARDS AND VARIANCES

G-MAX
Flexible Overhead Budgets

For Month Ended May 31	Variable Amount per Unit	Total Fixed Cost	Flexible Budget at Capacity Level of 70%	80%	90%	100%
Production (in units)	1 unit		3,500	4,000	4,500	5,000
Factory overhead						
Variable costs						
Indirect labor	$0.80/unit		$ 2,800	$ 3,200	$ 3,600	$ 4,000
Indirect materials	0.60/unit		2,100	2,400	2,700	3,000
Power and lights	0.40/unit		1,400	1,600	1,800	2,000
Maintenance	0.20/unit		700	800	900	1,000
Total variable overhead costs	$2.00/unit		7,000	8,000	9,000	10,000
Fixed costs (per month)						
Building rent		$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000
Depreciation—Machinery		4,000	4,000	4,000	4,000	4,000
Supervisory salaries		6,000	6,000	6,000	6,000	6,000
Total fixed overhead costs		$12,000	12,000	12,000	12,000	12,000
Total overhead			$19,000	$20,000	$21,000	$22,000

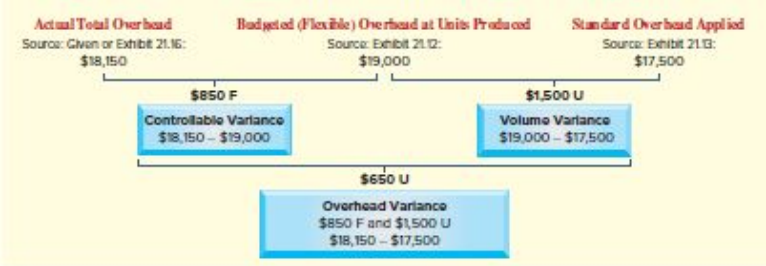
Total overhead variance

$$\text{Overhead variance} = \text{Actual total overhead} - \text{Standard overhead applied}$$

Standard Overhead Applied

$$\text{Standard overhead applied} = \text{Actual production} \times \text{Standard amount of allocation base} \times \text{Standard overhead rate}$$

Volume Variance and Controllable Variance



Volume variance = Budgeted overhead – Standard overhead applied

Controllable variance = Actual total overhead – Budgeted (flexible) overhead at units produced

Sales Variances

Sales price variance = [AS × AP] – [AS × BP]

Sales volume variance = [AS × BP] – [BS × BP]

where AS = Actual Sales units; AP = Actual sales Price;
BP = Budgeted sales Price; BS = Budgeted Sales units (fixed budget).

Detailed Overhead Variances (Appendix 21A)

Variable overhead variance = Variable overhead spending variance + Variable overhead efficiency variance

Fixed overhead variance = Fixed overhead spending variance + Fixed overhead volume variance

} = Total overhead variance

Variable overhead spending variance = [AH × AVR] – [AH × SVR]

Variable overhead efficiency variance = [AH × SVR] – [SH × SVR]

Fixed overhead spending variance = Actual fixed overhead – Budgeted fixed overhead

where AVR is Actual Variable Rate of overhead; SQ is Standard Quantity of materials;
SP is Standard Price of materials; SH is Standard Hours of labor;
SR is Standard Rate of wages; SVR is Standard Variable Rate of overhead.

Key Terms

Benchmarking (827)

Budget report (821)

Controllable variance (833)

Cost variance (826)

Efficiency variance (840)

Favorable variance (822)

Fixed budget (821)

Fixed budget performance report (822)

Flexible budget (821)

Flexible budget performance report (823)

Integrated reporting (836)

International Integrated Reporting Council (836)

Management by exception (825)

Overhead variance (833)

Price variance (828)

Quantity variance (828)

Spending variance (840)

Standard costing income statement (843)

Standard costs (825)

Unfavorable variance (822)

Variance (822)

Variance analysis (826)

Volume variance (834)

Multiple Choice Quiz

1. A company predicts its production and sales will be 24,000 units. At that level, its fixed costs are budgeted at $300,000, and its variable costs are budgeted at $246,000. If its activity level declines to 20,000 units, what will be its budgeted fixed and variable costs?

a. Fixed, $300,000; variable, $246,000

b. Fixed, $250,000; variable, $205,000

c. Fixed, $300,000; variable, $205,000

d. Fixed, $250,000; variable, $246,000

e. Fixed, $300,000; variable, $300,000

2. Using the following information, compute the total actual cost of direct materials used.

- Direct materials standard cost: 5 lbs. × $2 per lb. = $10.
- Total direct materials variance: $15,000 unfavorable.
- Actual direct materials used: 300,000 lbs.
- Actual units produced: 60,000 units.

a. $585,000

b. $600,000

c. $300,000

d. $315,000

e. $615,000

3. A company uses four hours of direct labor to produce one unit. The standard direct labor cost is $20 per hour. This period the company produced 20,000 units and used 84,160 hours of direct labor at a total cost of $1,599,040. What is its direct labor rate variance for the period?

a. $83,200 F

b. $84,160 U

c. $84,160 F

d. $83,200 U

e. $960 F

4. A company's standard overhead applied is $24,000 and its budgeted (flexible) overhead is $19,200. Actual total overhead is $24,100. The volume variance is

a. $4,800 U.

b. $4,800 F.

c. $100 U.

d. $100 F.

e. $4,900 U.

5.[A] A company's standard is $6 per unit in variable overhead (4 machine hours × $1.50 per hour). Actual variable overhead costs of $150,000 were incurred to produce 24,000 units. The total variable overhead variance is

a. $6,000 F.

b. $6,000 U.

c. $114,000 U.

d. $114,000 F.

e. $0.

ANSWERS TO MULTIPLE CHOICE QUIZ

1. c; Fixed costs remain at $300,000; Variable costs = ($246,000⁄24,000 units) × 20,000 units = $205,000

2. e; Budgeted direct materials + Unfavorable variance = Actual cost of direct materials used; or 60,000 units × $10 per unit = $600,000 + $15,000 U = $615,000

3. c; (AH × AR) − (AH × SR) = $1,599,040 − (84,160 hours × $20 per hour) = $84,160 F

4. b; Budgeted (flexible) overhead − Standard overhead applied = Volume variance; or $19,200 − $24,000 = $4,800 F

5. b; Actual variable overhead − Variable overhead applied = Variable overhead cost variance; or $150,000 − (24,000 hours × 4 MH × $1.50 per hour) = $6,000 U

Superscript letter A denotes assignments based on Appendix 21A.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

QUICK STUDY

QS 21-1

Flexible budget performance report **P1**

Beech Company produced and sold 105,000 units in May. For the level of production in May, budgeted amounts were sales, $1,300,000; variable costs, $750,000; and fixed costs, $300,000. The following actual results are available for May. Prepare a flexible budget performance report for May. Indicate whether each variance is favorable or unfavorable.

	Actual Results
Sales (105,000 units)	$1,275,000
Variable costs	712,500
Fixed costs	300,000

QS 21-2

Flexible budget cost calculations **P1**

Based on predicted production of 24,000 units, a company budgets $300,000 of fixed costs and $246,000 of variable costs. If the company actually produces 20,000 units, what are the flexible budget amounts of fixed and variable costs?

QS 21-3

Flexible budget income calculation **P1**

The fixed budget for 20,000 units of production shows sales of $400,000; variable costs of $80,000; and fixed costs of $150,000. If the company actually produces and sells 26,000 units, calculate the flexible budget income.

QS 21-4

Flexible budget performance report **P1**

The fixed budget for 20,000 units of production shows sales of $400,000; variable costs of $80,000; and fixed costs of $150,000. The company's actual sales were 26,000 units at $480,000. Actual variable costs were $112,000 and actual fixed costs were $145,000. Prepare a flexible budget performance report. Indicate whether each variance is favorable or unfavorable.

QS 21-5

Standard cost card **P2**

BatCo makes baseball bats. Each bat requires 2 pounds of wood at $18 per pound and 0.25 direct labor hour at $20 per hour. Overhead is applied at the rate of $40 per direct labor hour. Prepare a standard cost card for a baseball bat for BatCo.

QS 21-6

Total cost variance **P2**

Refer to information in QS 21-5. Assume the actual cost to manufacture 100 bats is $5,400. Compute the total cost variance and identify it as favorable or unfavorable.

QS 21-7

Direct materials variance

P3

A company reports the following for one of its products. Compute the total direct materials variance and identify it as favorable or unfavorable.

Direct materials standard (4 lbs. @ $2 per lb.)	$8 per unit
Actual units produced	60,000 units
Actual cost of direct materials used	$540,000

QS 21-8

Direct materials price and quantity variances

P3

A company reports the following for one of its products. Compute the direct materials price and quantity variances and identify each as favorable or unfavorable.

Direct materials standard (4 lbs. @ $2 per lb.) . . .	$8 per unit	Actual units produced	60,000 units
Actual direct materials used	300,000 lbs.	Actual cost of direct materials used . . .	$540,000

QS 21-9

Direct materials price variance **P3**

For the current period, Kay Company's manufacturing operations show a $4,000 unfavorable direct materials price variance. The actual price per pound of material is $78; the standard price is $77.50 per pound. How many pounds of material were used in the current period?

QS 21-10

Direct materials price and quantity variances **P3**

For the current period, Juan Company's standard cost of direct materials is $150,000. The direct materials variances consist of a $12,000 favorable price variance and a $2,000 favorable quantity variance. What is the actual cost of direct materials?

QS 21-11

Direct labor rate and efficiency variances

P3

A company reports the following for its direct labor. Compute the direct labor rate and efficiency variances and identify each as favorable or unfavorable.

Actual hours of direct labor used.	65,000	Standard rate of direct labor per hour.	$14
Actual rate of direct labor per hour	$15	Standard hours of direct labor for units produced . . .	67,000

QS 21-12

Direct labor rate and efficiency variances **P3**

A company shows a $20,000 unfavorable direct labor rate variance and a $10,000 unfavorable direct labor efficiency variance. The company's standard cost of direct labor is $400,000. What is the actual cost of direct labor?

QS 21-13

Overhead variances: total, controllable, and volume

P4

Derr Co. reports the following. Compute (*a*) controllable variance, (*b*) volume variance, and (*c*) total overhead variance.

Actual total overhead	$980
Budgeted (flexible) overhead at units produced	800
Standard overhead applied	900

QS 21-14

Total overhead and controllable variances **P4**

Fogel Co. expects to produce and sell 116,000 units for the period. The company's flexible budget for 116,000 units shows variable overhead costs of $162,400 and fixed overhead costs of $124,000. The company incurred actual total overhead costs of $262,800 while producing 110,000 units.

(*a*) Compute the total variable overhead costs for the flexible budget when producing 110,000 units. (*b*) Compute the budgeted (flexible) total overhead when producing 110,000 units. (*c*) Compute the controllable variance and identify it as favorable or unfavorable.

QS 21-15

Total overhead and controllable variances

P4

AirPro Corp. reports the following for this period. Compute the (*a*) total overhead variance and (*b*) controllable variance and identify each

variance as favorable or unfavorable.

Actual total overhead	$28,175
Standard overhead applied	$40,180
Budgeted (flexible) variable overhead rate	$3.10 per unit
Budgeted fixed overhead	$12,000
Predicted activity level	12,000 units
Actual activity level	9,800 units

QS 21-16

Volume variance **P4**

Refer to the information in QS 21-15. Compute the volume variance and identify it as favorable or unfavorable.

QS 21-17

Components of overhead variance **P4**

Alvarez Company for the current period shows a $20,000 favorable volume variance and a $60,400 unfavorable controllable variance. Standard overhead applied for the period is $225,000. (*a*) What is the actual total overhead for the period? (*b*) What is the total overhead variance and is it favorable or unfavorable?

QS 21-18[A]

Preparing overhead entries

P6

Refer to the information in QS 21-17. Alvarez records standard costs in its accounts. Prepare the journal entry to charge overhead costs to the Work in Process Inventory account and to record any variances.

QS 21-19[A]

Variable overhead variance

P5

Mosaic Company applies overhead using machine hours and shows the following information. Compute the variable overhead variance and identify it as favorable or unfavorable.

Actual hours of machine use	4,700 hours
Standard hours of machine use (for actual production)	5,000 hours
Actual variable overhead rate per machine hour	$4.15
Standard variable overhead rate per machine hour	$4.00

QS 21-20[A]

Overhead spending and efficiency variances **P5**

Refer to the information in QS 21-19. Compute the variable overhead spending variance and the variable overhead efficiency variance and identify each as favorable or unfavorable.

QS 21-21

Sales variances **A1**

Farad Inc. sells used trucks. During the month, Farad sold 50 trucks at a price of $9,000 each. The budget for the month was to sell 45 trucks at a price of $9,500 each. Compute the sales price variance and sales volume variance for the month and identify each variance as favorable or unfavorable.

QS 21-22

Sales variances **A1**

In a recent year a car manufacturer sold 182,158 cars. The company budgeted to sell 191,158 cars during the year. The budgeted sales price for each car was $30,000 and the actual sales price for each car was $30,200. Compute the sales price variance and the sales volume variance and identify each variance as favorable or unfavorable.

QS 21-23

Materials rate change

P3

Management believes it has found a more efficient way to package its products and use less cardboard. This new approach will reduce shipping costs from $10.00 per shipment to $9.25 per shipment. (1) If the company budgets 1,200 shipments this year, what amount of total direct materials costs would appear on the shipping department's flexible budget? (2) How much is this sustainability improvement predicted to save in direct materials costs for this coming year?

QS 21-24

Overhead rate change

P4

A company's returns department incurs annual overhead costs of $72,000 and budgets 2,000 returns per year. Management believes it has found a better way to package its products. As a result, the company expects to reduce the number of shipments that are returned due to damage by 5%. This is expected to reduce the department's annual overhead by $12,000.

Compute the department's standard overhead rate per return (*a*) before the sustainability improvement and (*b*) after the sustainability improvement.

QS 21-25

Standard costs terminology

C1

Match *a* through *d* with their definition 1 through 4.

a. Standard cost card

b. Management byexception

c. Standard cost

d. Ideal standard

_____**1.**Quantity of input required if a production process is 100% efficient.

_____**2.**Managing by focusing on large differences from standard costs.

_____**3.**Record that accumulates standard cost information.

_____**4.**Preset cost for delivering a product or service under normal conditions.

connect

EXERCISES

Exercise 21-1

Management by exception

C1

Resset Co. had the following results for April's operations: *F* indicates favorable and *U* indicates unfavorable. In applying management by exception, the company investigates all variances of $400 or more. Which variances will the company investigate?

Direct materials price variance	$ 300 F	Direct labor efficiency variance	$2,200 F
Direct materials quantity variance	3,000 U	Overhead controllable variance	400 U
Direct labor rate variance	100 U	Overhead volume variance	500 F

Exercise 21-2

Classifying costs as fixed or variable

P1

JPAK manufactures and sells mountain bikes. Classify each of the following costs as fixed or variable with respect to the number of bikes made.

a. Bike frames

b. Screws for assembly

c. Assembly worker wages

d. Property taxes

e. Bike tires

f. Bike paint

g. Accountant salary

h. Depreciation on office

i. Supervisor salaries

Exercise 21-3

Preparing flexible budgets

P1

Tempo Company's fixed budget (based on sales of 7,000 units) follows.

Fixed Budget	
Sales (7,000 units × $400 per unit)	$2,800,000
Costs	
Direct materials	280,000
Direct labor	490,000
Indirect materials	175,000
Supervisor salary	65,000
Sales commissions	140,000
Shipping	154,000
Administrative salaries	210,000
Depreciation—Office equip.	35,000
Insurance	20,000
Office rent	36,000
Income	$1,195,000

1. Compute total variable cost per unit.
2. Compute total fixed costs.
3. Prepare a flexible budget at activity levels of 6,000 units and 8,000 units. Follow format in Exhibit 21.3.

Exercise 21-4

Preparing flexible budget performance report **P1**

Complete the following partial flexible budget performance report, and indicate whether each variance is favorable or unfavorable. The company budgets a selling price of $80 per unit and variable costs of $35 per unit.

Flexible Budget Performance Report			
For Month Ended June 30	Flexible Budget (10,800 units)	Actual Results (10,800 units)	Variances
Sales	$?	$?	$21,000 F
Variable costs	?	351,000	?
Contribution margin	486,000	?	?
Fixed costs	270,000	285,000	?
Income	$?	$?	$?

Exercise 21-5

Preparing flexible budget performance report

P1

Nina Co. prepared the following fixed budget for July using 7,500 units for budgeted sales. Actual sales were 7,200 units and actual costs are shown below. Prepare a flexible budget performance report for July that shows variances between budgeted and actual amounts. Indicate whether each variance is favorable or unfavorable.

	Fixed Budget			
For Month Ended July 31	Variable Amount per Unit	Total Fixed Cost	Fixed Budget (7,500 units)	Actual Results (7,200 units)
Sales	$100		$750,000	$737,000
Variable costs				
Direct materials	35		262,500	266,800
Direct labor	15		112,500	109,600
Indirect materials	4		30,000	28,200
Sales commissions	11		82,500	78,400
Total variable costs	65		487,500	483,000
Contribution margin	$ 35		$262,500	$254,000
Fixed costs				
Depreciation—Machinery		$ 68,200	68,200	68,200
Supervisory salaries		40,500	40,500	41,600
Insurance		10,000	10,000	10,000
Depreciation—Office equipment		7,400	7,400	7,400
Administrative salaries		33,900	33,900	29,800
Total fixed costs		$160,000	160,000	157,000
Income			$102,500	$ 97,000

Exercise 21-6

Preparing flexible budget performance report

P1

Lewis Co. reports the following fixed budget and actual results for May. Prepare a flexible budget performance report showing variances between budgeted and actual results, and indicate whether each variance is favorable or unfavorable.

	Fixed Budget	Actual Results
Sales (units produced and sold)	1,200	1,400
Sales (in dollars)	$300 per unit	$435,000
Variable costs	$120 per unit	$172,000
Fixed costs	$125,000	$122,000

Exercise 21-7

Standard cost per unit, total budgeted cost, and total cost variance

P2

A manufactured product has the following information for August. (1) Prepare the standard cost card showing standard cost per unit. (2) Compute total budgeted cost for production in August. (3) Compute total cost variance for August, and indicate whether the variance is favorable or unfavorable.

	Standard Quantity and Cost	Actual Results
Direct materials	2 lbs. per unit @ $2.50 per lb.	
Direct labor	0.5 hour per unit @ $16 per DLH	
Overhead	$12 per DLH	
Units manufactured		12,000 units
Total manufacturing costs		$225,400

Exercise 21-8

Standard cost per unit, total budgeted and actual costs, and total cost variance **P2**

A manufactured product has the following information for June. (1) Prepare the standard cost card showing standard cost per unit. (2)

Compute total budgeted cost for June production. (3) Compute total actual cost for June production. (4) Compute total cost variance for June, and indicate whether the variance is favorable or unfavorable.

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	Standard Quantity and Cost	Actual Results
Direct materials	6 lbs. @ $8 per lb.	48,500 lbs. @ $8.10 per lb.
Direct labor	2 DLH @ $16 per DLH	15,700 hrs. @ $16.50 per hr.
Units manufactured		8,000 units

Exercise 21-9

Direct materials variances **P3**

Refer to the information in Exercise 21-8 and compute the (1) direct materials price variance and (2) direct materials quantity variance. Indicate whether each variance is favorable or unfavorable.

Exercise 21-10

Direct labor variances **P3**

Refer to the information in Exercise 21-8 and compute the (1) direct labor rate variance and (2) direct labor efficiency variance. Indicate whether each variance is favorable or unfavorable.

Exercise 21-11

Direct materials and direct labor variances

P3

Lucia Company has set the following standard cost per unit for direct materials and direct labor.

Direct materials (15 lbs. @ $4 per lb.)	$60	Direct labor (3 hrs. @ $15 per hr.)	$45

During May the company incurred the following actual costs to produce 9,000 units.

Direct materials (138,000 lbs. @ $3.75 per lb.)	$517,500	Direct labor (31,000 hrs. @ $15.10 per hr.)	$468,100

Compute the (1) direct materials price and quantity variances and (2) direct labor rate and efficiency variances. Indicate whether each variance is favorable or unfavorable.

Exercise 21-12

Direct materials and direct labor variances

P3

Camila Company has set the following standard cost per unit for direct materials and direct labor.

Direct materials (10 lbs. @ $3 per lb.)	$30	Direct labor (2 hrs. @ $12 per hr.)	$24

During June the company incurred the following actual costs to produce 9,000 units.

Direct materials (92,000 lbs. @ $2.95 per lb.). . .	$271,400	Direct labor (18,800 hrs. @ $12.05 per hr.) . . .	$226,540

Compute the (1) direct materials price and quantity variances and (2) direct labor rate and efficiency variances. Indicate whether each variance is favorable or unfavorable.

Exercise 21-13

Computing and analyzing materials variances **P3**

Hart Company made 3,000 shelves using 22,000 pounds of wood costing $266,200. The company's direct materials standards for one shelf are 8 pounds of wood at $12 per pound.

1. Compute the direct materials price and quantity variances along with the total direct materials variance and identify each as favorable or unfavorable.
2. Hart applies management by exception by investigating direct materials variances of more than 5% of actual direct materials costs. Which direct materials variances will Hart investigate further?

Exercise 21-14^{A}

Recording materials variances **P6**

Refer to Exercise 21-13. Hart Company uses a standard costing system. Prepare the journal entry to charge direct materials costs to Work in Process Inventory and record the direct materials variances.

Exercise 21-15

Direct materials and direct labor variances

P3

The following information relates to production activities of Mercer Manufacturing for the year.

Actual direct materials used	16,000 lbs. at $4.05 per lb.
Actual direct labor used	16,635 hours at $19 per hour
Actual units produced	30,000
Standard quantity and price per unit for direct materials	0.5 lb. at $4.00 per lb.
Standard quantity and rate per unit for direct labor	0.5 hour at $20 per hour

1. Compute the direct materials price and quantity variances and identify each as favorable or unfavorable.
2. Compute the direct labor rate and efficiency variances and identify each as favorable or unfavorable.

Exercise 21-16

Computing and analyzing direct labor variances **P3**

Check (1) October rate variance, $3,250 U

Javon Co. set standards of 3 hours of direct labor per unit at a rate of $15 per hour. During October, the company actually uses 16,250 hours of direct labor at a $247,000 total cost to produce 5,600 units. In November, the company uses 22,000 hours of direct labor at a $335,500 total cost to produce 6,000 units of product.

1. Compute the direct labor rate variance, the direct labor efficiency variance, and the total direct labor variance for each of these two months. Identify each variance as favorable or unfavorable.

2. Javon investigates variances of more than 5% of actual direct labor cost. Which direct labor variances will the company investigate further?

Exercise 21-17

Computing standard overhead rate and total overhead variance

P4

Manuel Company predicts it will operate at 80% of its capacity. Its overhead allocation base is DLH and its standard amount per allocation base is 0.5 DLH per unit. The company reports the following for this period.

	Fixed Budget at 80% Capacity	Actual Results
Production (in units)	50,000	44,000
Overhead		
Variable overhead	$275,000	
Fixed overhead	50,000	
Total overhead	$325,000	$305,000

1. Compute the standard overhead rate. *Hint:* Standard allocation base at 80% capacity is 25,000 DLH, computed as 50,000 units × 0.5 DLH per unit.
2. Compute the standard overhead applied.
3. Compute the total overhead variance.

Exercise 21-18

Volume and controllable variances **P4**

Refer to the information from Exercise 21-17. Compute the overhead (1) volume variance and (2) controllable variance, and identify each as favorable or unfavorable. *Hint:* Compute total budgeted (flexible) overhead for 44,000 units.

Exercise 21-19

Overhead controllable and volume variances

P4

Blaze Corp. applies overhead on the basis of DLH and the standard amount per allocation base is 4 DLH per unit. For March, the company planned production of 8,000 units (80% of its capacity of 10,000 units) and prepared the following budget. The company actually operated at 90% capacity (9,000 units) in March and incurred actual total overhead costs of $81,700.

Overhead Budget	80% Capacity Level
Production (in units)	8,000
Budgeted variable overhead	$32,000
Budgeted fixed overhead	48,000

1. Compute the standard overhead rate. *Hint:* Standard allocation base at 80% capacity is 32,000 DLH, computed as 8,000 units × 4 DLH per unit.
2. Compute the total overhead variance.
3. Compute the overhead controllable variance.
4. Compute the overhead volume variance.

Exercise 21-20

Controllable variance **P4**

Kenshaw Company's flexible overhead budget at an actual activity level of 1,000 units shows $10,000 in variable overhead costs and $5,000 in fixed overhead costs. Actual total overhead is $13,000. Compute the controllable variance.

Exercise 21-21

Volume variance **P4**

Shaw Co. produced 680 units. Its overhead allocation base is DLH and its standard amount per allocation base is 8 DLH per unit. Its standard overhead rate is $10 per DLH. The flexible overhead budget at an activity level of 680 units shows $26,000 in variable overhead costs and $30,000 in fixed overhead costs. Compute the volume variance.

Exercise 21-22

Total overhead variance

P4

Compute total overhead variance using the following information.

Actual overhead for 10,000 units produced	$44,000
Standard overhead rate	$9 per DLH
Standard amount per allocation base (DLH)	0.5 DLH per unit

Exercise 21-23

Flexible overhead budget

P1

Shawke Company's partially completed flexible overhead budget for the current period follows. This budget is based on its predicted activity of 50% of capacity. Complete its flexible overhead budgets for the current period using 1,000, 2,000, and 3,000 units of capacity.

Flexible Overhead Budgets					
For Year Ended December 31	Variable Amount per Unit	Total Fixed Cost	Flexible Budget at Capacity Level of		
			25%	50%	75%
Production (in units)	1 unit		1,000	2,000	3,000
Overhead					
Total variable overhead costs	$12/unit		____	____	____
Total fixed overhead costs		$16,000	____	____	____
Total overhead			____	____	____

Exercise 21-24

Controllable and volume variances

P4

Shaw Inc. began this period with a budget for 1,000 units of predicted production. The budgeted overhead at this predicted activity follows. At period-end, total actual overhead was $92,000, and actual units

produced were 900. The company applies overhead with a standard of 3 DLH per unit and a standard overhead rate of $30 per DLH.

Variable overhead	$50,000
Fixed overhead	40,000
Total overhead	$90,000

a. Compute controllable variance.

b. Compute volume variance.

Exercise 21-25

Overhead controllable and volume variances; overhead variance report

P4

For May, Mariana Company planned production of 8,000 units (80% of its capacity of 10,000 units) and prepared the following overhead budget. The company applies overhead with a standard of 3 DLH per unit and a standard overhead rate of $3.85 per DLH.

Overhead Budget	80% Capacity Level
Production (in units)	8,000
Budgeted overhead	
Variable overhead costs	
Indirect materials	$15,000
Indirect labor	24,000
Power	6,000
Maintenance	3,000
Total variable overhead costs	48,000
Fixed overhead costs	
Rent of building	15,000
Depreciation—Machinery	10,000
Supervisory salaries	19,400
Total fixed overhead costs	44,400
Total overhead	$92,400

It actually operated at 90% capacity (9,000 units) in May and page 854 incurred the following actual overhead.

Actual Overhead	90% Capacity Level
Indirect materials	$15,000
Indirect labor	26,500
Power	6,750
Maintenance	4,000
Rent of building	15,000
Depreciation—Machinery	10,000
Supervisory salaries	22,000
Actual total overhead	$99,250

1. Compute the overhead controllable variance and identify it as favorable or unfavorable.
2. Compute the overhead volume variance and identify it as favorable or unfavorable.
3. Prepare an overhead variance report at the actual activity level of 9,000 units.

Exercise 21-26

Computing sales variances

A1

Mia Wiz sells computers. During May, it sold 350 computers at a $1,200 per unit price. The fixed budget for May predicted sales of 365 computers at a per unit price of $1,100.

1. Compute the sales price variance and identify it as favorable or unfavorable.
2. Compute the sales volume variance and identify it as favorable or unfavorable.

Exercise 21-27[A]

Computing total variable and fixed overhead variances

P5

Sedona Company set the following standard costs for one unit of its product for this year.

Direct material (20 lbs. @ $2.50 per lb.)	$ 50
Direct labor (10 hrs. @ $22.00 per DLH)	220
Variable overhead (10 hrs. @ $4.00 per DLH)	40
Fixed overhead (10 hrs. @ $1.60 per DLH)	16
Standard cost per unit	$326

The $5.60 ($4.00 + $1.60) total overhead rate per direct labor hour (DLH) is based on a predicted activity level of 37,500 units, which is 75% of the factory's capacity of 50,000 units per month. The following monthly flexible budget information is available.

	Flexible Budget at Capacity Level of		
Flexible Budget	**70%**	**75%**	**80%**
Budgeted production (units)	35,000	37,500	40,000
Budgeted direct labor (standard hours)	350,000	375,000	400,000
Budgeted overhead			
Variable overhead	$1,400,000	$1,500,000	$1,600,000
Fixed overhead	600,000	600,000	600,000
Total overhead	$2,000,000	$2,100,000	$2,200,000

During the current month, the company operated at 70% of capacity, direct labor of 340,000 hours were used, and the following actual overhead costs were incurred.

Actual overhead	**70% of Capacity**
Variable overhead	$1,375,000
Fixed overhead	628,600
Total overhead	$2,003,600

1. Compute the total variable overhead variance, and identify it as favorable or unfavorable.
2. Compute the total fixed overhead variance, and identify it as favorable or unfavorable.

Exercise 21-28[A]

Detailed overhead variances **P5**

Check (1) Variable overhead: Spending, $15,000 U

Refer to the information from Exercise 21-27. Compute the following.

1. Variable overhead spending and efficiency variances.
2. Fixed overhead spending and volume variances.
3. Controllable variance.

connect

PROBLEM SET A

Problem 21-1A

Preparing and analyzinga flexible budget

P1

Phoenix Company reports the following fixed budget. It is based on an expected production and sales volume of 15,000 units.

Fixed Budget For Year Ended December 31	
Sales	$3,000,000
Costs	
Direct materials	975,000
Direct labor	225,000
Sales staff commissions	60,000
Depreciation—Machinery	300,000
Supervisory salaries	200,000
Shipping	225,000
Sales staff salaries (fixed annual amount)	250,000
Administrative salaries	411,000
Depreciation—Office equipment	195,000
Income	$ 159,000

Required

1. Classify all items listed in the fixed budget as variable or fixed. For variable costs, determine their amounts per unit. For fixed costs, determine their amounts for the year.
2. Prepare flexible budgets (see Exhibit 21.3) at sales volumes of 14,000 and 16,000 units.
3. The company's business conditions are improving. One possible result is a sales volume of 18,000 units. Prepare a simple budgeted

income statement (as in Exhibit 21.1) if 18,000 units are sold.

Check (2) Budgeted income at 16,000 units, $260,000

Problem 21-2A

Preparing a flexible budget performance report

P1

Refer to the information in Problem 21-1A. Phoenix Company reports the following actual results. Actual sales were 18,000 units.

Sales (18,000 units)	$3,648,000
Costs	
Direct materials	1,185,000
Direct labor	278,000
Sales staff commissions	63,000
Depreciation—Machinery	300,000
Supervisory salaries	210,000
Shipping	261,500
Sales staff salaries (fixed annual amount)	268,000
Administrative salaries	419,000
Depreciation—Office equipment	195,000
Income	$ 468,500

Required

Prepare a flexible budget performance report for the year.

Problem 21-3A

Flexible overhead budget; materials, labor, and overhead variances; and overhead variance report

P1 P2 P3 P4

Antuan Company set the following standard costs per unit for its product.

Direct materials (6 lbs. @ $5 per lb.)	$ 30
Direct labor (2 hrs. @ $17 per hr.)	34
Overhead (2 hrs. @ $18.50 per hr.)	37
Standard cost per unit	$101

The standard overhead rate ($18.50 per direct labor hour) is based on a predicted activity level of 75% of the factory's capacity of 20,000 units per month. Following are the company's budgeted overhead costs per month at the 75% capacity level.

Overhead Budget (75% Capacity)	
Variable overhead costs	
Indirect materials	$ 45,000
Indirect labor	180,000
Power	45,000
Maintenance	90,000
Total variable overhead costs	360,000
Fixed overhead costs	
Depreciation—Building	24,000
Depreciation—Machinery	80,000
Taxes and insurance	12,000
Supervisory salaries	79,000
Total fixed overhead costs	195,000
Total overhead costs	$555,000

The company incurred the following actual costs when it operated at 75% of capacity in October.

Direct materials (91,000 lbs. @ $5.10 per lb.)		$ 464,100
Direct labor (30,500 hrs. @ $17.25 per hr.)		526,125
Overhead costs		
Indirect materials	$ 44,250	
Indirect labor	177,750	
Power	43,000	
Maintenance	96,000	
Depreciation—Building	24,000	
Depreciation—Machinery	75,000	
Taxes and insurance	11,500	
Supervisory salaries	89,000	560,500
Total costs		$1,550,725

Check (1) Budgeted total overhead at 13,000 units, $507,000

Required

1. Prepare flexible overhead budgets (as in Exhibit 21.12) for October showing amounts of each variable and fixed cost at the 65%, 75%, and 85% capacity levels.
2. Compute the direct materials variance, including its price and quantity variances.

3. Compute the direct labor variance, including its rate and efficiency variances.
4. Prepare a detailed overhead variance report (as in Exhibit 21.16) that shows the variances for individual items of overhead.

Problem 21-4A

Computing materials, labor, and overhead variances

P3 P4

Trini Company set the following standard costs per unit for its single product.

Direct materials (30 lbs. @ $4 per lb.)	$120
Direct labor (5 hrs. @ $14 per hr.)	70
Variable overhead (5 hrs. @ $8 per hr.)	40
Fixed overhead (5 hrs. @ $10 per hr.)	50
Standard cost per unit	$280

Overhead is applied using direct labor hours. The standard overhead rate is based on a predicted activity level of 80% of the company's capacity of 60,000 units per quarter. The following additional information is available.

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	Capacity Level		
	70%	80%	90%
Production (in units)	42,000 units	48,000 units	54,000 units
Standard direct labor hours (5 DLH/unit)	210,000 hrs.	240,000 hrs.	270,000 hrs.
Budgeted overhead (flexible budget)			
Fixed overhead	$2,400,000	$2,400,000	$2,400,000
Variable overhead	$1,680,000	$1,920,000	$2,160,000

During the current quarter, the company operated at 90% of capacity and produced 54,000 units; actual direct labor totaled 265,000 hours. Units produced were assigned the following standard costs.

Direct materials (1,620,000 lbs. @ $4 per lb.)	$ 6,480,000
Direct labor (270,000 hrs. @ $14 per hr.)	3,780,000
Overhead (270,000 hrs. @ $18 per hr.)	4,860,000
Standard (budgeted) cost	$15,120,000

Actual costs incurred during the current quarter follow.

Direct materials (1,615,000 lbs. @ $4.10 per lb.)	$ 6,621,500
Direct labor (265,000 hrs. @ $13.75 per hr.)	3,643,750
Fixed overhead	2,350,000
Variable overhead	2,200,000
Actual cost	$14,815,250

Required

1. Compute the direct materials variance, including its price and quantity variances.
2. Compute the direct labor variance, including its rate and efficiency variances.
3. Compute the overhead controllable and volume variances.

Problem 21-5A[A]

Expanded overhead variances

P5

Refer to the information in Problem 21-4A.

Required

Compute these variances: (*a*) variable overhead spending and efficiency, (*b*) fixed overhead spending and volume, and (*c*) overhead controllable.

Problem 21-6A[A]

Recording and analyzing materials, labor, and overhead variances

P6

Amada Company's standard cost system reports this information from its December operations.

Standard direct materials cost	$100,000
Direct materials quantity variance	3,000 U
Direct materials price variance	500 F
Actual direct labor cost	90,000
Direct labor efficiency variance	7,000 F
Direct labor rate variance	1,200 U
Actual overhead cost	375,000
Volume variance	12,000 U
Controllable variance	9,000 U

Required

page 858

1. Prepare December 31 journal entries to record the company's costs and variances for the month for (*a*) direct materials, (*b*) direct labor, and (*c*) overhead. Ignore the journal entry to close the variances.

Analysis Component

2. If management investigates all variances above $5,000, which variances will management investigate?

PROBLEM SET B

Problem 21-1B

Preparing and analyzinga flexible budget

P1

Toho Company reports the following fixed budget. It is based on an expected production and sales volume of 20,000 units.

Fixed Budget For Year Ended December 31	
Sales	$3,000,000
Costs	
Direct materials	1,200,000
Direct labor	260,000
Sales staff commissions	57,000
Depreciation—Machinery	250,000
Supervisory salaries	140,000
Shipping	246,000
Sales staff salaries (fixed annual amount)	160,000
Administrative salaries	422,000
Depreciation—Office equipment	140,000
Income	$ 125,000

Required

1. Classify all items listed in the fixed budget as variable or fixed. For variable costs, determine their amounts per unit. For fixed costs, determine their amounts for the year.
2. Prepare flexible budgets (see Exhibit 21.3) at sales volumes of 18,000 and 24,000 units.
3. The company's business conditions are improving. One possible result is a sales volume of 28,000 units. Prepare a simple budgeted income statement (as in Exhibit 21.1) if 28,000 units are sold.

Check (2) Budgeted income at 24,000 units, $372,400

Problem 21-2B

Preparing and analyzinga flexible budget performance report

P1

Refer to the information in Problem 21-1B. Toho Company reports actual amounts for the year below. Actual sales were 24,000 units.

Sales (24,000 units)	$3,648,000
Costs	
Direct materials	1,400,000
Direct labor	360,000
Sales staff commissions	60,000
Depreciation—Machinery	250,000
Supervisory salaries	219,000
Shipping	214,000
Sales staff salaries (fixed annual amount)	162,000
Administrative salaries	450,000
Depreciation—Office equipment	140,000
Income	$ 393,000

Required

Prepare a flexible budget performance report for the year.

Problem 21-3B

Flexible overhead budget; materials, labor, and overhead variances; and overhead variance report

P1 P2 P3 P4

Suncoast Company set the following standard costs per unit for its product.

Direct materials (4.5 lbs. @ $6 per lb.)	$27
Direct labor (1.5 hrs. @ $12 per hr.)	18
Overhead (1.5 hrs. @ $16 per hr.)	24
Standard cost per unit	$69

The standard overhead rate ($16 per direct labor hour) is based on a predicted activity level of 75% of the factory's capacity of 20,000 units per month. Following are the company's budgeted overhead costs per month at the 75% capacity level.

Overhead Budget (75% Capacity)	
Variable overhead costs	
Indirect materials	$ 22,500
Indirect labor	90,000
Power	22,500
Maintenance	45,000
Total variable overhead costs	180,000
Fixed overhead costs	
Depreciation—Building	24,000
Depreciation—Machinery	72,000
Taxes and insurance	18,000
Supervisory salaries	66,000
Total fixed overhead costs	180,000
Total overhead costs	$360,000

The company incurred the following actual costs when it operated at 75% of capacity in December.

Direct materials (69,000 lbs. @ $6.10 per lb.)		$ 420,900
Direct labor (22,800 hrs. @ $12.30 per hr.)		280,440
Overhead costs		
Indirect materials	$21,600	
Indirect labor	82,260	
Power	23,100	
Maintenance	46,800	
Depreciation—Building	24,000	
Depreciation—Machinery	75,000	
Taxes and insurance	16,500	
Supervisory salaries	66,000	355,260
Total costs		$1,056,600

Required

1. Prepare flexible overhead budgets (as in Exhibit 21.12) for December showing amounts of each variable and fixed cost at the 65%, 75%, and 85% capacity levels.
2. Compute the direct materials variance, including its price and quantity variances.
3. Compute the direct labor variance, including its rate and efficiency variances.
4. Prepare a detailed overhead variance report (as in Exhibit 21.16) that shows the variances for individual items of overhead.

Check (1) Budgeted total overhead at 17,000 units, $384,000

Problem 21-4B

Computing materials, labor, and overhead variances

P3 P4

Kryll Company set the following standard costs per unit for its single product.

Direct materials (25 lbs. @ $4 per lb.)	$100
Direct labor (6 hrs. @ $8 per hr.)	48
Variable overhead (6 hrs. @ $5 per hr.)	30
Fixed overhead (6 hrs. @ $7 per hr.)	42
Standard cost per unit	$220

Overhead is applied using direct labor hours. The standard overhead rate is based on a predicted activity level of 80% of the company's capacity of 60,000 units per quarter. The following additional information is available.

	Capacity Level		
	70%	80%	90%
Production (in units)	42,000 units	48,000 units	54,000 units
Standard direct labor hours (6 DLH/unit)	252,000 hrs.	288,000 hrs.	324,000 hrs.
Budgeted overhead (flexible budget)			
Fixed overhead	$2,016,000	$2,016,000	$2,016,000
Variable overhead	$1,260,000	$1,440,000	$1,620,000

During the current quarter, the company operated at 70% of capacity and produced 42,000 units; direct labor hours worked were 250,000. Units produced were assigned the following standard costs.

Direct materials (1,050,000 lbs. @ $4 per lb.)	$4,200,000
Direct labor (252,000 hrs. @ $8 per hr.)	2,016,000
Overhead (252,000 hrs. @ $12 per hr.)	3,024,000
Standard (budgeted) cost	$9,240,000

Actual costs incurred during the current quarter follow.

Direct materials (1,000,000 lbs. @ $4.25 per lb.)	$4,250,000
Direct labor (250,000 hrs. @ $7.75 per hr.)	1,937,500
Fixed overhead	1,960,000
Variable overhead	1,200,000
Actual cost	$9,347,500

Required

1. Compute the direct materials variance, including its price and quantity variances.
2. Compute the direct labor variance, including its rate and efficiency variances.
3. Compute the overhead controllable and volume variances.

Problem 21-5B[A]

Expanded overhead variances

P5

Refer to the information in Problem 21-4B.

Required

Compute these variances: (*a*) variable overhead spending and efficiency, (*b*) fixed overhead spending and volume, and (*c*) overhead controllable.

Problem 21-6B[A]

Recording and analyzing materials, labor, and overhead variances

P6

Kenya Company's standard cost system reports this information from its June operations.

Standard direct materials cost	$130,000
Direct materials quantity variance	5,000 F
Direct materials price variance	1,500 F
Actual direct labor cost	65,000
Direct labor efficiency variance	3,000 F
Direct labor rate variance	500 U
Actual overhead cost	250,000
Volume variance	12,000 U
Controllable variance	8,000 U

Required

1. Prepare journal entries dated June 30 to record the company's costs and variances for the month for (*a*) direct materials, (*b*) direct labor, and (*c*) overhead. Ignore the journal entry to close the variances.

Analysis Component

2. Identify the variances that would attract the attention of a manager who uses management by exception. Describe what action(s) the manager should consider.

SERIAL PROBLEM

Business Solutions

P1

Alexander Image/Shutterstock

Check Variances: Fixed expenses, $1,000 U

This serial problem began in Chapter 1 and continues through most of the book. If previous chapter segments were not completed, the serial problem can begin at this point.

SSP 21 **Business Solutions**'s second-quarter 2022 fixed budget performance report for its computer furniture operations follows. The $156,000 budgeted expenses include $108,000 in variable expenses for desks and $18,000 in variable expenses for chairs, as well as $30,000 of fixed expenses. Actual fixed expenses total $31,000. Prepare a flexible budget performance report that shows variances between budgeted results and actual results. List fixed and variable expenses separately.

	Fixed Budget	Actual Results	Variances
Desk sales (in units)	144	150	
Chair sales (in units)	72	80	
Desk sales	$180,000	$186,000	$6,000 F
Chair sales	36,000	41,200	5,200 F
Total expenses	156,000	163,880	7,880 U
Income	$ 60,000	$ 63,320	$3,320 F

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments (1) do not require instructors to know Tableau, (2) are accessible to introductory students, (3) do not require Tableau software, and (4) run in **Connect**. All are auto-gradable.

Tableau DA 21-1 Quick Study, Compute standard unit cost and total cost variance, **P2**—similar to QS 21-5 and 21-6.

Tableau DA 21-2 Exercise, Compute direct materials variances, **P3**—similar to QS 21-8 and Exercise 21-9.

Tableau DA 21-3 Mini-case, Compute direct labor and overhead variances, **P3**, **P4**—similar to Exercise 21-10 and Exercise 21-17.

COMPANY ANALYSIS

A1

AA 21-1 **Apple** offers sales price discounts to college students. Apple can use sales variance analysis to assess the effects of these sales discounts. Assumed data for a local college follow.

MacBook Pro	Budgeted	Actual
Sales (units)	1,000 units	1,150 units
Sales price per unit	$1,800	$1,600

Required

1. Compute the sales price and sales volume variances and identify each as favorable or unfavorable.
2. Is the total sales variance favorable or unfavorable?

COMPARATIVE ANALYSIS

A1

AA 21-2 **Apple** and **Google** use historical sales growth rates in estimating future sales. Data below are for one product segment for each company (Apple: iPhone; and Google: Apps, Hardware, and Cloud services).

Sales ($ millions)	Apple, 1 Year Prior	Apple, 2 Years Prior
iPhone	$164,688	$149,337

Sales ($ millions)	Google, 1 Year Prior	Google, 2 Years Prior
Apps, Hardware, and Cloud	$19,906	$15,503

Required

1. Compute the sales growth rate for each company's product segment. Which company's product segment grew at a faster rate?
2. Assume the sales growth rates computed in part 1 are expected to continue into the current year. Compute estimated sales for each company's product segment.

EXTENDED ANALYSIS

A1

AA 21-3 **Samsung** offers sales price discounts on some products. Samsung can use sales variance analysis to assess the effects of these sales discounts. Assumed data for one model of a Samsung television follow.

TV	Budgeted	Actual
Sales (units)	2,000 units	3,000 units
Sales price per unit	$1,800	$1,100

Required

1. Compute the sales price and sales volume variances and identify each as favorable or unfavorable.
2. Is the total sales variance favorable or unfavorable?

Discussion Questions

1. What limits the usefulness of fixed budget performance reports for cost control?
2. Identify the two main purposes of a flexible budget.
3. What formula can be used to compute total budgeted costs at any activity level?
4. What type of analysis does a flexible budget performance report help management perform?
5. Describe the concept of *management by exception* and explain how standard costs help managers apply this concept to control costs.
6. What department is usually responsible for a direct labor rate variance? What department is usually responsible for a direct labor efficiency variance? Explain.
7. What is a price variance? What is a quantity variance?

8. What is the purpose of using standard costs?
9. In an analysis of fixed overhead cost variances, what is the volume variance?
10. In an analysis of overhead cost variances, what is the controllable variance and what causes it?
11. What is the standard overhead rate? How is it computed?
12. How are flexible budget reports useful in management by exception? page 863
13. How can the manager of advertising sales at **Google** use flexible budgets to enhance performance?

GOOGLE

14. Can a retail store like **Apple** use variances in analyzing its operating performance? Explain.

APPLE

15. Assume that **Samsung** is budgeted to operate at 80% of capacity but actually operates at 75% of capacity. What effect will the 5% deviation have on controllable variance? Volume variance?

Samsung

16. List at least two positive and two negative features of standard costing systems.

Beyond the Numbers

ETHICS CHALLENGE

C1

BTN 21-1 Setting standards is challenging. If standards are set too low, companies might purchase inferior products and employees might not work to their full potential. If standards are set too high, companies could be unable to offer a quality product at a profitable price and employees could be overworked. The ethical challenge is to set a high but reasonable standard. Assume that you are asked to set the standard materials price and quantity for a new warehouse

robot, a technically advanced product. To properly set the price and quantity standards, you assemble a team of specialists to provide input.

Required

Identify three types of specialists that you would assemble to provide information to help set the materials price and quantity standards. Briefly explain why you chose each specialist.

COMMUNICATING IN PRACTICE

P6

BTN 21-2 The reason we use the words *favorable* and *unfavorable* when evaluating variances is made clear when we look at the closing of accounts. To see this, consider that (1) all variance accounts are closed at the end of each period (temporary accounts), (2) a favorable variance is always a credit balance, and (3) an unfavorable variance is always a debit balance. Write a half-page memorandum to your instructor with three parts that answer the following three requirements. (Assume that variance accounts are closed to Cost of Goods Sold.)

Required

1. Does Cost of Goods Sold increase or decrease when closing a favorable variance? Does income increase or decrease when a favorable variance is closed to Cost of Goods Sold? Explain.
2. Does Cost of Goods Sold increase or decrease when closing an unfavorable variance? Does income increase or decrease when an unfavorable variance is closed to Cost of Goods Sold? Explain.
3. Explain the meaning of a favorable variance and an unfavorable variance.

TEAMWORK IN ACTION

C1

BTN 21-3 Many service industries link labor rate and time (quantity) standards with their processes. One example is the standard time to board an aircraft. The reason time plays such an important role in the service industry is that it is viewed as a competitive advantage: best service in the shortest amount of time. Although the labor rate component is difficult to observe, the time component of a service delivery standard is often readily apparent—for example, "Lunch will be served in less than five minutes, or it is free."

Required

Break into teams and select two service industries for your analysis. Identify and describe all the time elements each industry uses to create a competitive advantage.

ENTREPRENEURIAL DECISION

C1

BTN 21-4 **True Fit**, as discussed in the chapter opener, uses a costing system with standard costs for direct labor and overhead costs. Two comments frequently are mentioned in relation to standard costing and variance analysis: "Variances are not explanations" and "Management's goal is not to minimize variances."

Required

Write a short memo (no more than one-half page) to Romney Evans, Jessica Murphy, and Bill Adler, co-founders of True Fit, interpreting these two comments in the context of their business.

22 Performance Measurement and Responsibility Accounting

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Chapter Preview

RESPONSIBILITY ACCOUNTING

P1 Performance evaluation

Controllable versus uncontrollable costs

Cost centers

NTK 22-1

PROFIT CENTERS

P2 Direct and indirect expense allocation

P3 Departmental income statements

Departmental contribution to overhead

NTK 22-2

INVESTMENT CENTERS

A1 Return on investment

Residual income

A2 Profit margin

Investment turnover

NTK 22-3

SCORECARD AND TRANSFER PRICING

A3 Balanced scorecard

C1 Transfer pricing

A4 Cash conversion cycle

C2 *Appendix:* Joint costs

NTK 22-4

Learning Objectives

CONCEPTUAL

C1 Explain transfer pricing and methods to set transfer prices.

C2 *Appendix 22A*—Describe allocation of joint costs across products.

ANALYTICAL

A1 Analyze investment centers using return on investment and residual income.

A2 Analyze investment centers using profit margin and investment turnover.

A3 Analyze investment centers using the balanced scorecard.

A4 Compute the number of days in the cash conversion cycle.

PROCEDURAL

P1 Prepare a responsibility accounting report using controllable costs.

P2 Allocate indirect expenses to departments.

P3 Prepare departmental income statements and contribution reports.

page 865

Step by Step

"Paso a paso . . . never stop going"—**SOFIA LUZ ECKRICH**

PASTORES, GUATEMALA—With a Mexican mother and American father, Sofia Luz Eckrich developed a passion for Mexican art and culture. This passion, combined with her college studies in sociology and international development, led Sofia to create **Teysha** (**Teysha.world**), a seller of shoes handcrafted by Latin American artisans. Sofia's goal: "share traditional arts and different cultures with the world in an ethical way."

"We don't follow a 'top-down' approach," declares Sofia. "We let local entrepreneurs create, using classic methods." Her business team offers advice on sales, quality control, and online presence. This decentralized structure encourages creativity and innovation.

Starting with just two shoe styles, Teysha now offers over 20 different styles and custom orders, and has expanded into home

goods. This diverse product line requires Sofia to measure performance and allocate indirect expenses to control costs and grow her business.

Departmental income statements help Sofia analyze her shoe and home goods departments. She also looks at return on investment and residual income in making business decisions.

"Learn to love the numbers," Sofia asserts, "they hold the key to building a sustainable future!"

Alyssa Greenberg

Sources: *Teysha website*, January 2021; *Hiplatina.com*, January 2018; *Fierce.com*, April 2018; *sofialuze.com*, January 2021

RESPONSIBILITY ACCOUNTING

P1

Prepare a responsibility accounting report using controllable costs.

Performance Evaluation

Many large companies are easier to manage if they are divided into smaller units, called *divisions, segments*, or *departments*. **Callaway Golf** uses two product lines, golf balls and golf clubs, while **Kraft Heinz** has both geographic and product lines. In these **decentralized**

organizations, unit managers make decisions and top management then evaluates the performance of unit managers.

Responsibility accounting evaluates unit managers only on activities they can control. Methods of performance evaluation vary for cost centers, profit centers, and investment centers. Responsibility accounting divides a company into three types of *responsibility centers* and then measures their performances.

- **Cost center** incurs costs without generating revenues. The manufacturing departments of a manufacturer are cost centers. Kraft Heinz's Dover, Delaware, manufacturing plant is a cost center. Service departments such as office support and purchasing are also cost centers. *Cost center managers are evaluated on their success in controlling actual costs* compared to budgeted costs.
- **Profit center** generates revenues and incurs costs. Product lines are often evaluated as profit centers. Kraft Heinz's condiment product line is a profit center. *Profit center managers are evaluated on their success in generating income*. A profit center manager does not have the authority to make major investing decisions, such as the decision to build a new manufacturing plant.
- **Investment center** generates revenues and incurs costs, and its manager is responsible for major investing decisions. Kraft Heinz's chief operating officer for U.S. operations has the authority to make decisions such as building a new manufacturing plant. *Investment center managers are evaluated on their use of assets to generate income*.

Controllable versus Uncontrollable Costs

Performance evaluations are best done using controllable costs.

- **Controllable costs** are costs a manager can determine or influence.
- **Uncontrollable costs** are costs not within the manager's control or influence.

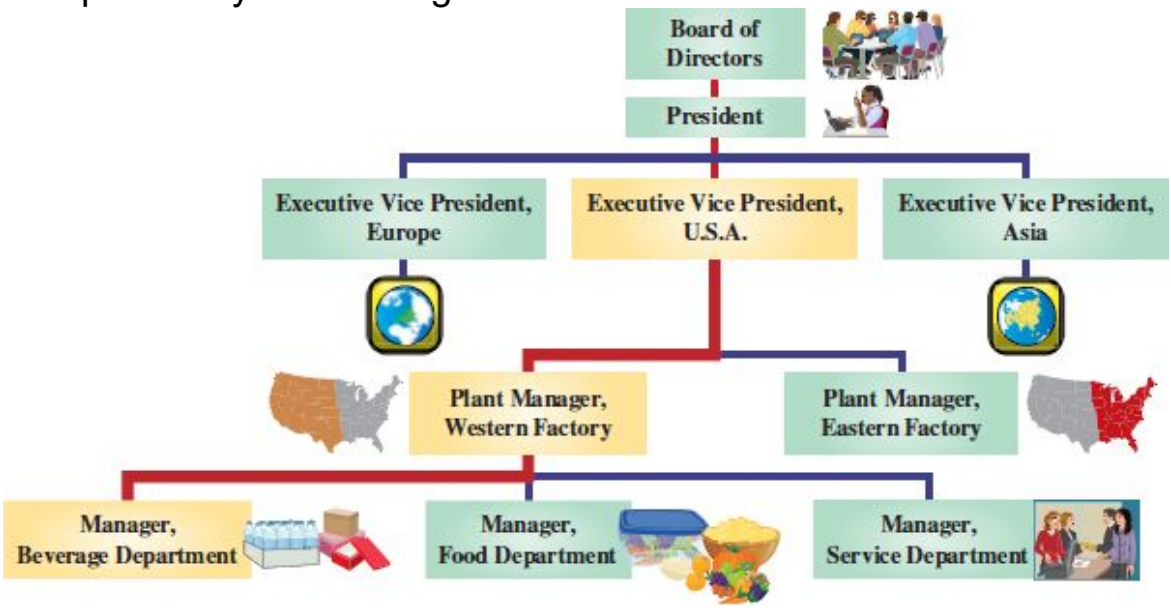
For example, department managers rarely control their own salaries. However, they often control or influence items such as utilities and

supplies used in their departments. Higher-level managers *can* control department manager salaries and other costs like rent and insurance.

A responsibility accounting system recognizes that control over costs is different for different levels of management as in the partial organization chart in Exhibit 22.1. The lines in this chart connecting the managerial levels reflect channels of authority. For example, the three department managers (Beverage, Food, and Service) are responsible for controllable costs incurred in their departments. These department managers report to the plant manager of the Western factory, who has overall control of department costs. The costs of the Western factory are reported to and controlled by the executive vice president (EVP) of U.S.A. operations, who reports to the president, who reports to the board of directors.

EXHIBIT$ 22.1

Responsibility Accounting Chart



Responsibility Accounting for Cost Centers

A **responsibility accounting performance report** lists actual costs that a manager is responsible for and their budgeted amounts. Analysis of differences between budgeted and actual amounts often results in corrective or strategic managerial actions.

Exhibit 22.2 shows performance reports for the three management levels identified in Exhibit 22.1. The Beverage department is a **cost center**. The Beverage department's total controllable costs are included in the controllable costs of the Plant Manager of the Western Factory. The controllable costs of this plant manager are included in the controllable costs of the Executive VP, U.S.A.

Lower-level managers have responsibility for more detailed costs. Higher-level managers are responsible for larger and broader costs. Reports to higher-level managers usually are less detailed because (1) lower-level managers are often responsible for detailed costs and (2) detailed reports can distract from key issues facing top managers.

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EXHIBIT$ 22.2

Responsibility Accounting Performance Reports

Executive Vice President, U.S.A.

Controllable Costs	Budgeted (For July)	Actual (For July)	Over (Under) Budget (For July)
Salaries, plant managers	$ 80,000	$ 81,400	$ 1,400
Depreciation	21,000	21,000	0
Office costs	29,500	28,800	(700)
Western factory	276,700	279,500	2,800
Eastern factory	390,000	380,600	(9,400)
Totals	$797,200	$ 791,300	$(5,900)

Plant Manager, Western Factory

Controllable Costs	Budgeted (For July)	Actual (For July)	Over (Under) Budget (For July)
Salaries, department managers	$ 75,000	$ 76,500	$ 1,500
Building rent	10,600	10,600	0
Insurance	6,800	6,300	(500)
Beverage department	79,600	79,900	300
Food department	61,500	64,200	2,700
Service department	43,200	42,000	(1,200)
Totals	$276,700	$279,500	$ 2,800

Manager, Beverage Department

Controllable Costs	Budgeted (For July)	Actual (For July)	Over (Under) Budget (For July)
Direct materials	$ 51,600	$ 52,500	$ 900
Direct labor	20,000	19,600	(400)
Utilities	8,000	7,800	(200)
Totals	$ 79,600	$ 79,900	$ 300

NEED-TO-KNOW 22-1

Responsibility Accounting

P1

Following are Rios Co.'s annual budgeted and actual costs for the Western region's manufacturing plant. The plant has two departments: Motorcycle and ATV. The plant manager is responsible for all of the plant's costs (other than her own salary). Each department has a manager who is responsible for that department's direct materials, direct labor, and supplies used. Prepare responsibility accounting reports like those in Exhibit 22.2 for (1) each department manager and (2) the plant manager.

	Budgeted Amount		Actual Amount	
	Motorcycle	ATV	Motorcycle	ATV
Direct materials	$ 97,000	$138,000	$ 98,500	$133,800
Direct labor	52,000	105,000	56,100	101,300
Department manager salaries	60,000	56,000	60,000	56,000
Rent	9,000	12,000	8,400	10,900
Supplies used	5,000	11,000	7,000	8,000
Totals	$223,000	$322,000	$230,000	$310,000

Solution

1a.

Responsibility Accounting Performance Report
Department Manager, Motorcycle Department

	Budgeted	Actual	Over (Under) Budget
Direct materials	$ 97,000	$ 98,500	$1,500
Direct labor	52,000	56,100	4,100
Supplies used	5,000	7,000	2,000
Totals	$154,000	$161,600	$7,600

1b.

Responsibility Accounting Performance Report
Department Manager, ATV Department

	Budgeted	Actual	Over (Under) Budget
Direct materials	$ 138,000	$ 133,800	$ (4,200)
Direct labor	105,000	101,300	(3,700)
Supplies used	11,000	8,000	(3,000)
Totals	$254,000	$243,100	$(10,900)

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2.

Responsibility Accounting Performance Report
Plant Manager, Western Region

	Budgeted	Actual	Over (Under) Budget
Department manager salaries	$116,000	$116,000	$ 0
Rent	21,000	19,300	(1,700)
Motorcycle department	154,000	161,600	7,600
ATV department	254,000	243,100	(10,900)
Totals	$545,000	$540,000	$ (5,000)

Do More: QS 22-3, QS 22-4, E 22-1, E 22-2, P 22-1

PROFIT CENTERS

P2

Allocate indirect expenses to departments.

When departments are organized as profit centers, responsibility accounting focuses on how well each department controlled costs *and* generated revenues. **Departmental income statements** are used to report profit center performance. When computing departmental income, we make two decisions for allocating expenses.

1. How to allocate *indirect expenses* such as rent and utilities, which benefit several departments.
2. How to allocate *service department expenses*such as payroll and purchasing, which benefit seve ral departments.

Expenses

Direct expenses are costs readily traced to a department because they are incurred for that department's sole benefit. They are *not* allocated across departments. For example, the salary of an employee who works in only one department is a direct expense of that one department. Direct expenses are often, but not always, controllable costs.

Indirect expenses are costs incurred for the joint benefit of more than one department; they cannot be readily traced to only one department. For example, if two or more departments share a single building, all enjoy the benefits of the expenses for rent, heat, and light.

Service department expenses are costs that benefit more than one department; they cannot be readily traced to only one department. The *operating departments* that perform an organization's main functions, for example, manufacturing and selling, benefit from the work of *service departments*. Service departments do not generate revenues, but their support is crucial for operating department success.

Expense Allocations

Indirect expenses and service department expenses are allocated to departments that benefit from them. Exhibit 22.3 shows a formula for cost allocation.

EXHIBIT$ 22.3

Cost Allocation Formula

Allocated cost = Total cost to allocate × Percentage of allocation base used

Allocating Indirect Expenses No standard rule for the "best" allocation base exists. Exhibit 22.4 shows commonly used bases for allocating indirect expenses.

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EXHIBIT$ 22.4

Bases for Allocating Indirect Expenses

Indirect Expense	Common Allocation Bases
Supervisor salaries.....	Number of employees in department
Rent and utilities.....	Square feet of space occupied
Advertising	Percentage of total sales
Insurance	Value of insured assets

Allocating Service Department Expenses Operating departments use service departments such as personnel, payroll, and

purchasing. Exhibit 22.5 shows commonly used bases for allocating service department expenses.

EXHIBIT$ 22.5

Bases for Allocating Service Department Expenses

Service Department	Common Allocation Bases
Office	Number of employees or sales in department
Personnel and payroll	Number of employees in department
Purchasing	Dollars of purchases or number of purchase orders processed
Maintenance	Square feet of space occupied

Cost Allocation Demo We demonstrate allocating costs by looking at cleaning services for a retail store (an indirect expense). An outside company cleans the retail store for a total cost of $800 per month. Management allocates this cost to the store's three departments based on the square feet that each department occupies. Exhibit 22.6 shows this allocation. The total cost to allocate is $800. Because the Jewelry department occupies 60% of the total floor space (2,400 square feet/4,000 square feet), it is allocated $480 (60% × $800) of the cleaning cost. Calculations are similar for other departments.

EXHIBIT$ 22.6

Cost Allocation

Department	Department Square Feet	Percent of Total Square Feet	Cost Allocated to Department
Jewelry	2,400	60% (2,400/4,000)	$480 (60% × $800)
Repair	600	15 (600/4,000)	120 (15% × $800)
Clothes	1,000	25 (1,000/4,000)	200 (25% × $800)
Totals	4,000	100%	$800

NEED-TO-KNOW 22-2

Cost Allocations

P2

Allocate a retailer's purchasing department's costs of $20,000 to its operating departments using each department's percentage of total

purchase orders.

Department	Number of Purchase Orders
Clothing	250
Health Care	450
Sporting Goods	300
Total	1,000

Solution

Department	Number of Purchase Orders	Percent of Total Purchase Orders	Cost Allocated to Department
Clothing	250	25% (250/1,000)	$ 5,000
Health Care	450	45% (450/1,000)	9,000
Sporting Goods	300	30% (300/1,000)	6,000
Total	1,000	100%	$20,000

Do More: QS 22-6, QS 22-7, QS 22-8, E-22-3, E-22-4, E-22-5

Departmental Income Statements

P3

Prepare departmental income statements and contribution reports.

Departmental income is computed using the formula in Exhibit 22.7.

EXHIBIT$ 22.7

Departmental Income

$$\text{Departmental income} = \text{Department sales} - \text{Department direct expenses} - \text{Allocated indirect expenses} - \text{Allocated service department expenses}$$

We prepare departmental income statements using **Outdoor Gal** and its three departments. It has Purchasing, a service department, and two operating departments, Hiking and Camping.

Preparing departmental income statements involves three steps.

Step ①:Accumulate sales, direct expenses, and indirect expenses by department.

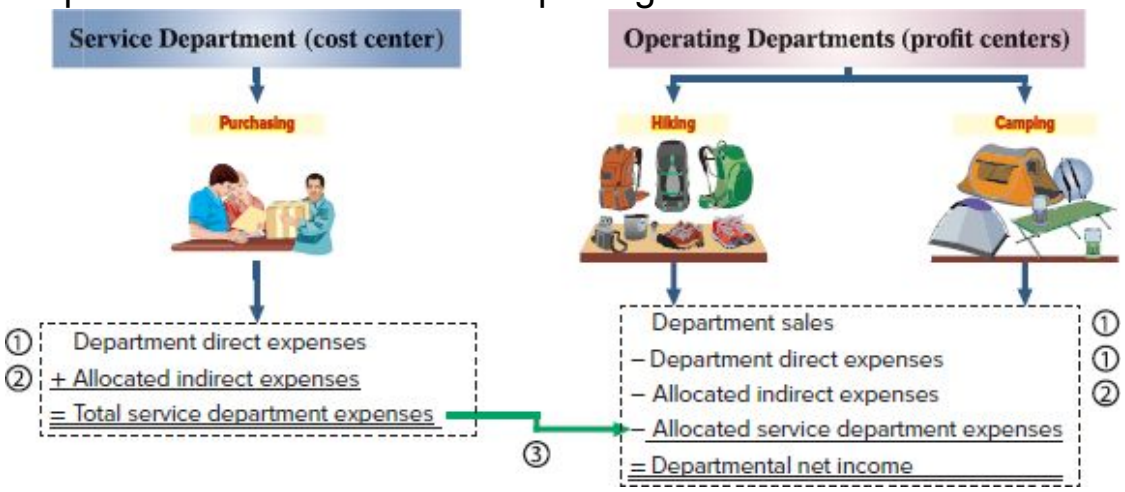
Step ②:Allocate indirect expenses to both service and operating departments.

Step ③:Allocate service department expenses to operating departments.

Exhibit 22.8 summarizes these steps in preparing departmental performance reports for cost centers and profit centers (links to the steps are coded with circled numbers *1* through *3*). The service department (Purchasing) is a **cost center**, so its performance is based on how well it controls direct department expenses. The operating departments (Hiking and Camping) are **profit centers**, and their performance is based on how well they generate departmental income.

EXHIBIT$ 22.8

Departmental Performance Reporting



Step 1: We list sales, cost of goods sold, direct expenses, and indirect expenses for each department in Exhibit 22.9. The total for each expense is in the Expenses column.

EXHIBIT$ 22.9

Sales and Expenses Data

OUTDOOR GAL Sales and Expenses Data		Service Department	Operating Departments	
For Year Ended Dec. 31	Expenses	Purchasing	Hiking	Camping
Sales		$ 0	$136,200	$90,800
Cost of goods sold	$148,000	0	78,000	70,000
Direct expenses				
Salaries	41,000	15,000	14,020	11,980
Depreciation—Equipment	3,000	2,000	600	400
Indirect expenses				
Rent	12,000			
Advertising	4,000			
Total expenses	$208,000			

Step 2: We allocate indirect expenses to all departments. page 871 We show this with the *departmental expense allocation spreadsheet* in Exhibit 22.10. Calculations follow for allocating Rent and Advertising. Direct expenses do not show an allocation base because they are not allocated.

Allocating Rent Rent of $12,000 is allocated to all departments based on 9,000 square feet of space occupied.

Department	Square Feet	Percent of Total	Allocated Cost
Purchasing	1,800	20% (1,800/9,000)	$ 2,400
Hiking	2,700	30% (2,700/9,000)	3,600
Camping	4,500	50% (4,500/9,000)	6,000
Total.....	9,000	100%	$12,000

Allocating Advertising Advertising of $4,000 is allocated only to operating departments, based on sales. Service departments do not generate sales so they are not allocated advertising costs.

Department	Sales*	Percent of Total	Allocated Cost
Hiking	$136,200	60% ($136,200/$227,000)	$2,400
Camping	90,800	40% ($90,800/$227,000)	1,600
Total.....	$227,000	100%	$4,000

*Sales are from Exhibit 22.9.

Step 3: We allocate service department expenses to operating departments. Service department expenses are not allocated to other service departments. The purchasing department has $19,400 of

expenses to allocate to operating departments. This consists of $17,000 of direct expenses and $2,400 of indirect expenses (computed in step 2). Purchasing department expenses are allocated based on each operating department's number of purchase orders as follows.

Department	Purchase Orders	Percent of Total	Allocated Cost
Hiking	840	70% (840/1,200)	$13,580
Camping	360	30% (360/1,200)	5,820
Total	1,200	100%	$19,400

After service department costs are allocated, no expenses remain in the service department.

EXHIBIT$ 22.10

Departmental Expense Allocation Spreadsheet

OUTDOOR GAL
Departmental Expense Allocations

For Year Ended Dec. 31	Allocation Base	Expenses	Allocation of Expenses to Departments: Purchasing	Hiking	Camping
Direct expenses (Exhibit 22.9)					
Salaries		$41,000	$15,000	$14,020	$11,980
Depreciation—Equipment		3,000	2,000	600	400
Indirect expenses (Step 2)					
Rent	*Square feet of space*	12,000	2,400	3,600	6,000
Advertising	*Sales*	4,000	0	2,400	1,600
Total department expenses		60,000	19,400	20,620	19,980
Service department expenses (Step 3)					
Purchasing department	*Purchase orders*		(19,400)	13,580	5,820
Total expenses allocated to operating departments		$60,000	$ 0	$34,200	$25,800

Prepare Income Statements: The departmental expense allocation spreadsheet is used to prepare departmental income statements. Exhibit 22.11 shows income statements for the two operating departments. This exhibit uses the spreadsheet in Exhibit 22.10 for expenses; information on sales and cost of goods sold comes from Exhibit 22.9. We do not prepare a departmental income statement for Purchasing because it is a service department and does not generate sales. After considering all costs, we see the Hiking department is most profitable.

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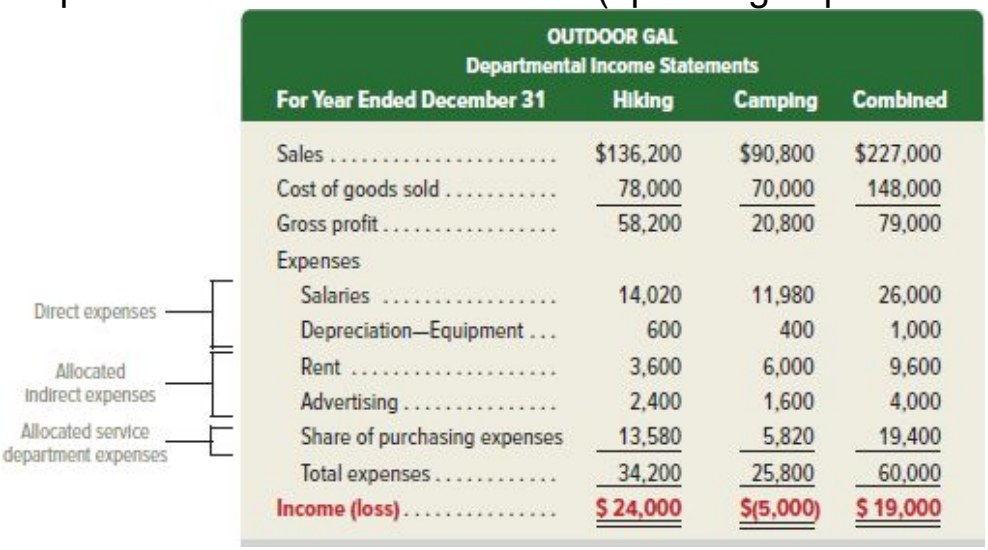
EXHIBIT$ 22.11

Departmental Income Statements (operating departments)



OUTDOOR GAL
Departmental Income Statements

For Year Ended December 31	Hiking	Camping	Combined
Sales	$136,200	$90,800	$227,000
Cost of goods sold	78,000	70,000	148,000
Gross profit	58,200	20,800	79,000
Expenses			
Salaries	14,020	11,980	26,000
Depreciation—Equipment	600	400	1,000
Rent	3,600	6,000	9,600
Advertising	2,400	1,600	4,000
Share of purchasing expenses	13,580	5,820	19,400
Total expenses	34,200	25,800	60,000
Income (loss)	$ 24,000	$(5,000)	$ 19,000

Departmental Contribution to Overhead

The Camping department shows a loss of $(5,000). Did its manager perform poorly? Should the Camping department be eliminated? To answer these questions, we compute **departmental contribution to overhead**, which is sales minus cost of goods sold and direct expenses. It is a performance measure based on *controllable* costs.

Exhibit 22.12 shows each department's contribution to overhead. For this purpose we use pre-allocation data from Exhibit 22.9. The Camping department's contribution to overhead is $8,420. Its manager performed better than its loss of $(5,000) would suggest. If the Camping department were eliminated, the company's income would decrease by $8,420. This is because the company's indirect expenses would not change and they would be allocated to the Hiking department. Based on contribution to overhead, the Camping department should not be eliminated.

EXHIBIT$ 22.12

Departmental Contribution to Overhead

OUTDOOR GAL
Departmental Contribution to Overhead

For Year Ended December 31	Hiking	Camping	Combined
Sales	$136,200	$90,800	$227,000
Cost of goods sold	78,000	70,000	148,000
Gross profit	58,200	20,800	79,000
Direct expenses			
Salaries	14,020	11,980	26,000
Depreciation—Equipment	600	400	1,000
Total direct expenses	14,620	12,380	27,000
Departmental contribution to overhead	$ 43,580	$ 8,420	$ 52,000

Decision Insight

Performance Pay Bonuses are linked to performance measures that executives have some control over. Bonus plans are often based on exceeding a target return on investment or certain balanced scorecard indicators. The goal of bonus plans is to encourage executives to make decisions that increase company performance and value. ■

INVESTMENT CENTERS

A1

Analyze investment centers using return on investment and residual income.

Investment center managers are responsible for revenues and costs, *and for investments in operating assets*. We describe financial and nonfinancial measures of investment center performance.

Return on Investment and Residual Income

Assume a company operates two divisions as **investment centers**: LCD and Phone. The LCD division manufactures liquid crystal display (LCD) touch-screens and sells them for use in computers and smartphones. The Phone division sells smartphones. The table below shows current year income and average assets for the divisions.

Division	LCD	Phone
Income	$ 750,000	$ 370,000
Average assets	2,500,000	1,850,000

Return on Investment One measure to evaluate division performance is **return on investment (ROI)**, also called *return on assets* (ROA). This measure is defined in Exhibit 22.13.

EXHIBIT$ 22.13

Return on Investment

$$\text{Return on investment} = \frac{\text{Income}}{\text{Average assets}}$$

Return on investment for the LCD division is 30%, computed as $750,000/$2,500,000. The Phone division's return on investment is 20%, computed as $370,000/$1,850,000. Management can use ROI as part of its performance evaluation. For example, actual ROI can be compared to target ROI or to the ROI for similar divisions.

Residual Income Another way to evaluate division performance is to compute **residual income**, which equals income minus a target income (see Exhibit 22.14).

EXHIBIT$ 22.14

Residual Income

$$\text{Residual income} = \text{Income} - \text{Target income}$$

Assume management sets target income at 8% of average assets. (The target percentage is often the interest rate on financing.) Residual income for the LCD and Phone divisions follow. The LCD division earned more residual income than the Phone division.

Division	LCD	Phone
Income	$750,000	$370,000
Less target income: $2,500,000 × 8%	200,000	
$1,850,000 × 8%		148,000
Residual income	$550,000	$222,000

Using residual income to evaluate division performance encourages division managers to accept opportunities that return more than the target income, thus increasing company value. For example, the Phone division might (mistakenly) not want to accept a new customer that will provide a 15% return on investment because that will reduce the Phone division's overall return on investment (20%, as shown above). However, the Phone division *should* accept this opportunity because the new customer would increase residual income by providing income above the target of 8% of assets.

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Profit Margin and Investment Turnover

A2

Analyze investment centers using profit margin and investment turnover.

We can further examine investment center (division) performance by splitting return on investment into two measures—profit margin and investment turnover—as in Exhibit 22.15.

EXHIBIT$ 22.15

Profit Margin and Investment Turnover

$$\text{Return on investment} = \text{Profit margin} \times \text{Investment turnover}$$

$$\text{Return on investment} = \frac{\text{Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average assets}}$$

- **Profit margin** measures the income per dollar of sales. It is shown as a percent. A higher profit margin indicates better performance.
- **Investment turnover** measures how efficiently an investment center generates sales from its assets. Higher investment turnover indicates better use of assets.

To demonstrate, the following table shows results from the LCD and Phone divisions.

	LCD	Phone
Sales	$9,375,000	$7,400,000
Income.	750,000	370,000
Average assets . . .	2,500,000	1,850,000

Profit margin and investment turnover for these two divisions are computed in Exhibit 22.16. This means the LCD division makes 8 cents profit on each dollar of sales. The Phone division makes 5 cents profit on each dollar of sales. The Phone division (4.00 investment turnover) is more efficient in its use of assets than the LCD division (3.75 investment turnover). Management can use these measures to evaluate performance, determine strategy, and direct future investment.

EXHIBIT$ 22.16

Division Profit Margin and Investment Turnover

		LCD	Phone
Profit margin:	$750,000/$9,375,000	8%	
	$370,000/$7,400,000		5%
Investment turnover:	$9,375,000/$2,500,000 . . .	3.75	
	$7,400,000/$1,850,000 . . .		4.00

Ariel Skelley/Blend Images LLC

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Analytics Insight

Customer ROI Marketing departments use data analytics to apply ROI at the customer level. *Customer lifetime value* (CLV) considers the costs of acquiring, retaining, and supporting customers. With this measure, companies can market to customers with a higher CLV, and thus increase ROI. **Amazon** used CLV to determine that its Prime members and Kindle owners spend more each year in comparison with other customers.

NEED-TO-KNOW 22-3

Return on Investment and Residual Income; Margin, Turnover, and Return on Investment

A1 A2

Part A The Media division of a company reports income of $600,000, average assets of $7,500,000, and a target income of 6% of average assets. Compute the division's (a) return on investment and (b) residual income.

Solution

a. $600,000/$7,500,000 = 8%

b. $600,000 − ($7,500,000 × 6%) = $150,000

Part B A division reports sales of $50,000, income of $2,000, and average assets of $10,000. Compute the division's (a) profit margin, (b) investment turnover, and (c) return on investment.

Solution

a. $2,000/$50,000 = 4%

b. $50,000/$10,000 = 5.0

c. $2,000/$10,000 = 20%

Do More: QS 22-12, QS 22-13, QS 22-15, E 22-9,E 22-10, E 22-11, E 22-12

BALANCED SCORECARD AND TRANSFER PRICING

A3

Analyze investment centers using the balanced scorecard.

Evaluating performance solely on financial measures has limitations such as: (1) some managers might forgo profitable projects to keep their return on investment high, (2) residual income is less useful when comparing investment centers of different size, and (3) both return on

investment and residual income can encourage managers to focus too heavily on short-term financial goals.

In response to such limitations, companies also use *nonfinancial* measures. **FedEx** tracks the percentage of on-time deliveries. **Penn** judges production managers on the percent of defective tennis balls manufactured. **Walmart**'s credit card screens often ask customers at checkout whether the cashier was friendly or the store was clean. **Coca-Cola** measures its water usage to enhance sustainability. This kind of information helps division managers run operations and helps top management evaluate division managers.

Balanced Scorecard

The **balanced scorecard** is a system of performance measures, including nonfinancial measures, used to assess company and division manager performance. The balanced scorecard requires managers to think of their company from four perspectives.

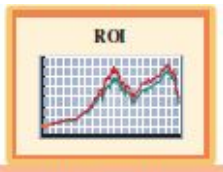
1. **Customer:** What do customers think of us?
2. **Internal Processes:** Which operations are crucial to customers?
3. **Innovation/Learning:** How can we improve?
4. **Financial:** What do our owners think of us?

The balanced scorecard collects information on *key performance indicators* (KPIs) on each of the four perspectives. KPIs vary across companies. Exhibit 22.17 lists common KPIs on the balanced scorecard.

Point: A survey found that nearly 60% of global companies use some form of balanced scorecard.

EXHIBIT$ 22.17

Balanced Scorecard Performance Indicators



Customer	Internal Processes	Innovation/Learning	Financial
• Customer satisfaction rating	• Defect rates	• Employee satisfaction	• Net income
• # of new customers	• Cycle time	• Employee turnover	• ROI
• % of on-time deliveries	• Product costs	• $ spent on training	• Sales growth
• % of sales from new products	• Labor hours per order	• # of new products	• Profit margin
• Time to fill orders	• Accident-free days	• # of patents	• Residual income
• % of sales returned	• Warranty claims	• $ spent on research	• Investment turnover

After selecting KPIs, companies collect data on each indicator and compare actual amounts to target (goal) amounts. For example, a company might have a goal of filling 98% of customer orders within two hours. Results on this KPI help division managers in improving order fulfillment. page 876

Exhibit 22.18 is an example of balanced scorecard reporting on the customer perspective for a retailer. This scorecard reports that 1.2% of all orders are returned. The color of the circles in the Signal column reveals whether the company is beating its goal (green), meeting its goal (gray), or not meeting its goal (red). The retailer is meeting or exceeding its goals on orders returned and customer satisfaction. However, the company received more customer complaints than was hoped for. A manager would combine this information with information from other performance indicators to improve customer service.

EXHIBIT$ 22.18

Balanced Scorecard Reporting: Retailer

KPI: Customer Perspective	Actual	Goal	Signal
Orders returned	1.2%	2%	
Customer satisfaction rating	9.5 of 10.0	9.5	
Number of customer complaints	142	100	

Decision Maker

CFO As CFO, your best division, based on ROI, reports a large decrease in employee satisfaction. Should you investigate reasons for employee dissatisfaction or ignore it because financial performance is superb? ■ *Answer:* You should investigate. Lower employee satisfaction can lead to higher employee turnover and lower customer satisfaction, both of which can increase financial costs.

NEED-TO-KNOW 22-4

Balanced Scorecard

A3

Classify each of the performance measures below into the best balanced scorecard perspective to which it relates: customer (**C**), internal processes (**P**), innovation and learning (**I**), or financial (**F**).

1. On-time delivery rate
2. Accident-free days
3. Sustainability training workshops
4. Defective products made
5. Residual income
6. Patents applied for
7. Sales returns
8. Customer complaints

Solution

Do More: QS 22-16, QS 22-17,E 22-17, E 22-18

Transfer Pricing

C1

Explain transfer pricing and methods to set transfer prices.

Divisions within a company sometimes do business with one another. For example, a separate division of **Harley-Davidson** manufactures

the plastic and fiberglass parts used in its motorcycles. **Anheuser-Busch InBev**'s metal container division makes cans used in its brewing operations and also sells cans to soft-drink companies. A division of **Prince** produces strings used in tennis rackets made by Prince and other manufacturers.

The price used to record transfers of goods across divisions page 877 of the same company is called the **transfer price**. Transfer prices can be used in cost, profit, and investment centers.

Because these transfers are not with customers outside the company, the transfer price has no direct impact on *company income*. However, transfer prices can impact *division income* and, if set incorrectly, lead to bad decisions.

To illustrate the impact of alternative transfer prices on division income, consider a company who's LCD division makes touch-screens that are used in its Phone division or sold to outside customers. LCD's variable manufacturing cost is $30 per screen, and the market price is $80 per screen. There are two extremes for the transfer price.

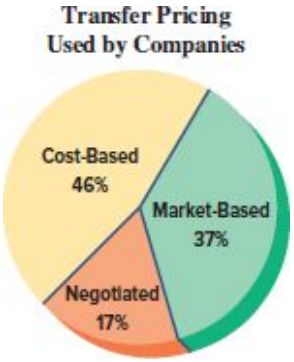
- **Low Transfer Price** The *Phone division manager* wants to pay a *low* transfer price. The transfer price cannot be less than the $30 variable cost per screen, as any lower price would cause the LCD manager to lose money on each screen.
- **High Transfer Price** The *LCD division manager* wants to receive a *high* transfer price. The transfer price cannot be more than $80 per screen, as the Phone division manager will not pay more than the market price.

The transfer price must be between $30 and $80 per screen, and a negotiated price somewhere between these two extremes is reasonable—see the graphic below.

How do we determine the transfer price? The answer depends in part on whether the LCD division has excess capacity.

No Excess Capacity If the LCD division can sell every screen it produces at a market price of $80 per screen, the LCD manager would not accept any transfer price less than $80. This is a **market-based transfer price**—one based on the market price of the good or service being transferred. Any transfer price less than $80 would cause the LCD manager to incur an unnecessary *opportunity cost* that would lower the division's income and hurt its manager's performance evaluation.

Excess Capacity With excess capacity, LCD should accept any transfer price of $30 per unit or greater, and the Phone division would purchase screens from the LCD division. This would allow the LCD division to cover variable costs *and* some (or all) of its fixed costs and to increase company income. For example, if a transfer price of $50 per screen is used, the Phone manager will buy from LCD division because that price is below the $80 market price. For each screen transferred from LCD to Phone at $50, the LCD division receives a *contribution margin* of $20 (computed as $50 transfer price less $30 variable cost) to contribute toward recovering its fixed costs. This is called **cost-based transfer pricing**. Under this approach, the transfer price might be based on variable costs, total costs, or variable costs plus a markup.



With excess capacity, division managers often negotiate a transfer price between variable cost per unit and market price per unit. The **negotiated transfer price** and resulting departmental performance reports reflect, in part, the negotiating skills of the respective division managers. This might not be best for overall company performance. Determining the transfer price under excess capacity is complex and is covered in advanced courses.

page 878

CORPORATE SOCIAL RESPONSIBILITY

This chapter focused on performance measurement and reporting. Companies report on their sustainability performance in a variety of ways. One approach integrates sustainability metrics in the four balanced scorecard perspectives (customer, internal process, innovation and learning, and financial). Many key performance indicators address the internal process and innovation and learning perspectives. For example, **General Mills** reports on its environmental targets and progress in its annual corporate sustainability report. Exhibit 22.19 captures how this information might appear as part of a balanced scorecard report.

Some companies report the direct effects on income from a focus on sustainability. For example, **Target** recently started a *Made to Matter* department. To be sold in this department, brands must focus on consumer wellness and be committed to social responsibility. Target's *Made to Matter* department reported sales of over $1 billion in a recent year.

Alyssa Greenberg

Teysha, this chapter's feature company, uses a labor-intensive production process. This provides jobs for local Latin Americans. "Every artisan we work with receives fair trade wages and consistent work," explains Sofia Luz Eckrich, owner. While focused on the "people" aspect of the triple bottom line, Teysha fills a niche by bringing unique products to market.

EXHIBIT$ 22.19

Balanced Scorecard—Sustainability

KPI: Internal Process Perspective	Actual Reduction	Goal Reduction	Signal
Emissions	23%	20%	
Energy usage	10%	20%	
Solid waste	38%	50%	
Fuel	25%	35%	

Decision Analysis Cash Conversion Cycle

A4

Compute the number of days in the cash conversion cycle.

Effectively managing working capital is important for businesses to survive and profit. For example, lean manufacturers try to reduce the time from paying for raw materials (cash outflow) to collecting on credit sales from customers (cash inflow). Measures based on accounts receivable, accounts payable, and inventory are used to evaluate performance on each of these separate dimensions. These measures can be combined to show how a company manages its working capital. The **cash conversion cycle**, or *cash-to-cash cycle*, measures the average time it takes to convert cash outflows into cash inflows. It is defined in Exhibit 22.20.

EXHIBIT$ 22.20

Cash Conversion Cycle

$$\text{Cash conversion cycle} = \text{Days' sales in accounts receivable} + \text{Days' sales in inventory} - \text{Days' payable outstanding}$$

Formulas for Components of Cash Conversion Cycle	
Days' sales in accounts receivable	$= \frac{\text{Accounts receivable, net}}{\text{Net sales}} \times 365$
Days' sales in inventory	$= \frac{\text{Inventory}}{\text{Cost of goods sold}} \times 365$
Days' payable outstanding (*Days' sales in accounts payable*)	$= \frac{\text{Accounts payable}}{\text{Cost of goods sold}} \times 365$

page 879

Exhibit 22.21 shows these calculations for **General Mills**, a food processor.

EXHIBIT$ 22.21

Cash Conversion Cycle Applied

	$ millions	Current year	Prior year
	Accounts receivable, net	$ 1,430	$ 1,361
	Net sales	$15,620	$16,563
1	Days' sales in accounts receivable	33 days	30 days
	Inventory	$ 1,484	$ 1,414
	Cost of goods sold	$10,056	$10,734
2	Days' sales in inventory	54 days	48 days
	Accounts payable	$ 2,120	$ 2,047
	Cost of goods sold	$10,056	$10,734
3	Days' payable outstanding	77 days	70 days
	Cash conversion cycle (1) + (2) − (3)	10 days	8 days

Point: Calculations rounded to the nearest day.

General Mills's cash conversion cycle is 10 days in the current year and 8 days in the prior year. This is a short period and indicates the company efficiently manages its cash. For comparison, the American Productivity and Quality Center (APQC) reports an average cash conversion cycle of 45 days. The most efficient companies report cash conversion cycles of 30 days or less, while

the least efficient take over 80 days to convert cash outflows to cash inflows.

If the cash conversion cycle is too long, companies do not have use of that money and risk missing investment opportunities. To speed up the cash conversion cycle companies can:

- Offer customers fewer days to pay.
- Offer customers discounts for prompt payment.
- Adopt lean principles to reduce inventory.
- Negotiate longer times to pay suppliers.

NEED-TO-KNOW 22-5

COMPREHENSIVE

Departmental Cost Allocations and Income Statements

Gamer's Haven is a computer store that has five departments. Three are operating departments (Hardware, Software, and Repairs) and two are service departments (Office and Purchasing).

	Office	Purchasing	Hardware	Software	Repairs
Sales	—	—	$960,000	$600,000	$840,000
Cost of goods sold	—	—	500,000	300,000	200,000
Direct expenses					
Salaries	$60,000	$45,000	80,000	25,000	325,000
Depreciation	6,000	7,200	33,000	4,200	9,600
Supplies used	15,000	10,000	10,000	2,000	25,000

To prepare departmental income statements, indirect page 880 expenses must be allocated across five departments. Then service department expenses must be allocated to the three operating departments. Allocation information follows.

	Total Cost	Allocation Basis
Indirect expenses		
Rent	$150,000	Square feet occupied
Utilities	50,000	Square feet occupied
Advertising	125,000	Dollars of sales
Insurance	30,000	Value of insured assets
Service department expenses		
Office	?*	Number of employees
Purchasing	?	Number of purchases

*Equals service department direct expenses plus allocated indirect expenses (shown next).

The following additional information is obtained for indirect expense allocations.

Department	Square Feet	Sales	Insured Assets	Employees	Number of Purchases
Office	500		$ 60,000		
Purchasing	500		72,000		
Hardware	4,000	$ 960,000	330,000	5	2,000
Software	3,000	600,000	42,000	5	1,200
Repairs	2,000	840,000	96,000	10	800
Totals	10,000	$2,400,000	$600,000	20	4,000

Required

1. Prepare a departmental expense allocation spreadsheet.
2. Prepare a departmental income statement for each operating department and for all operating departments combined. Refer to Exhibit 22.11.
3. Prepare a departmental contribution to overhead report. Refer to Exhibit 22.12.

SOLUTION

1. Allocations of the four indirect expenses across the departments.

Rent	Square Feet	Percent of Total	Allocated Cost
Office	500	5%	$ 7,500
Purchasing	500	5	7,500
Hardware	4,000	40	60,000
Software	3,000	30	45,000
Repairs	2,000	20	30,000
Totals	10,000	100%	$150,000

Utilities	Square Feet	Percent of Total	Allocated Cost
Office	500	5%	$ 2,500
Purchasing	500	5	2,500
Hardware	4,000	40	20,000
Software	3,000	30	15,000
Repairs	2,000	20	10,000
Totals	10,000	100%	$50,000

Advertising	Sales Dollars	Percent of Total	Allocated Cost
Hardware	$ 960,000	40%	$ 50,000
Software	600,000	25	31,250
Repairs	840,000	35	43,750
Totals	$2,400,000	100%	$125,000

Insurance	Assets Insured	Percent of Total	Allocated Cost
Office	$ 60,000	10%	$ 3,000
Purchasing	72,000	12	3,600
Hardware	330,000	55	16,500
Software	42,000	7	2,100
Repairs	96,000	16	4,800
Totals	$600,000	100%	$30,000

Allocations of service department expenses to the three operating departments. page 881

Office Allocations to	Employees	Percent of Total	Allocated Cost
Hardware	5	25%	$23,500
Software	5	25	23,500
Repairs	10	50	47,000
Totals	20	100%	$94,000*

*$81,000 direct expenses + $7,500 rent + $2,500 utilities + $3,000 insurance

Purchasing Allocations to	Number of Purchases	Percent of Total	Allocated Cost
Hardware	2,000	50%	$37,900
Software	1,200	30	22,740
Repairs	800	20	15,160
Totals	4,000	100%	$75,800**

**$62,200 direct expenses + $7,500 rent + $2,500 utilities + $3,600 insurance

Departmental Expense Allocations							
For Year Ended Dec. 31	Allocation Base	Expenses	Office	Purchasing	Hardware	Software	Repairs
Direct expenses							
Salaries		$ 535,000	$60,000	$45,000	$ 80,000	$ 25,000	$325,000
Depreciation		60,000	6,000	7,200	33,000	4,200	9,600
Supplies used		62,000	15,000	10,000	10,000	2,000	25,000
Indirect expenses							
Rent	*Square ft.*	150,000	7,500	7,500	60,000	45,000	30,000
Utilities	*Square ft.*	50,000	2,500	2,500	20,000	15,000	10,000
Advertising	*Sales*	125,000			50,000	31,250	43,750
Insurance	*Assets*	30,000	3,000	3,600	16,500	2,100	4,800
Total expenses		1,012,000	94,000	75,800	269,500	124,550	448,150
Service department expenses							
Office department	*Employees*		(94,000)		23,500	23,500	47,000
Purchasing department	*Purchases*			(75,800)	37,900	22,740	15,160
Total expenses allocated to operating departments		$1,012,000	$ 0	$ 0	$330,900	$170,790	$510,310

2. Departmental income statements.

Departmental Income Statements				
For Year Ended December 31	Hardware	Software	Repairs	Combined
Sales	$ 960,000	$ 600,000	$ 840,000	$2,400,000
Cost of goods sold	500,000	300,000	200,000	1,000,000
Gross profit	460,000	300,000	640,000	1,400,000
Expenses				
Salaries	80,000	25,000	325,000	430,000
Depreciation	33,000	4,200	9,600	46,800
Supplies used	10,000	2,000	25,000	37,000
Rent	60,000	45,000	30,000	135,000
Utilities	20,000	15,000	10,000	45,000
Advertising	50,000	31,250	43,750	125,000
Insurance	16,500	2,100	4,800	23,400
Share of office expenses	23,500	23,500	47,000	94,000
Share of purchasing expenses	37,900	22,740	15,160	75,800
Total expenses	330,900	170,790	510,310	1,012,000
Income	$129,100	$129,210	$129,690	$ 388,000

3. Departmental contribution to overhead.

page 882

Departmental Contribution to Overhead				
For Year Ended December 31	Hardware	Software	Repairs	Combined
Sales	$ 960,000	$ 600,000	$ 840,000	$2,400,000
Cost of goods sold	500,000	300,000	200,000	1,000,000
Gross profit	460,000	300,000	640,000	1,400,000
Direct expenses				
Salaries	80,000	25,000	325,000	430,000
Depreciation	33,000	4,200	9,600	46,800
Supplies used	10,000	2,000	25,000	37,000
Total direct expenses	123,000	31,200	359,600	513,800
Departmental contribution to overhead	$337,000	$268,800	$280,400	$ 886,200

APPENDIX

22A Joint Costs and Their Allocation

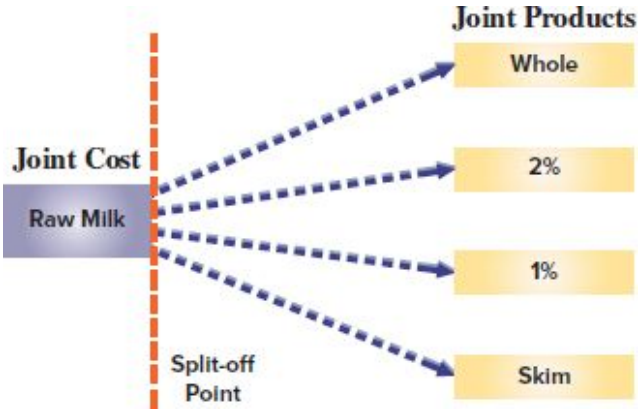
C2

Describe allocation of joint costs across products.

Some manufacturing processes involve **joint costs**, which are costs incurred to produce or purchase two or more products at the same time. For example, a dairy company incurs joint costs when it processes raw milk, as shown in Exhibit 22A.1. The joint costs are the costs to process and pasteurize milk. After milk is pasteurized, any further processing costs are not joint costs.

EXHIBIT$ 22A.1

Joint Products from Raw Milk



When management wishes to estimate the costs of individual products, joint costs must be allocated to these joint products. Financial statements prepared according to GAAP also must assign joint costs to products. The preferred approach is the *value basis*, which allocates a joint cost in proportion to the sales value of the output produced by the process at the "split-off point"; see Exhibit 22A.1. The split-off point is the point at which separate products can be identified.

Value Basis Allocation of Joint Costs Exhibit 22A.2 illustrates the value basis method of allocation. It determines the percents of the $30,000 total cost allocated to each product by the ratio of each product's sales value at the split-off point to the $50,000 total sales value. Whole milk receives 24% of the total cost ($12,000/$50,000). This means it is allocated $7,200 (24% × $30,000) of cost and earns $4,800 ($12,000 − $7,200) of gross profit.

EXHIBIT$ 22A.2

Allocating Joint Costs on a Value Basis

Type of Milk	Sales Value	Percent of Total	Allocated Cost	Gross Profit
Whole	$12,000	24%	$ 7,200	$ 4,800
2%	18,000	36	10,800	7,200
1%	16,000	32	9,600	6,400
Skim	4,000	8	2,400	1,600
Totals	$50,000	100%	$30,000	$20,000

An outcome of value basis allocation is that *each* type of milk produces exactly the same 40% gross profit at the split-off point. This 40% rate equals the gross profit rate from selling all types of milk made from the raw milk for a combined price of $50,000. It is this closer matching of cost and revenues that makes the value basis allocation of joint costs a popular method of joint cost allocation.

Summary: Cheat Sheet

RESPONSIBILITY ACCOUNTING

Cost center: A center that incurs costs but generates no revenues.

Profit center: A center that incurs costs *and* generates revenues.

Investment center: A center that incurs costs *and* generates revenues, and where managers are responsible for center investments.

Controllable costs: Manager can control or influence these costs.

Uncontrollable costs: Costs not within manager's control or influence.

PROFIT CENTERS

Direct expenses: Can be readily traced to departments; *not* allocated.

Indirect expenses: Incurred for joint benefit of more than one department; *must be* allocated.

Cost allocation

Allocated cost = Total cost to allocate × Percentage of allocation base used

Indirect expenses. Allocate to all departments. *Example:* $12,000 of rent allocated based on 9,000 square feet occupied.

Department	Square Feet	Percent of Total	Allocated Cost
Purchasing	1,800	20% (1,800/9,000)	$ 2,400
Hiking	2,700	30% (2,700/9,000)	3,600
Camping	4,500	50% (4,500/9,000)	6,000
Total	9,000	100%	$12,000

Service department expenses. Allocate to operating departments. *Example:* $19,400 of purchasing expenses allocated to Operating departments.

Department	Purchase Orders	Percent of Total	Allocated Cost
Hiking	840	70% (840/1,200)	$13,580
Camping	360	30% (360/1,200)	5,820
Total	1,200	100%	$19,400

Departmental income statement

Departmental income = Department sales − Department direct expenses − Allocated indirect expenses − Allocated service department expenses

OUTDOOR GAL
Departmental Income Statements

For Year Ended December 31	Hiking	Camping	Combined
Sales	$136,200	$90,800	$227,000
Cost of goods sold	78,000	70,000	148,000
Gross profit	58,200	20,800	79,000
Expenses			
Salaries	14,020	11,980	26,000
Depreciation—Equipment	600	400	1,000
Rent	3,600	6,000	9,600
Advertising	2,400	1,600	4,000
Share of purchasing expenses	13,580	5,820	19,400
Total expenses	34,200	25,800	60,000
Income (loss)	$ 24,000	$(5,000)	$ 19,000

Departmental contribution to overhead

OUTDOOR GAL
Departmental Contribution to Overhead

For Year Ended December 31	Hiking	Camping	Combined
Sales	$136,200	$90,800	$227,000
Cost of goods sold	78,000	70,000	148,000
Gross profit	58,200	20,800	79,000
Direct expenses			
Salaries	14,020	11,980	26,000
Depreciation—Equipment	600	400	1,000
Total direct expenses	14,620	12,380	27,000
Departmental contribution to overhead	$ 43,580	$ 8,420	$ 52,000

INVESTMENT CENTERS

$$\text{Return on investment} = \frac{\text{Income}}{\text{Average assets}}$$

$$\text{Residual income} = \text{Income} - \text{Target income}$$

$$\text{Return on investment} = \text{Profit margin} \times \text{Investment turnover}$$

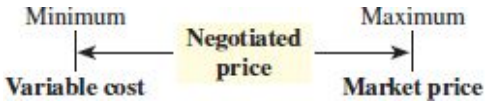
$$\text{Return on investment} = \frac{\text{Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average assets}}$$

BALANCED SCORECARD & TRANSFER PRICING

Balanced scorecard: System of performance measures.

- **Customers:** What do they think of us?
- **Internal processes:** Which are crucial to customers?
- **Innovation/learning:** How can we improve?
- **Financial:** What do owners think of us?

Transfer price: Price set on transfers of goods across divisions.



Cash conversion cycle: Efficiency measure of cash management.

$$\text{Days' sales in accounts receivable} + \text{Days' sales in inventory} - \text{Days' payable outstanding}$$

$$\text{Days' sales in accounts receivable} = \frac{\text{Accounts receivable, net}}{\text{Net sales}} \times 365$$

$$\text{Days' sales in inventory} = \frac{\text{Inventory}}{\text{Cost of goods sold}} \times 365$$

$$\text{Days' payable outstanding} = \frac{\text{Accounts payable}}{\text{Cost of goods sold}} \times 365$$

Key Terms

Balanced scorecard (875)

Cash conversion cycle (878)

Controllable costs (866)

Cost-based transfer pricing (877)

Cost center (865)

Decentralized organization (865)

Departmental contribution to overhead (872)

Departmental income statements (868)

Direct expenses (868)

Indirect expenses (868)

Investment center (865)

Investment turnover (874)

Joint cost (882)

Market-based transfer price (877)

Negotiated transfer price (878)

Profit center (865)

Profit margin (874)

Residual income (873)

Responsibility accounting (865)

Responsibility accounting performance report (866)

Return on investment (ROI) (873)

Transfer price (877)

Uncontrollable costs (866)

Multiple Choice Quiz

1. A retailer has three departments—Housewares, Appliances, and Clothing—and buys advertising that benefits all departments. Advertising expense is $150,000, and departmental sales follow: Housewares, $356,250; Appliances, $641,250; and Clothing, $427,500. How much advertising expense is allocated to Appliances if allocation is based on departmental sales?
   - **a.** $37,500
   - **b.** $67,500
   - **c.** $45,000
   - **d.** $150,000
   - **e.** $641,250
2. Indirect expenses
   - **a.** Cannot be readily traced to one department.
   - **b.** Are allocated to departments based on the relative benefit each department receives.
   - **c.** Are the same as uncontrollable expenses.
   - **d.** *a*, *b*, and *c* are true.
   - **e.** *a* and *b* are true.
3. A division reports the information below. What is the division's return on investment?

Sales	$500,000
Income	75,000
Average assets	200,000

a. 37.5%

b. 30%

c. 15%

d. 40%

e. 2.5%

4. Using the data in question 3, the department's investment turnover is

a. 37.5

b. 15

c. 2.5

d. 2.67

e. 4

5. A company operates three retail departments X, Y, and Z as profit centers. Which department has the largest departmental contribution to overhead, and what is the amount contributed?

Department	Sales	Cost of Goods Sold	Direct Expenses	Allocated Indirect Expenses
X	$500,000	$350,000	$50,000	$40,000
Y	200,000	75,000	20,000	50,000
Z	350,000	150,000	75,000	10,000

a. Department Y, $55,000

b. Department Z, $125,000

c. Department X, $500,000

d. Department Z, $200,000

e. Department X, $60,000

ANSWERS TO MULTIPLE CHOICE QUIZ

1. b; [$641,250/($356,250 + $641,250 + $427,500)] × $150,000 = $67,500

2. d

3. a; $75,000/$200,000 = 37.5%

4. c; $500,000/200,000 = 2.5

5. b;

	Dept. X	Dept. Y	Dept. Z
Sales	$500,000	$200,000	$350,000
Cost of goods sold	350,000	75,000	150,000
Gross profit	150,000	125,000	200,000
Direct expenses	50,000	20,000	75,000
Departmental contribution to overhead	$100,000	$105,000	$125,000

Superscript letter A denotes assignments based on Appendix 22A.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

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QUICK STUDY

QS 22-1

Allocation and measurement terms

P1

For each of the following, select its best description.

1. Cost center

2. Profit center

3. Responsibility accounting system

4. Operating department

5. Indirect expenses

6. Controllable costs

a. Incurs costs without directly yielding revenues.

b. Evaluates unit managers only on activities they can control.

c. Performs an organization's main functions, like manufacturing and selling.

d. Costs incurred for the joint benefit of more than one department.

e. Costs that a manager has the ability to affect.

f. Incurs costs and also generates revenues.

QS 22-2

Responsibility accounting report—cost center

P1

Jose Ruiz manages a construction firm's equipment repair department. His department is a cost center. Costs for a recent period follow. Jose cannot control his salary, rent, or insurance. Compute total controllable costs that would appear on a responsibility accounting report for the repair department.

Cost of parts used	$22,400	Shop supplies used	$1,200
Mechanics' wages	14,300	Rent	800
Department manager's salary	8,000	Insurance	2,200

QS 22-3

Responsibility accounting report—cost center

P1

A partial responsibility accounting report for a cost center follows. Complete the report by determining the missing items *a, b*, and *c*.

Controllable Costs	Budgeted	Actual	Over (Under) Budget
Direct materials	$52,800	$ *a*	$(1,200)
Direct labor	24,000	26,000	*b*
Utilities	19,200	*c*	(200)
Totals	$96,000	$96,600	$ 600

QS 22-4

Responsibility accounting report

P1

The plant manager of the Ohio factory is responsible for two cost centers: Clothing and Shoes. Responsibility accounting reports for the Ohio factory (incomplete) and for the Shoes department (complete) follow. Finish the report for the Ohio factory by determining the missing items *a* through *e*.

Plant Manager, Ohio Factory Controllable Costs	Budgeted	Actual	Over (Under) Budget
Salaries, department managers	$ 20,000	$ 20,000	$ 0
Rent	8,500	8,500	0
Insurance	2,200	2,400	*a*
Clothing department	40,000	38,900	*b*
Shoes department	*c*	*d*	*e*
Totals	$127,700	$128,420	$720

Manager, Shoes Department Controllable Costs	Budgeted	Actual	Over (Under) Budget
Direct materials	$32,400	$31,100	$(1,300)
Direct labor	16,400	17,200	800
Supplies used	8,200	10,320	2,120
Totals	$57,000	$58,620	$ 1,620

QS 22-5

Basis for cost allocation

P2

For each of the following expenses, select the best allocation basis.

1. Purchasing department expenses for the operating departments.

2. Office department expenses of the operating departments.

3. Advertising expenses of the operating departments.

4. Electric utility expenses of all departments.

a. Relative number of employees.

b. Proportion of total sales for each operating department.

c. Proportion of floor space occupied by each department.

d. Proportion of total purchase orders for each operating department.

QS 22-6

Allocating costs to departments

P2

Macee Store has three operating departments, and it conducts advertising that benefits all departments. Advertising costs are $100,000. Sales for its operating departments follow. How much advertising cost is allocated to each operating department if the allocation is based on departmental sales?

Department	Sales
1	$220,000
2	400,000
3	180,000

QS 22-7

Allocating costs to departments **P2**

SodaPop Company has two operating departments: Mixing and Bottling. Mixing has 300 employees and Bottling has 200 employees. Office costs of $160,000 are allocated to operating departments based on the number of employees. Determine the office costs allocated to each operating department.

QS 22-8

Allocating costs to departments **P2**

Sierra Company has two operating departments: Mixing and Bottling. Mixing occupies 22,000 square feet. Bottling occupies 18,000 square feet. Maintenance costs of $200,000 are allocated to operating departments based on square feet occupied. Determine the maintenance costs allocated to each operating department.

QS 22-9

Rent expense allocated to departments

P2

A retailer pays $130,000 rent each year for its two-story building. Space in this building is occupied by five departments as shown here.

Department	Square feet occupied
Jewelry	1,440 (first-floor)
Cosmetics	3,360 (first-floor)

Department	Square feet occupied
Housewares	2,016 (second-floor)
Tools	960 (second-floor)
Shoes	1,824 (second-floor)

The company allocates $84,500 of total rent expense to the first floor and $45,500 to the second floor. It then allocates rent expense for each floor to the departments on that floor based on square feet occupied. Determine the rent expense to be allocated to each department.

Check Allocated to Jewelry, $25,350

QS 22-10

Departmental contribution to overhead

P3

Use the following information to compute each department's contribution to overhead. Which department contributes the largest amount toward total overhead?

	Dept. A	Dept. B	Dept. C
Sales	$53,000	$180,000	$84,000
Cost of goods sold	34,185	103,700	49,560
Gross profit	18,815	76,300	34,440
Total direct expenses	3,660	37,060	7,386
Contribution to overhead	$	$	$

QS 22-11

Departmental income and contribution to overhead

P3

Use the information below to prepare (*a*) departmental income statements and (*b*) the departmental contribution to overhead. Salaries are direct expenses, and all other expenses are indirect expenses.

	Food	Beverage
Sales	$120,000	$80,000
Cost of goods sold	72,000	44,000
Gross profit	48,000	36,000
Expenses		
Salaries	14,500	8,250
Rent	3,300	1,700
Utilities	2,200	1,100
Share of office expenses	4,250	5,100
Share of purchasing expenses	3,750	5,650

QS 22-12

Computing return on investment

A1

Compute return on investment for each investment center. Which center performed the best based on return on investment?

Investment Center	Income	Average Assets	Return on Investment
Cameras	$4,500,000	$20,000,000	_____%
Phones	1,500,000	12,500,000	_____
Computers	800,000	10,000,000	_____

QS 22-13

Computing residual income **A1**

Refer to the information in QS 22-12. Assume a target income of 12% of average assets. Compute residual income for each center.

QS 22-14

Components of performance measures

A1 A2

Fill in the blanks in the schedule below for two separate investment centers A and B.

Investment Center	A	B
Sales	$_____	$10,400,000
Income	$ 240,000	$ _____
Average assets	$1,200,000	$ _____
Profit margin	8.0%	_____%
Investment turnover	_____	2.0
Return on investment	_____%	12.0%

QS 22-15

Computing profit margin, ROI, and investment turnover **A2**

A company's division has sales of $2,000,000, income of $80,000, and average assets of $1,600,000. Compute the division's profit margin, return on investment, and investment turnover.

QS 22-16

Balanced scorecard measures

A3

Classify each of the performance measures below into the most likely of four balanced scorecard perspectives it relates to: Customer, Internal process, Innovation & learning, or Financial.

1. Customer wait time
2. Days of employee absences
3. Profit margin
4. Number of new products introduced
5. Employee sustainability sessions attended
6. Length of time raw materials are in inventory

7. Customer satisfaction index
8. Gallons of water reused

QS 22-17

Preparing a balanced scorecard

A3

A hotel reports the following for its two divisions. The company uses a balanced scorecard and sets a goal of 85% occupancy in its hotels.

	U.S.		International	
	Current Year	Prior Year	Current Year	Prior Year
Hotel occupancy rates	87%	83%	79%	78%

1. Which division(s) exceeded the occupancy goal for the current year? page 888
2. Which division(s) improved its occupancy performance for the current year?
3. Prepare a balanced scorecard for the current year following the layout in Exhibit 22.18.

QS 22-18

Determining transfer prices without excess capacity

C1

The Windshield division of Jaguar Co. makes windshields for use in its Assembly division. The Windshield division incurs variable costs of $200 per windshield and has capacity to make 500,000 windshields per year. The market price is $450 per windshield. The Windshield division incurs total fixed costs of $3,000,000 per year. If the Windshield division *is operating at full capacity*, what transfer price should be used on transfers between the Windshield and Assembly divisions?

QS 22-19

Determining transfer prices with excess capacity

C1

The Windshield division of Jaguar Co. makes windshields for use in its Assembly division. The Windshield division incurs variable costs of $200 per windshield and has capacity to make 500,000 windshields per year. The market price is $450 per windshield. The Windshield division incurs total fixed costs of $3,000,000 per year. If the Windshield division *has excess capacity*, what is the range of possible transfer prices that could be used on transfers between the Windshield and Assembly divisions?

QS 22-20

Cash conversion cycle

A4

(1) Use the information below to compute the days in the cash conversion cycle for each company. (2) Which company is more effective at managing cash based on this measure?

	Sparta Co.	Athens Co.
Days' sales in accounts receivable	32	45
Days' sales in inventory	20	24
Days' payable outstanding	27	32

QS 22-21[A]

Joint cost allocation

C2

A company purchases a 10,020-square-foot building for $375,000. The building has two separate rental units. Unit A, which has the desirable location on the corner and contains 3,340 square feet, will be rented for $1.00 per square foot. Unit B contains 6,680 square feet and will be

rented for $0.75 per square foot. How much of the joint cost should be allocated to Unit A and to Unit B using the value basis of allocation?

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EXERCISES

Exercise 22-1

Responsibility accounting performance report

P1

Arctica manufactures snowmobiles and ATVs. These products are made in different departments, and each department has its own manager. Each responsibility performance report includes only those costs that the department manager can control: direct materials, direct labor, supplies used, and utilities. Prepare a responsibility accounting performance report for the Snowmobile department.

	Budgeted		Actual	
For Year Ended December 31	Snowmobile	ATV	Snowmobile	ATV
Direct materials	$19,500	$27,500	$19,420	$28,820
Direct labor	10,400	20,500	10,660	21,240
Department manager salaries	4,300	5,200	4,400	4,400
Supplies used	3,300	900	3,170	920
Utilities	360	540	330	500
Rent	5,700	6,300	5,300	6,300
Totals	$43,560	$60,940	$43,280	$62,180

Exercise 22-2

Responsibility accounting performance report **P1**

Refer to the information in Exercise 22-1 and prepare a responsibility accounting performance report for the ATV department.

Exercise 22-3

Service department expenses allocated to operating departments

P2

Lucia Company has two service departments: Office and Purchasing. Total expenses for the Office is $24,000 and for Purchasing is $34,000. Expenses for the Office are allocated to operating departments based on sales. Expenses for Purchasing are allocated to operating departments based on purchase orders. Allocate the expenses from (*a*) the Office and (*b*) Purchasing to each of the company's three operating departments using the following information.

Department	Sales	Purchase Orders
Books	$495,000	516
Magazines	198,000	360
Newspapers	207,000	324
Totals	$900,000	1,200

Exercise 22-4

Payroll expense allocated to departments

P2

Mia works in both the Jewelry department and the Cosmetics department of a retail store. She assists customers in both departments and organizes merchandise in both departments. The store allocates her wages between the two departments based on the time worked in the two departments in each two-week pay period. Mia reports the following hours and activities spent in the two departments in the most recent two weeks. Allocate Mia's $1,200 of wages for two weeks to the two departments.

Activities	Hours
Selling in Jewelry department	51
Organizing in Jewelry department	6
Selling in Cosmetics department	12
Organizing in Cosmetics department	7
Total	76

Exercise 22-5

Departmental expense allocations

P2

Renata Co. has four departments: Materials, Personnel, Manufacturing, and Packaging. Information follows.

Department	Employees	Square Feet	Asset Values
Materials	27	25,000	$ 6,000
Personnel	9	5,000	1,200
Manufacturing	63	55,000	37,800
Packaging	51	15,000	15,000
Totals	150	100,000	$60,000

The four departments share the following indirect expenses for supervision, utilities, and insurance. Allocate each of the three indirect expenses to the four departments according to their allocation bases.

Indirect Expense	Cost	Allocation Base
Supervision	$ 82,500	Number of employees
Utilities	50,000	Square feet occupied
Insurance	22,500	Asset values
Total	$155,000	

Exercise 22-6

Departmental expense allocations

P2

Gomez Company has two service departments (Personnel and Office) and two operating departments (Shoes and Clothing). Following are the direct expenses and square feet occupied by the four departments, and the total sales for the two operating departments.

Department	Direct Expenses	Square Feet	Sales
Personnel	$ 18,000	1,120	—
Office	25,000	1,400	—
Shoes	103,000	7,140	$273,000
Clothing	15,000	4,340	77,000

The company also has $64,000 of utilities expense, which is an indirect expense to all departments and is allocated to the four departments based on square feet occupied. page 890

The Shoes department has 9 employees and the Clothing department has 3 employees. Personnel expense is allocated to operating departments based on the number of employees. Office expense is allocated to operating departments based on sales.

1. Allocate utilities expense to the four departments.
2. Allocate personnel expense to the Shoes and Clothing departments.
3. Allocate office expense to the Shoes and Clothing departments.

Exercise 22-7

Departmental contribution to overhead

P3

Below are departmental income statements for a guitar manufacturer. The company classifies advertising, rent, and utilities as indirect expenses. The manufacturer is considering eliminating its Electric Guitar department because it shows a loss.

Departmental Income Statements For Year Ended December 31	Acoustic	Electric
Sales	$112,500	$105,500
Cost of goods sold	55,675	66,750
Gross profit	56,825	38,750
Expenses		
Advertising	8,075	6,250
Depreciation—Equipment	10,150	9,000
Salaries	17,300	13,500
Supplies used	2,030	1,700
Rent	6,105	5,950
Utilities	3,045	2,550
Total expenses	46,705	38,950
Income (loss)	$ 10,120	$ (200)

1. Prepare a departmental contribution to overhead report (see Exhibit 22.12).

2. Based on contribution to overhead, should the Electric Guitar department be eliminated?

Exercise 22-8

Departmental income statement and contribution to overhead

P3

The Ski department reports sales of $605,000 and cost of goods sold of $425,000. Its expenses follow.

Direct expenses		Indirect expenses		Service department expenses	
Salaries	$112,000	Rent	$14,000	Office	$20,000
Depreciation	42,000				

For the Ski department only, prepare a (1) departmental income statement and (2) departmental contribution to overhead report. (3) Based on these two reports, should the Ski department be eliminated?

Exercise 22-9

Return on investment analysis

A1

A growing chain is trying to decide which store location to open. The West location requires a $1,000,000 investment in average assets and is expected to yield annual income of $160,000. The East location requires a $600,000 investment in average assets and is expected to yield annual income of $108,000. (1) Compute the expected return on investment for each location. (2) Using return on investment, which location (West or East) should the company open?

Exercise 22-10

Computing return on investment and residual income; investing decision

A1

Megamart provides the following information on its two investment centers.

Investment Center	Sales	Income	Average Assets
Electronics	$40,000,000	$2,880,000	$16,000,000
Sporting Goods	20,000,000	2,040,000	12,000,000

1. Compute return on investment for each center. Using return on investment, which center is most efficient at using assets to generate income?
2. Assume a target income of 12% of average assets. Compute residual income for each center. Which center generated the most residual income?
3. Assume the Electronics center is presented with a new investment opportunity that will yield a 15% return on investment. Should the new investment opportunity be accepted? The target return is 12%.

Exercise 22-11

Computing profit margin and investment turnover

A2

Refer to information in Exercise 22-10. (1) Compute profit margin and investment turnover for each center. (2) Which center generates more income per dollar of sales? (3) Which center has the better investment turnover?

Exercise 22-12

Computing ROI, profit margin, and investment turnover

A1 A2

A manufacturer reports the following for two of its divisions for a recent month. For each division, compute (1) return on investment, (2) profit margin, and (3) investment turnover.

	Beverage Division	Cheese Division
Average assets	$5,000	$10,000
Sales	3,000	5,000
Income	600	800

Exercise 22-13

Residual income **A1**

Refer to the information in Exercise 22-12. Assume that each of the company's divisions has a target income at 7% of average assets. Compute residual income for each division.

Exercise 22-14

Return on investment

A1

A company reports the following for the past year.

Sales	$5,000,000	Income	$1,000,000	Average assets	$12,500,000

The company's CFO believes that income for next year will be $1,200,000. Average assets will be the same as the past year.

1. Compute return on investment for the past year.
2. If the CFO's forecast is correct, what will return on investment be for next year?

Exercise 22-15

Profit margin

A2

A retailer reports the following for its geographic divisions for the year.

	Americas	Europe	China
Income.	$ 300,000	$ 80,000	$ 60,000
Sales	1,000,000	400,000	240,000

1. Compute profit margin for each division.
2. Based on profit margin, which division performed best?

Exercise 22-16

Profit margin

A2

The Food division of Garcia Company reports the following for the current year.

Sales	$4,000,000
Cost of goods sold	2,800,000
Gross profit	1,200,000
Expenses	1,000,000
Income.	$ 200,000

The Food division wants to make at least a 10% profit margin next year. Two alternative strategies are proposed.

Strategy 1: Increase advertising expenses by $225,000. The company expects this to increase sales by $600,000 due to a higher sales price for its products. Cost of goods sold will not change.

Strategy 2: Develop a more efficient manufacturing process. This will decrease cost of goods sold by $140,000.

a. For each strategy, compute the profit margin expected for next year.

b. Which strategy should Garcia choose based on expected profit margin?

Exercise 22-17

Performance measures—balanced scorecard

A3

USA Airlines uses the following performance measures. Classify each performance measure into the most likely balanced scorecard perspective it relates to: customer, internal process, innovation and learning, or financial.

1. Cash flow from operations
2. Percentage of ground crew trained
3. Return on investment
4. Market value
5. Safety violations per mile flown
6. Customer complaints
7. Flight attendant training sessions attended
8. Time airplane is on ground between flights
9. Airplane miles per gallon of fuel
10. Revenue per seat
11. Cost of leasing airplanes

Exercise 22-18

Performance measures— balanced scorecard

A3

Midwest Mfg. uses a balanced scorecard as part of its performance evaluation. The company wants to include information on its sustainability efforts in its balanced scorecard. For each performance measure below, indicate the most likely balanced scorecard perspective it relates to: customer, internal process, innovation and learning, or financial.

1. CO_2 emissions
2. Number of solar panels installed
3. Gallons of water used

4. Customer feedback on sustainability reputation
5. Pounds of recyclable packaging used
6. Pounds of trash diverted from landfill
7. Dollar sales of green products
8. Number of sustainability trainings held
9. Cubic feet of natural gas used
10. Patents for green products applied for

Exercise 22-19

Determining transfer prices

C1

The Trailer division of Baxter Bicycles makes bike trailers that attach to bicycles and can carry children or cargo. The trailers have a market price of $200 each. Each trailer incurs $80 of variable manufacturing costs. The Trailer division has capacity for 40,000 trailers per year and has fixed costs of $1,000,000 per year.

1. Assume the Assembly division of Baxter Bicycles wants to buy 15,000 trailers per year from the Trailer division. If the Trailer division can sell all of the trailers it manufactures to outside customers (and has no excess capacity), what price should be used on transfers between divisions?
2. Assume the Trailer division currently only sells 20,000 trailers to outside customers and has excess capacity. The Assembly division wants to buy 15,000 trailers per year from the Trailer division. What is the range of acceptable prices on transfers between divisions?

Exercise 22-20

Cash conversion cycle

A4

A manufacturer reports the data below. (1) Compute the number of days in the cash conversion cycle for each year. (2) Did the company

manage cash more effectively in the current year?

	Current Year	Prior Year
Accounts payable	$ 4,603	$ 8,548
Accounts receivable	18,685	15,726
Inventory	6,904	6,055
Net sales	220,186	205,000
Cost of goods sold	139,998	130,000

Exercise 22-21

Cash conversion cycle

A4

A manufacturer reports the data below. (1) Compute the number of days in the cash conversion cycle. (2) Is the company more efficient at managing cash than its competitor who has a cash conversion cycle of 14 days?

Accounts payable	$ 9,049	Net sales	$233,007
Accounts receivable	17,874	Cost of goods sold	137,600
Inventory	4,855		

Exercise 22-22[A]

Assigning joint costs **C2**

Home Properties is developing a subdivision that includes 600 home lots. The 450 lots in the Canyon section are below a ridge and do not have views of the neighboring canyons and hills; the 150 lots in the Hilltop section offer unobstructed views. The expected selling price for each Canyon lot is $55,000 and for each Hilltop lot is $110,000. The developer acquired the land for $4,000,000 and spent another $3,500,000 on street and utilities improvements. Assign the joint land and improvement costs of $7,500,000 to the Canyon section and the Hilltop section using the value basis of allocation.

Exercise 22-23[A]

Assigning joint product costs **C2**

A dairy company processed raw milk for $60,000. This raw milk can be converted into the following types of milk with listed sales values. Use the value basis to (1) allocate the total cost of the raw milk to each type of milk and (2) determine the gross profit for each type of milk.

Joint Products	Sales Value
Whole milk	$ 25,000
2% milk	40,000
Skim milk	35,000
Total	$100,000

PROBLEM SET A

Problem 22-1A

Responsibility accounting performance reports; controllable and budgeted costs

P1

Ana Perez is the plant manager of Travel Free's Indiana plant. The Camper and Trailer operating departments manufacture products and have their own managers. The Office department, which Perez also manages, provides services equally to the two operating departments.

Each performance report includes only those costs that a particular operating department manager can control: direct materials, direct labor, supplies used, and utilities. The plant manager is responsible for the department managers' salaries, building rent, office salaries other than her own, and other office costs plus all costs controlled by the two operating department managers.

The annual departmental budgets and actual costs for the two operating departments follow.

For Year Ended December 31	Budgeted		Actual	
	Campers	Trailers	Campers	Trailers
Direct materials	$195,000	$275,000	$194,200	$273,200
Direct labor	104,000	205,000	106,600	206,400
Department manager salaries	43,000	52,000	44,000	53,500
Supplies used	3,000	9,000	3,700	8,600
Utilities	3,600	5,400	3,300	5,000
Building rent	5,700	9,300	5,300	8,700
Office department costs	68,750	68,750	67,550	67,550
Totals	$423,050	$624,450	$424,650	$622,950

The Office department's budgeted and actual costs follow.

For Year Ended December 31	Budgeted	Actual
Plant manager salary	$ 80,000	$ 82,000
Other office salaries	32,500	30,100
Other office costs	25,000	23,000
Totals	$137,500	$135,100

Required

Prepare responsibility accounting performance reports like those in Exhibit 22.2 that list costs controlled by the following.

1. Manager of Camper department.
2. Manager of Trailer department.
3. Manager of Indiana plant.

Problem 22-2A

Allocation of indirect expenses to departments

P2

National Retail has two departments, Housewares and Sporting. Indirect expenses for the period follow.

Rent	$45,000
Advertising	25,000
Insurance	10,000
Total	$80,000

The company occupies 4,000 square feet of a rented building. In prior periods, the company divided the $80,000 of indirect expenses by 4,000 square feet to find an average cost of $20 per square foot, and then allocated indirect expenses to each department based on the square feet it occupied.

The company now wants to allocate indirect expenses using the allocation bases shown below.

Department	Square Feet	Sales	Value of Insured Assets
Housewares	2,200	$180,000	$ 40,000
Sporting	1,800	320,000	60,000
Total	4,000	$500,000	$100,000

Required

1. Allocate indirect expenses to the two departments using the allocation method used in prior periods.
2. Allocate indirect expenses to the two departments. Rent expense is allocated based on square feet occupied. Advertising expense is allocated based on total sales. Insurance expense is allocated based on the value of insured assets.

Check (1) Total allocated to *Housewares, $44,000*

(2) Advertising allocated to Sporting, $16,000

Problem 22-3A

Departmental income statements

P3

Garcia Company has two operating departments (Phone and Earbuds) and one service department (Office). Its departmental income statements follow. Indirect expenses and service department expenses consist of rent, utilities, and office department expenses.

Departmental Income Statements For Year Ended December 31	Phone	Earbuds	Combined
Sales	$130,000	$55,000	$185,000
Cost of goods sold	63,700	34,100	97,800
Gross profit	66,300	20,900	87,200
Expenses			
Sales salaries	21,200	7,500	28,700
Supplies used	900	400	1,300
Depreciation—Equipment	1,500	300	1,800
Rent	7,020	3,780	10,800
Utilities	2,600	1,400	4,000
Share of office department expenses	10,500	4,500	15,000
Total expenses	43,720	17,880	61,600
Income	$ 22,580	$ 3,020	$ 25,600

Required

Prepare a departmental contribution to overhead report (see Exhibit 22.12).

Problem 22-4A

Departmental income

P3

Diaz Company is a retail store with two operating departments, Clothes and Shoes. Information follows.

For Year Ended December 31	Clothes	Shoes
Sales	$800,000	$450,000
Cost of goods sold	497,000	291,000
Direct expenses: Wages	125,000	88,000
Supplies used	20,000	10,000
Depreciation	28,000	17,000

The company reports the following indirect expenses for the year.

Indirect Expense	Amount	Allocation Base
Utilities	$ 6,000	Square feet of space occupied
Supervisor salaries	50,000	Number of employees in department

Additional information about the two departments follows.

Department	Square Footage	Number of Employees
Clothes	28,000	75
Shoes	12,000	50

Required

1. Allocate indirect expenses to the two operating departments.
2. Prepare departmental income statements.

Check (2) Clothes income, $95,800

Problem 22-5A[A]

Allocation of joint costs

C2

California Orchards reports the following sales data for the year ended December 31.

Grade of Walnuts	Sales
No. 1	$450,000
No. 2	300,000
No. 3	187,500
Total.....	$937,500

The company incurred the following joint costs for the year.

Tree pruning and care.....	$405,000
Pickup, sorting, and grading.....	202,500

Required

1. Use the value basis to allocate joint costs to the three grades of walnuts.
2. Compute gross profit for each of the three grades of walnuts.

PROBLEM SET B

Problem 22-1B

Responsibility accounting performance reports; controllable and budgeted costs

P1

Britney Brown is the plant manager of GT Co.'s Chicago plant. The Refrigerator and Dishwasher operating departments manufacture products and have their own managers. The Office department, which Brown also manages, provides services equally to the two operating departments.

Each performance report includes only those costs that a particular operating department manager can control: direct materials, direct labor, supplies used, and utilities. The plant manager is responsible for the department managers' salaries, building rent, office salaries other than her own, and other office costs plus all costs controlled by the two operating department managers.

The April departmental budgets and actual costs for the two operating departments follow. page 896

	Budgeted		Actual	
For Month Ended April 30	Refrigerators	Dishwashers	Refrigerators	Dishwashers
Direct materials	$400,000	$200,000	$385,000	$202,000
Direct labor	170,000	80,000	174,700	81,500
Department manager salaries	55,000	49,000	55,000	46,500
Supplies used	15,000	9,000	14,000	9,700
Utilities	30,000	18,000	34,500	20,700
Building rent	63,000	17,000	65,800	16,500
Office department costs	70,500	70,500	75,000	75,000
Totals	$803,500	$443,500	$804,000	$451,900

The Office department's budgeted and actual costs follow.

For Month Ended April 30	Budgeted	Actual
Plant manager salary	$ 80,000	$ 85,000
Other office salaries	40,000	35,200
Other office costs	21,000	29,800
Totals	$141,000	$150,000

Required

1. Prepare responsibility accounting performance reports like those in Exhibit 22.2 that list costs controlled by the following.
   a. Manager of Refrigerator department.
   b. Manager of Dishwasher department.
   c. Manager of Chicago plant.

Check (1*a*) $*6,800* total under budget

(1*c*) Chicago plant controllable costs, $3,900 total over budget

Analysis Component

2. Did the plant manager or one of the operating department managers best control costs?

Problem 22-2B

Allocation of indirect expenses to departments

P2

Harmon's has two operating departments, Clothing and Shoes. Indirect expenses for the period follow.

Rent	$50,000
Advertising	30,000
Insurance	12,000
Total	$92,000

The company occupies 4,000 square feet of a rented building. In prior periods, the company divided the $92,000 of indirect expenses by 4,000 square feet to find an average cost of $23 per square foot, and then allocated indirect expenses to each department based on the square feet it occupied.

The company now wants to allocate indirect expenses using the allocation bases shown below.

Department	Square Feet	Sales	Value of Insured Assets
Clothing	2,400	$ 240,000	$ 36,000
Shoes	1,600	360,000	84,000
Total	4,000	$600,000	$120,000

Required

page 897

1. Allocate indirect expenses to the two departments using the allocation method used in prior periods.
2. Allocate indirect expenses to the two departments. Rent expense is allocated based on square feet occupied. Advertising expense is allocated based on total sales. Insurance expense is allocated based on the value of insured assets.

Check (1) Total allocated to Shoes, $36,800

(2) Insurance allocated to Clothing, $3,600

Problem 22-3B

Departmental income statements

P3

Bonanza has two operating departments (Movies and Video Games) and one service department (Office). Its departmental income statements follow. Indirect expenses and service department expenses consist of rent, utilities, and office department expenses.

Departmental Income Statements			
For Year Ended December 31	Movies	Video Games	Combined
Sales	$600,000	$200,000	$800,000
Cost of goods sold	420,000	154,000	574,000
Gross profit	180,000	46,000	226,000
Expenses			
Sales salaries	49,500	21,000	70,500
Supplies used	4,000	1,000	5,000
Depreciation—Equipment	4,500	3,000	7,500
Rent	41,000	9,000	50,000
Utilities	7,380	1,620	9,000
Share of office department expenses	56,250	18,750	75,000
Total expenses	162,630	54,370	217,000
Income (loss)	$ 17,370	$ (8,370)	$ 9,000

Required

1. Prepare a departmental contribution to overhead report (see Exhibit 22.12).
2. Should the video games department be eliminated? Explain.

Problem 22-4B

Departmental income

P3

Sadar Company is a store with two operating departments, Guitar and Piano. Information follows.

For Year Ended December 31	Guitar	Piano
Sales	$370,500	$279,500
Cost of goods sold	320,000	175,000
Direct expenses: Salaries	35,000	25,000
Depreciation	12,000	10,000
Supplies used	4,200	3,700

The company reports the following indirect expenses for the year.

Indirect Expense	Amount	Allocation Base
Advertising	$15,000	Percentage of total sales
Rent	3,200	Square feet of space occupied

Additional information about the two operating departments follows. page 898

Department	Square Footage	Sales
Guitar	5,000	$370,500
Piano	3,000	279,500

Required

1. Allocate indirect expenses to the two operating departments.
2. Prepare departmental income statements.

Check (2) Piano dept. income, $58,150

Problem 22-5B[A]

Allocation of joint costs

C2

Tampa Tomatoes reports the following sales data for the year ended December 31.

Grade of Tomatoes	Sales
No. 1	$ 600,000
No. 2	350,000
No. 3	50,000
Total	$1,000,000

The company incurred the following joint costs for the year.

Land preparation, seeding, and cultivating	$700,000
Harvesting, sorting, and grading	40,000

Required

1. Use the value basis to allocate joint costs to the three grades of tomatoes.
2. Compute gross profit for each of the three grades of tomatoes.

SERIAL PROBLEM

Business Solutions

A4

Alexander Image/Shutterstock

This serial problem began in Chapter 1 and continues through most of the book. If previous chapter segments were not completed, the serial problem can begin at this point.

SP 22 Santana Rey's two departments, Computer Consulting Services and Computer Workstation Furniture Manufacturing, have each been profitable for **Business Solutions**. Santana has heard of the cash conversion cycle and wants to use it as another performance measure for the workstation manufacturing department. Data below are for the most recent two quarters.

	1st Quarter	2nd Quarter
Days' sales in accounts receivable	19 days	21 days
Days' sales in inventory	25 days	24 days
Days' payable outstanding	31 days	28 days

Required

1. Compute cash conversion cycle for the first quarter.
2. Compute cash conversion cycle for the second quarter.
3. Did cash conversion cycle improve or worsen from the first to the second quarter?

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments (1) do not require instructors to know Tableau, (2) are accessible to introductory students, (3) do not require Tableau software, and (4) run in **Connect**. All are auto-gradable.

Tableau DA 22-1 Quick Study, Allocate indirect expenses, **P2**—similar to QS 22-6, QS 22-7, and QS 22-8.

Tableau DA 22-2 Exercise, Allocate indirect expenses and prepare departmental income statements, **P2**, **P3**—similar to Exercise 22-5, Exercise 22-6, and Exercise 22-8.

Tableau DA 22-3 Mini-case, Prepare departmental contribution to overhead report and analyze strategies, **P3**—similar to Exercise 22-8.

Accounting Analysis connect

COMPANY ANALYSIS

A4

AA 22-1 Information for **Google** follows.

$ millions	Current Year	One Year Prior
Accounts receivable, net	$ 25,326	$ 20,838
Net sales	161,857	136,819
Inventory	999	1,107
Cost of goods sold	71,896	59,549
Accounts payable	5,561	4,378

Required

1. Compute Google's cash conversion cycle for both the current and prior years.
2. Did Google become more effective at managing cash in the current year?

COMPARATIVE ANALYSIS

A2

APPLE
GOOGLE

AA 22-2 Current year information for **Apple** and **Google** follows.

$ millions	Apple	Google
Sales	$260,174	$161,857
Income	55,256	34,343
Average assets	352,121	254,351

Required

1. Compute profit margin for each company.
2. Compute investment turnover for each company.
3. Refer to answers for parts 1 and 2. Which company performed better on investment turnover?

EXTENDED ANALYSIS

A4

Samsung
GOOGLE

AA 22-3 Current year information for **Samsung** and **Google** follows.

$ millions	Samsung	Google
Accounts receivable, net	$ 30,144	$ 25,326
Net sales	197,691	161,857
Inventory	22,966	999
Cost of goods sold	126,336	71,896
Accounts payable	7,480	5,561

Required

1. Compute the cash conversion cycle for both Samsung and Google for the current year.
2. Which company, Samsung or Google, was more effective at managing cash in the current year?

Discussion Questions

1. Why are many companies divided into departments?
2. What is the difference between operating departments and service departments?
3. What are controllable costs?
4. How is the performance of cost center managers evaluated?
5. In responsibility accounting, why are reports to higher-level managers usually less detailed?
6. How are decisions made in decentralized organizations?
7. How is the performance of profit center managers evaluated? page 900
8. What is the difference between direct and indirect expenses?
9. Suggest a reasonable basis for allocating each of the following indirect expenses to departments: (*a*) salary of a supervisor who manages several departments, (*b*) rent, (*c*) heat, (*d*) advertising, and (*e*) property taxes on equipment.
10. How is a department's contribution to overhead measured?
11. Describe the four perspectives of the balanced scorecard.
12. What is a transfer price? What are the three main approaches to setting transfer prices?
13. Under what conditions is a market-based transfer price most likely to be used?
14. A What is a joint cost? How are joint costs usually allocated among the products produced from them?

15. Each **Apple** retail store has several departments. Why is it useful for its management to (*a*) collect accounting information about each department and (*b*) treat each department as a profit center?

APPLE

16. **Apple** delivers its products to locations around the world. List three controllable and three uncontrollable costs for its delivery department.

APPLE

17. Define and describe the *cash conversion cycle* and identify its three components.

18. Can management of a company such as **Samsung** use the cash conversion cycle as a useful measure of performance? Explain.

Samsung

Beyond the Numbers

ETHICS CHALLENGE

P3

BTN 22-1 Super Security Co. offers security services for athletes and entertainers. Each type of service is considered within a separate department. Marc Pincus, the overall manager, is compensated partly on the basis of departmental performance by staying within the quarterly cost budget. He often revises operations to make sure departments stay within budget. Says Pincus, "I will not go over budget even if it means slightly compromising the level and quality of service. These are minor compromises that don't significantly affect my clients, at least in the short term."

Required

1. Is there an ethical concern in this situation? If so, which parties are affected? Explain.

2. Can Pincus take action to eliminate or reduce any ethical concerns? Explain.
3. What is Super Security's ethical responsibility in offering professional services?

COMMUNICATING IN PRACTICE

P2

BTN 22-2 Improvement Station is a national home improvement chain with more than 100 stores throughout the country. The manager of each store receives a salary plus a bonus equal to a percent of the store's income for the reporting period. The following income calculation is on the Denver store manager's performance report for the recent monthly period.

Sales	$2,500,000
Cost of goods sold	800,000
Salaries expense	500,000
Depreciation—Equipment	200,000
General office expense	75,000
Income	$ 925,000
Manager's bonus (0.5%)	$ 4,625

In previous periods, the bonus had also been 0.5%, but the performance report had not included any charges for the general office expense, which is now allocated to each store as a percent of its sales.

Required

Assume that you are the national office manager. Write a half-page memorandum to your store managers explaining why general office expense is in the new performance report.

TEAMWORK IN ACTION

P1

APPLE

Samsung

BTN 22-3 **Apple** and **Samsung** compete across the world in several markets.

Required

1. Design a three-tier responsibility accounting organizational chart assuming that you have available internal information for both companies. Use Exhibit 22.1 as an example. The goal of this assignment is to design a reporting framework for the companies; numbers are not required. Limit your reporting framework to sales activity only.
2. Explain why it is important to have similar performance reports when comparing performance within a company (and across different companies). Be specific in your response.

ENTREPRENEURIAL DECISION

P3

BTN 22-4 Sofia Luz Eckrich's company **Teysha** makes hand-made boots, shoes, and home goods.

Required

1. How can Sofia use departmental (product line) income statements to assist in understanding and controlling operations?
2. Are departmental income statements always the best measure of a department's performance? Explain.

23 Relevant Costs for Managerial Decisions

Chapter Preview

DECISIONS AND INFORMATION

Managerial Decisions

C1 Relevant revenues and costs

NTK 23-1

PRODUCTION DECISIONS

P1 Make or buy

P2 Sell or process

Scrap or rework

P3 Sales mix

NTK 23-2, 3, 4

CAPACITY DECISIONS

P4 Segment elimination

P5 Keep or replace

NTK 23-5

PRICING DECISIONS

P6 Normal pricing

P7 Special pricing

A1 Time and materials

NTK 23-6

Learning Objectives

CONCEPTUAL

C1 Describe the use of relevant costs and benefits for short-term decisions.

ANALYTICAL

A1 Determine price of services using time and materials pricing.

PROCEDURAL

P1 Evaluate make or buy decisions.

P2 Evaluate sell or process decisions.

P3 Determine sales mix with constrained resources.

P4 Evaluate segment elimination decisions.

P5 Evaluate keep or replace decisions.

P6 Determine product selling price.

P7 Evaluate special offer decisions.

page 903

Catch a Wave

"Create something that makes people happy"—**MAX STEWART**

SYDNEY, AUSTRALIA—Working days for surfboard manufacturers and nights fixing shoes, Max Stewart saved enough money to finance his own start-up, **Eye Symmetry (EyeSymmetry.com)**. A one-man manufacturer, Max makes about 30 surfboards per month. "My goal is to create unique boards that surfers love," proclaims Max.

Each step of surfboard making is done by Max. "I have a unique way to laminate boards to make them lighter," explains Max. "I have a patented surfboard core." Unlike Max, many competitors outsource parts of board making, like fiberglass finishing and polishing. This "make or buy" decision depends on the costs of alternatives.

Max knows his costs. "My blanks cost about $85 to $110 each." Adding overhead costs like rent and utilities, Max estimates a cost of "about $500 per board, without paying myself anything." He tracks costs to help price his boards, which can sell for $850 per board or more.

Eye Symmetry recently expanded into other products, like clothing. Max tracks sales and costs for each business segment to ensure that it makes a positive contribution to covering costs and generating income. It is clear that Max is riding a wave of success. Says Max, "Go for it!"

Eye Symmetry Pty Ltd.

Sources: *Eye Symmetry website*, January 2021; *Stabmag.com*, 2016; *Pacific Standard*, June 2017; www.youtube.com/watch?v=9Cbz43MKEgk

DECISIONS AND INFORMATION

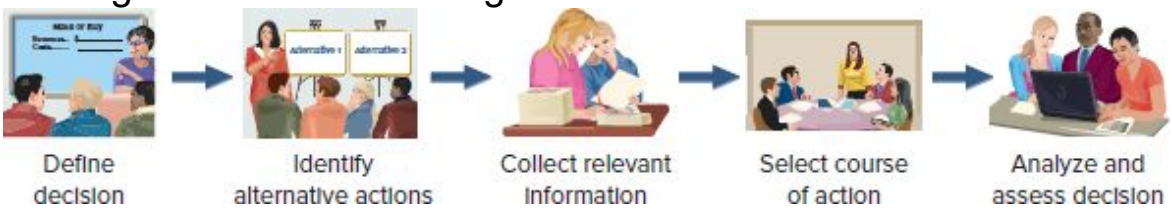
This chapter focuses on using accounting information to make managerial decisions. Many managerial tasks involve short-term decisions. This differs from longer-term managerial decisions described in the next chapter.

Decision Making

Managerial decision making has five steps: (1) Define the decision, (2) identify alternatives, (3) collect relevant information and evaluate alternatives, (4) select the course of action, and (5) analyze and assess decisions made. These five steps are illustrated in Exhibit 23.1. Managers use *financial* information, like expected revenues and costs, for decision making. *Nonfinancial* information is also important and includes environmental and social data.

EXHIBIT 23.1

Managerial Decision Making



Relevant Costs and Benefits

C1

Describe the use of relevant costs and benefits for short-term decisions.

Managers must be able to distinguish between relevant and irrelevant costs and benefits. *Relevant costs and benefits* must be considered in managerial decisions. Relevant costs and benefits are future-oriented and focus on incremental effects from alternative managerial decisions. Those incremental, also called differential or avoidable, effects are important to define so that good managerial decisions are made.

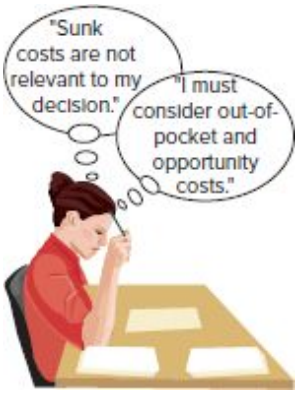
- **Incremental revenues** are the additional revenues from selecting a certain course of action over another.
- **Incremental costs**, or *differential costs*, are the additional page 904 costs from selecting a certain course of action.
- **Incremental income** is incremental revenues minus incremental costs. A good rule is to choose the alternative that most increases incremental income.

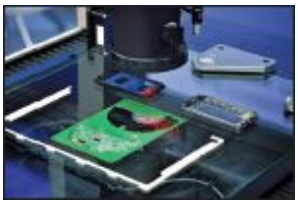
Four types of costs are important in distinguishing relevant costs.

- ***Sunk cost*** arises from a past decision and cannot be avoided or changed; it is irrelevant to current and future decisions. An example is the $1,000 we *previously* paid for a smartphone. That sunk cost is not relevant to a decision to replace it if it breaks. Likewise, depreciation of the original cost of an asset is a sunk

cost. Most of a company's allocated costs, including fixed overhead, are sunk costs.

- ***Out-of-pocket cost*** requires a future outlay of cash and is relevant for decisions. For instance, the cost of a *future* phone purchase is relevant to the decision of whether to replace a phone.
- ***Opportunity cost*** is the potential benefit lost by taking an action instead of an alternative action. An example is a student giving up wages from a job to attend summer school. The lost wages are part of the cost of attending summer school. Although opportunity costs are not entered in accounting records, they are relevant to many managerial decisions.
- ***Avoidable cost*** is a cost that can be eliminated by choosing one action versus another; an avoidable cost is always relevant. An example is worker pay that is avoidable if the work is automated.





Zorazhuang/iStock/Getty Images Plus Collection/Getty Images

Analytics Insight

Sam-apple? **Apple** buys its component parts from over 200 different suppliers, including competitors. For example, **Samsung** supplies screens for iPhones and iPads. Apple relies on data analytics to manage its vast supply chain and to analyze its incremental costs and revenues for production decisions. ■

NEED-TO-KNOW 23-1

Relevant Costs

C1

Georgia Co. produces and harvests peanuts at a cost of $20,000. The peanuts can be sold as is to a manufacturer for $35,000. Instead, Georgia can process the peanuts further into peanut butter. Processing further will cost an additional $25,000 and will result in total revenues of $55,000. Identify each revenue or cost as relevant or not relevant to Georgia's decision to sell as is or process further.

Solution

Revenues and Costs	Relevant	Not Relevant
$20,000 cost to produce and harvest		x
$55,000 revenue after further processing	x	
$25,000 additional cost to process further	x	
$35,000 "as is" selling price	x	

Do More: QS 23-1, QS 23-3, QS 23-4

PRODUCTION DECISIONS

Analysis of incremental costs and benefits is useful in several short-term production decisions.

Make or Buy

P1

Evaluate make or buy decisions.

Buying goods or services from an external supplier is called **outsourcing**. The decision to make or buy depends on the costs of

each alternative. To illustrate, let's look at FasTrac, an exercise supplements and equipment manufacturer operating at 80% of capacity, and consider its production decisions.

FasTrac currently buys a key part for its main product for $1.20 per unit. With excess capacity, making this part would incur per unit variable costs of $0.35 for direct materials and $0.50 for direct labor. Management must also consider *incremental* overhead costs, which include power for operating machines, extra supplies, and added cleanup costs. Management estimates *incremental overhead* of $0.20 per unit if it makes the part. (A predetermined overhead rate is not relevant for this decision.) Our cost per unit analysis is in Exhibit 23.2. The cost to make this part is $1.05, which is less than the $1.20 to buy it. **Decision rule:** Select the action with the lower cost.

page 905

EXHIBIT 23.2

Make or Buy Analysis

Make or Buy Analysis	Make	Buy
Direct materials	$0.35	—
Direct labor	0.50	—
Overhead (incremental only)	0.20	—
Cost to buy	—	$1.20
Cost per unit	$1.05	$1.20
Decision: Cost savings to Make	$0.15	

Additional Factors While it is less costly to make the part in this case, the company also should consider nonfinancial factors. These include product quality, timeliness of delivery, reactions of suppliers, and employee morale and workload. When additional factors are considered, small cost per unit differences might not matter.

NEED-TO-KNOW 23-2

Make or Buy

P1

A company pays $5 per unit to buy a part for a product it manufactures. It can make the part for $1.50 per unit for direct materials and $3.50 per unit for direct labor. The company normally applies overhead costs at a predetermined rate of 50% of direct labor cost. Incremental overhead cost to make this part is $0.75 per unit. Should the company make or buy the part?

Solution

Make or Buy Analysis	Make	Buy
Direct materials	$1.50	—
Direct labor	3.50	—
Overhead (incremental)	0.75	—
Cost to buy	—	$5.00
Cost per unit	$5.75	$5.00
Decision: Cost savings to Buy	$0.75	

The company should **buy the part** because the $5.75 cost to make it is more than the $5.00 cost to buy it. The predetermined overhead rate is not relevant, but incremental overhead cost is relevant.

Do More: QS 23-5, QS 23-6, E 23-1, E 23-2

Sell or Process

P2

Evaluate sell or process decisions.

Many companies must decide whether to sell partially completed products as is or to process them further into other products. For example, a peanut grower could sell its peanut harvest as is, or it could process peanuts further into other products such as peanut butter, peanut oil, and peanut lotion. The decision depends on the incremental costs and revenues of processing further.

To illustrate, suppose a company has spent $30,000 to harvest peanuts. The company can sell the peanuts to another manufacturer as raw material for $50,000. Alternatively, it can process them further and produce a nutritional supplement. Processing further costs an additional $80,000 and will result in revenues of $150,000. The company must decide whether selling as is or processing further produces the higher income.

Exhibit 23.3 shows the sell or process analysis. The income of $70,000 from processing further is greater than the income of $50,000 from selling as is. The company should process further and earn $20,000 of incremental income ($70,000 − $50,000). The $30,000 of previously incurred harvest costs are excluded from the analysis. Those are sunk costs and are not relevant to the decision. **Decision rule:** Select the action with the higher income.

page 906

EXHIBIT 23.3

Sell or Process Analysis

Sell or Process Analysis	Sell As Is		Process Further
Revenue	$50,000		$150,000
Cost	—		80,000
Income	$50,000		$ 70,000
Decision: Incremental Income to Process Further		$20,000	

Scrap or Rework

A variation of the sell or process further analysis is the scrap or rework analysis. Manufacturing processes sometimes yield defective products. Managers must decide whether to scrap or rework such products.

FasTrac has 1,000 defective units of a product that have already cost $10,000 to manufacture. These units can be sold as scrap for $4,000, or they can be reworked for $8,000 and then sold for $15,000. Should FasTrac sell the units as scrap or rework them?

The $10,000 manufacturing cost already incurred is a sunk cost and is irrelevant. The $4,000 revenue as scrap is the opportunity cost of reworking and is relevant. Analysis is in Exhibit 23.4. FasTrac

should rework the units and obtain $3,000 ($7,000 – $4,000) of incremental income.

EXHIBIT 23.4

Scrap or Rework Analysis

Scrap or Rework Analysis	Scrap	Rework
Revenue from scrapped/reworked units	$ 4,000	$15,000
Cost of reworked units		8,000
Income	$ 4,000	$ 7,000
Decision: Incremental Income to Rework	$3,000	

NEED-TO-KNOW 23-3

Sell or Process; and Scrap or Rework

P2

1. $20,000 of costs have been incurred to produce raw milk. The milk can be sold as is for $40,000 or processed further into ice cream. Processing further will cost $25,000, and the resulting ice cream can be sold for $60,000. Should the company sell the milk as is or process further?
2. $50,000 of costs have been incurred to produce a batch of defective handbags. The handbags can be sold as scrap for $15,000 or reworked into saleable handbags. Rework will cost $9,000, and the reworked handbags can be sold for $20,000. Should the company scrap or rework the handbags?

Solution

1.

Sell or Process Further Analysis	Sell As Is	Process Further
Revenue	$40,000	$60,000
Cost	—	25,000
Income	$40,000	$35,000
Decision: Incremental Income to Sell As Is	$5,000	

The milk should be **sold as is;** doing so will yield $5,000 ($40,000 − $35,000) of incremental income.

2.

Scrap or Rework Analysis	Scrap	Rework
Revenue from scrapped/reworked units	$15,000	$20,000
Cost of reworked units	—	9,000
Income	$15,000	$11,000
Decision: Incremental income to Scrap		$4,000

The handbags should be **scrapped;** doing so will yield $4,000 ($15,000 − $11,000) of incremental income.

Do More: QS 23-7, QS 23-8, E 23-3

Sales Mix When Resources Constrained

P3

Determine sales mix with constrained resources.

When a company sells a mix of products, and its production facilities are operating at or near capacity, management looks for the most profitable *sales mix* of products. The *contribution margin per unit of constrained resource* is used to find the best sales mix.

To illustrate, let's look at a company that makes two page 907 models of scooters with selling prices and variable costs in Exhibit 23.5. The same machines are used to produce both models. The company has a capacity of 2,000 machine hours (MH) per year. Pro model uses 1 machine hour per unit while Max uses 2 machine hours per unit. **The company should produce the model that yields the highest contribution margin per machine hour, until market demand is satisfied.** Exhibit 23.5 shows the contribution margin per machine hour for both models. The Pro model has a higher contribution margin of $150 per *machine hour*. The company should produce as many units of Pro as possible, up to the market demand.

EXHIBIT 23.5

Product Contribution Margin per Machine Hour

Product Contribution Margin	Pro	Max
Selling price per unit	$500	$750
Variable costs per unit	350	550
Contribution margin per unit	$150	$200
Machine hours per unit	1 hr.	2 hrs.
Contribution margin per machine hour	**$150** ($150/1 hr.)	**$100** ($200/2 hrs.)

Point: A machine hour producing Pro earns $150 versus only $100 from Max.

Unlimited Demand If the market will buy all that the company can produce, the company should devote all 2,000 machine hours to produce the Pro model and none to the Max model. The 2,000 MH can produce 2,000 Pro scooters as each Pro requires 1 MH to make. This sales mix yields a contribution margin of $300,000, see Exhibit 23.6.

EXHIBIT 23.6

Contribution Margin from Sales Mix with **Unlimited** Demand

Sales Mix with Unlimited Demand	Contribution Margin	Machine Hours Used
Pro (2,000 units × $150 per unit)	$300,000	2,000
Max (0 units)	0	0
Total	$300,000	2,000

Limited Demand If demand for the Pro model is limited to 1,200 units, the company will first produce 1,200 units of Pro using 1,200 machine hours required to make them. This leaves 800 machine hours to produce the Max model. The 800 MH result in 400 Max

scooters as each Max requires 2 MH to make. This sales mix yields a $260,000 contribution margin in Exhibit 23.7.

EXHIBIT 23.7

Contribution Margin from Sales Mix with **Limited** Demand

Sales Mix with Limited Demand	Contribution Margin	Machine Hours Used
Pro (1,200 units × $150 per unit)	$180,000	1,200
Max (400 units × $200 per unit)	80,000	800
Total	$260,000	2,000

Decision rule: Produce the product with the highest contribution margin per unit of scarce resource up to its total demand. Use remaining capacity to produce the product with the next highest contribution margin per unit of scarce resource.

iqoncept/123RF

Decision Insight

Truckin' Ford sells over 2 million vehicles per year. With customers preferring larger vehicles, Ford's sales mix has shifted towards trucks and SUVs. Car sales are now less than 15% of Ford's total unit sales.

NEED-TO-KNOW 23-4

Sales Mix

P3

A company produces two products, Gamma and Omega. Gamma sells for $10 per unit and Omega sells for $12.50 per unit. Variable costs are $7 per unit for Gamma and $8 per unit for Omega. The company has a capacity of 5,000 machine hours per month.

Gamma uses 1 machine hour per unit and Omega uses 3 machine hours per unit.

1. Compute the contribution margin per machine hour for each product.
2. Demand for Gamma is limited to 3,800 units per month. How many units of Gamma and Omega should the company produce, and what is the total contribution margin from this sales mix?

Solution

1.

Product Contribution Margin	Gamma	Omega
Selling price per unit	$10.00	$12.50
Variable costs per unit	7.00	8.00
Contribution margin per unit	$ 3.00	$ 4.50
Machine hours per unit	1 hr.	3 hrs.
Contribution margin per machine hour	**$ 3.00**	**$ 1.50**

2. Because Gamma has the higher contribution margin per machine hour, the company will begin by producing Gamma to meet the market demand of 3,800 units. That production level will use 3,800 machine hours, leaving 1,200 machine hours to produce Omega. With 1,200 machine hours, the company can produce 400 units (1,200 remaining machine hours⁄3 machine hours per unit) of Omega. Total contribution margin from this sales mix follows.

Sales Mix with Limited Demand	Contribution Margin	Machine Hours Used
Gamma (3,800 units × $3.00 per unit)	$11,400	3,800
Omega (400 units × $4.50 per unit)	1,800	1,200
Total	$13,200	5,000

Do More: QS 23-12, E 23-6,E 23-7

CAPACITY DECISIONS

P4

Evaluate segment elimination decisions.

Segment Elimination

When a segment of a business is performing poorly, management must consider eliminating it. Segments with contribution margin less than *avoidable fixed costs* are candidates for elimination.

- **Avoidable costs** are eliminated when the segment is eliminated; they include all variable costs and direct fixed costs such as rent on that segment's space and insurance on that segment's eliminated equipment.
- **Unavoidable costs** remain even if the segment is eliminated; these costs are allocated to remaining segments when a segment is eliminated.

FasTrac reports results for its three segments in Exhibit 23.8. Total income is $95,000. However, its Treadmill segment shows a $10,000 loss. Management is considering eliminating its Treadmill segment. We must be careful as some segment costs might be unavoidable even if the segment is eliminated.

EXHIBIT 23.8

Segment Income

Segment Income before Segment Elimination				
	Treadmill	Wellness	Fitness	Total
Sales	$ 40,000	$200,000	$100,000	$340,000
Variable costs	35,000	110,000	55,000	200,000
Contribution margin	5,000	90,000	45,000	140,000
Fixed costs	15,000	20,000	10,000	45,000
Income (loss)	$(10,000)	$ 70,000	$ 35,000	$ 95,000

Point: Treadmill's $5,000 contribution margin in Exhibit 23.8 exceeded its $4,000 avoidable fixed costs.

Eliminating the Treadmill division would eliminate its sales, variable costs, and contribution margin. Its $15,000 in fixed costs consists of $4,000 in avoidable costs and $11,000 in unavoidable costs. The $11,000 in unavoidable costs would be reallocated to Wellness

($8,000) and Fitness ($3,000). Revised results are in Exhibit 23.9. We see that if the Treadmill segment is eliminated, total income decreases by $1,000, from $95,000 to $94,000. This means the *Treadmill segment should continue*.

page 909

EXHIBIT 23.9

Segment Income after Segment Elimination

Segment Income after Segment Elimination	Wellness	Fitness	Total
Sales	$200,000	$100,000	$300,000
Variable costs	110,000	55,000	165,000
Contribution margin	90,000	45,000	135,000
Fixed costs	**28,000**	**13,000**	41,000
Income (loss)	$ 62,000	$ 32,000	**$ 94,000**

Point: Segment should continue if its contribution margin exceeds its avoidable fixed costs.

The same decision is made using the segment elimination analysis in Exhibit 23.10. The Continue column shows Treadmill results for the current period. The Eliminate column shows what items remain after the segment is eliminated. We see $0 for sales, variable costs, and contribution margin as they all disappear if the segment is eliminated. The Eliminate column does show $11,000 of fixed costs that are unavoidable even if the segment is eliminated.

The Income Increase (Decrease) column shows the $1,000 decreased income if the segment is eliminated. This indicates the segment should *not* be eliminated and is the same result from comparing Exhibit 23.8 to Exhibit 23.9. **Decision rule:** A segment should be eliminated if income increases from elimination; it should continue if income decreases from elimination.

EXHIBIT 23.10

Segment Elimination Analysis

Segment Elimination Analysis	Continue	Eliminate	Income Increase (Decrease)
Sales	$ 40,000	$ 0	
Variable costs	35,000	0	
Contribution margin	5,000	0	
Fixed costs	15,000	11,000	
Income (loss)	$(10,000)	$(11,000)	$(1,000)

Keep or Replace

P5

Evaluate keep or replace decisions.

Managers periodically must decide whether to keep using a plant asset such as equipment or to replace it. Advances in technology typically mean newer equipment can operate more efficiently and at lower cost.

Point: Next chapter looks at time value of money in a keep or replace analysis.

The keep or replace analysis compares the revenues and costs of keeping the old asset versus replacing with the new asset. Relevant revenues and costs include any change in variable manufacturing costs with the new asset and the net cost of the new asset (computed as its purchase price minus any trade-in allowance or cash received from sale of the old asset).

To illustrate, FasTrac is considering replacing an existing machine with a new machine.

Existing Machine	
Book value	$20,000
Variable manufacturing costs per year	$50,000
Salvage value	$ 0
Selling price currently	$25,000
Remaining useful life	5 years

New Machine	
Purchase price	$100,000
Variable manufacturing costs per year	$ 36,000
Useful life	5 years

The keep or replace analysis is in Exhibit 23.11. We should keep the existing machine because to replace it will decrease income by $5,000. The $20,000 book value of the old machine is not relevant as book value is a sunk cost and cannot be changed. **Decision rule:** Replace an asset if income increases (but keep the asset if income decreases) from the replacement.

EXHIBIT 23.11

Keep or Replace Analysis

Keep or Replace Analysis	Keep	Replace	Income Increase (Decrease)
Revenues			
Sale of existing machine		$ 25,000	
Costs			
Purchase of new machine		(100,000)	
Variable manufacturing costs	$(250,000)*	(180,000)‡	
Income (loss)	$(250,000)	$(255,000)	$(5,000)

*$50,000 × 5 years ‡$36,000 × 5 years

NEED-TO-KNOW 23-5

Segment Elimination

P4

A bike maker is considering eliminating its Tandem Bike division as it reports the following loss for the year. All $30,000 of its variable costs are avoidable, and $12,000 of its fixed costs are avoidable. Determine whether the division should be eliminated.

	Tandem Bike
Sales	$40,000
Variable costs	30,000
Contribution margin	10,000
Fixed costs	16,000
Income (loss)	$ (6,000)

Solution

Segment Elimination Analysis	Continue	Eliminate	Income Increase (Decrease)
Sales	$40,000	$ 0	
Variable costs	30,000	0	
Contribution margin	10,000	0	
Fixed costs	16,000	4,000	
Income (loss)	$ (6,000)	$(4,000)	$2,000

Decision: Eliminate the division. Total income increases by $2,000 from eliminating the division. This is because the $10,000 in lost contribution margin from the Tandem bike division is exceeded by the $12,000 savings from eliminating avoidable fixed costs.

Do More: QS 23-13, QS 23-14,E 23-8

PRICING DECISIONS

Normal Pricing

P6

Determine product selling price.

Pricing decisions are one of the more important decisions managers make. They are also one of the most difficult decisions. Managers must take concepts involving supply and demand and apply them to product or service pricing. It is important for managers to understand the setting in which they set prices.

Companies can be **price-takers** or **price-setters** or anywhere in between. The graphic to the side reflects this range and the characteristics of companies at the extremes. Price-setters have more control over setting prices, whereas price-takers have less control. Price-setters use more cost-plus pricing methods, and price-takers use more target pricing. Most companies lie in between. We describe three normal pricing methods.

Eye Symmetry Pty Ltd.

Total Cost Method *Cost-plus* methods are common when companies are price-setters. Management adds a **markup** to cost to get selling price: Selling price per unit = Cost per unit + Markup per unit. The **total cost method**, or *cost-plus pricing*, is a three-step process.

❶ Determine total cost per unit.

Total costs = Product costs + Selling, general, and administrative costs

Total cost per unit = Total costs ÷ Total units expected to be produced and sold

❷ Determine dollar markup per unit.

Markup per unit = Total cost per unit × Markup percentage

❸ Determine selling price per unit.

Selling price per unit = Total cost per unit + Markup per unit

To illustrate, a company produces headphones and it targets a 20% markup on total cost. It expects to produce and sell 10,000 headphones. The following additional information is available. page 911

Variable costs (per unit)		Fixed costs (total)	
Direct materials	$20	Overhead	$140,000
Direct labor	16	Selling, general, and administrative	60,000
Overhead	8		
Selling, general, and administrative	6		

We apply the three-step total cost method to determine selling price per unit.

❶

Product costs		
Direct materials ($20 × 10,000)	$200,000	
Direct labor ($16 × 10,000)	160,000	
Variable overhead ($8 × 10,000)	80,000	
Fixed overhead	140,000	$580,000
Selling, general and administrative costs		
Variable ($6 × 10,000)	60,000	
Fixed	60,000	120,000
Total costs		$700,000
Units to be produced and sold		÷ 10,000
Total cost per unit		**$ 70**

❷

Total cost per unit	$ 70
Markup percentage	× 20%
Markup per unit	**$ 14**

❸

Total cost per unit	$ 70
Markup per unit	14
Selling price per unit	**$84**

Target Cost Method When competition is high, companies might be price-takers and have little control in setting prices. In such cases

target costing, or *target pricing*, can be useful. Target cost is defined as

$$\text{Target cost} = \text{Expected selling price} - \text{Target profit}$$

If the target cost is too high, lean techniques can be used to determine whether the cost can be reduced enough that the target profit can be made. For example, if the expected selling price for headphones is $80 each and the company wants to make a profit of $14 per unit, it must find a way to reduce its target cost per unit to $66 ($80 price − $14 target profit).

Variable Cost Method The **variable cost method** determines price by adding a markup to variable cost. The markup is set to cover fixed costs plus target profit on top of variable cost. Three steps are needed.

① Determine markup percentage.

$$\text{Markup percentage} = \frac{\text{Target profit} + \text{Total fixed costs}}{\text{Total variable cost}}$$

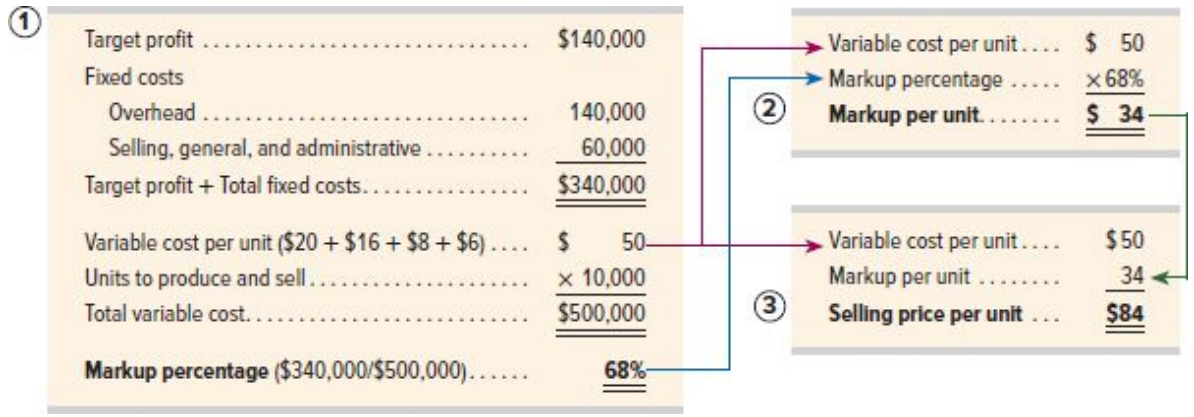
② Determine dollar markup per unit.

$$\text{Markup per unit} = \text{Variable cost per unit} \times \text{Markup percentage}$$

③ Determine selling price per unit.

$$\text{Selling price per unit} = \text{Variable cost per unit} + \text{Markup per unit}$$

To illustrate, we apply these three steps to the 10,000 page 912 headphones from the total cost example above. Assume the target profit is $140,000. Following shows the selling price is $84 per unit.



Decision Insight

Price is Right Companies use some very unique ways to set selling prices.

- **Value-based pricing** This approach determines the maximum customers will pay without reducing demand. **Starbucks** uses data analytics in setting value-based prices.
- **Auction-based pricing** This approach uses potential buyers' bid prices. **Priceline** uses electronic auctions to sell hotel rooms and airline flights.
- **Dynamic pricing** (*surge pricing*) **Uber** uses prices that vary depending on changing market conditions or customer demand. ■

Kaspars Grinvalds/Shutterstock

Special Pricing

P7

Evaluate special offer decisions.

Companies sometimes receive special offers at prices lower than their normal selling prices. We evaluate these special offers by computing their income effects. To illustrate, FasTrac produces and sells 100,000 units annually. Its per unit and annual sales and costs

are in the contribution margin income statement in Exhibit 23.12. Its normal selling price is $10.00 per unit, and each unit sold generates $2.00 per unit of income.

EXHIBIT 23.12

Contribution Margin Income Statement

Contribution Margin Income Statement

For Year Ended December 31	Per Unit	Total
Sales (100,000 units)	$10.00	$1,000,000
Variable costs		
Direct materials	3.50	350,000
Direct labor	2.20	220,000
Variable overhead	0.90	90,000
Contribution margin	3.40	340,000
Fixed costs		
Fixed overhead	0.60	60,000
Fixed general and administrative	0.80	80,000
Income	$ 2.00	$ 200,000

A new customer wants to buy 10,000 units at $8.50 each and export them to another country. The offer price is below the normal price of $10.00 per unit, but this sale would be several times larger than any single previous sale and would use idle capacity. Because the units will be exported, this new business will not affect current sales.

We focus on incremental costs to determine whether accepting the offer will increase income. The historical cost per unit is not necessarily the cost of this special order. The following information is collected.

- Variable manufacturing costs to produce this order will be the same as for its normal business—$3.50 per unit for direct materials, $2.20 per unit for direct labor, and $0.90 per unit for variable overhead.
- Fixed overhead costs will not change regardless of whether this order is accepted. Fixed overhead costs of $0.60 per unit on normal business are not relevant to this decision. page 913
- This order will incur *incremental* fixed general and administrative costs of $1,000.

Ingram Publishing/SuperStock

We prepare a contribution margin income statement covering only this special offer in Exhibit 23.13. It shows that accepting this special offer yields $18,000 of additional income. **Decision rule:** Accept the special offer if income increases (reject it if income decreases).

EXHIBIT 23.13

Special Offer Analysis

Special Offer Analysis	Per Unit	Total
Sales (10,000 units)	$ 8.50	$ 85,000
Variable costs		
Direct materials	3.50	35,000
Direct labor	2.20	22,000
Variable overhead	0.90	9,000
Contribution margin	1.90	19,000
Fixed costs		
Fixed overhead	—	—
Fixed general and administrative	0.10	1,000
Income	$1.80	$18,000

NEED-TO-KNOW 23-6

Special Pricing

P7

A company produces a single product and operates at 80% of its capacity. Costs to produce its current monthly sales of 8,000 units follow. The normal selling price is $22 per unit. A potential new customer wants to buy 1,000 units for $18 per unit. These units would be exported and not affect domestic sales. This order would require $3,000 of incremental fixed overhead and $1,000 of

incremental fixed general and administrative costs. Should management accept the special offer?

Total Costs (at 8,000 units)	Per Unit	Total
Variable costs		
Direct materials	$ 5.00	$ 40,000
Direct labor	8.00	64,000
Variable overhead	2.20	17,600
Fixed costs		
Fixed overhead	2.80	22,400
Fixed general and administrative	1.00	8,000
Total costs	$19.00	$152,000

Solution

Special Offer Analysis	Per Unit	Total
Sales (1,000 units)	$18.00	$18,000
Variable costs		
Direct materials	5.00	5,000
Direct labor	8.00	8,000
Variable overhead	2.20	2,200
Contribution margin	2.80	2,800
Fixed costs		
Fixed overhead	3.00	3,000
Fixed general and administrative	1.00	1,000
Income (loss)	$(1.20)	$(1,200)

Special offer should be rejected. The special offer would decrease income by $1,200.

Do More: QS 23-20, E 23-13, E 23-14

CORPORATE SOCIAL RESPONSIBILITY

Managers consider social responsibility in many of the decisions in this chapter. Companies that buy rather than make components must consider the labor and safety practices of suppliers. **Apple** requires its suppliers to comply with its *Supplier Code of Conduct* (**https://images.apple.com/supplier-responsibility/pdf/Apple-Supplier-Code-of-**

Conduct-January.pdf). This code details Apple's requirements with respect to antidiscrimination, antiharassment, prevention of involuntary labor and human trafficking, and other issues. In a recent report, Apple noted 97% compliance with its requirements.

Another responsible practice is to reduce waste. Poorly made surfboards that break usually end up in landfills. Max Stewart, founder of **Eye Symmetry**, uses carbon fiber "stringers" [middle pieces] in his boards. "Making the stringers by hand adds four hours to each surfboard," explains Max, "but it keeps the board from breaking in half." Max's focus on innovation is good for his customers and the environment.

Eye Symmetry Pty Ltd.

Decision Analysis — Time and Materials Pricing

A1

Determine price of services using time and materials pricing.

It is common to price services using **time and materials pricing**. With this method, companies set a price for direct labor and a price for direct materials, and each includes a charge for overhead costs and a target profit. Auto mechanics, construction companies, electricians, and accounting firms commonly use time and materials pricing. Time and materials pricing follows three steps.

1. Compute **time charge** (in $) per hour of direct labor. This includes a charge for non-materials-related overhead costs plus a target profit.
2. Compute **materials markup** (%), which includes overhead costs related to buying, storing, and handling materials, plus a target profit margin on materials' cost.

3 Estimate direct labor hours and costs, direct materials cost, and the markup to get price.

To illustrate, we use the following estimates for Erin Builders.

Direct labor rate	$40 per DLH
Non-materials-related overhead	$10 per DLH
Materials-related overhead	3% of direct materials cost
Target profit margin (on both conversion and direct materials)	22%

1 Time charge per hour of direct labor.

Direct labor rate per hour	$40
Non-materials-related overhead per hour	10
Total hourly conversion cost	50
Target profit ($50 × 22%)	11
Time charge per hour of direct labor	$61

2 Materials markup per dollar of materials cost.

Materials-related overhead	3%
Target profit margin	22%
Materials markup	25%

3 Job is estimated to use 300 direct labor hours (DLH) and $14,000 of direct materials. Time and materials pricing yields a $35,800 price in Exhibit 23.14.

EXHIBIT 23.14

Time and Materials Pricing

Time and Materials Price	
Direct labor (300 hours × $61 per DLH)	$18,300
Direct materials	14,000
Materials markup ($14,000 × 25%)	3,500
Time and materials price	**$35,800**

NEED-TO-KNOW 23-7

COMPREHENSIVE

Manager Decisions

Determine the best decision in each of the following separate situations. For each decision, assume the company has sufficient excess capacity.

Production Decisions

1. **Make or Buy**. Green Co. uses part JJ in manufacturing its products. It currently buys this part for $40 per unit. Making the part would require direct materials of $11 per unit and direct labor of $15 per unit (1 direct labor hour per unit). Green normally applies overhead using a predetermined overhead rate of $30 per direct labor hour. Making the part would require incremental overhead of $17 per direct labor hour. Should Green make or buy the part?

page 915

2. **Sell or Process**. Gold Co. makes a product that can be either sold as is or processed further. The company has already spent $75,000 to produce 10,000 units that can be sold as is for $100,000. Instead, the units can be processed further at a cost of $80,000, and then sold for $220,000. Should Gold sell the 10,000 units as is or process them further?

3. **Scrap or Rework**. Packer Co. has already spent $90,000 to produce 1,200 defective earbuds. A salvage company will buy the earbuds as is for $66,000. Instead, Packer can rework the earbuds for $30,000 and sell them for $120,000. Should Packer scrap or rework the earbuds?

4. **Sales Mix**. Champ Co. can sell all units of both types of scooters it produces, but it has capacity of only 900 machine hours. The Edge model uses two machine hours per unit and the Razz model uses three machine hours per unit. Selling prices and variable costs per unit follow. Compute the contribution margin per machine hour for each product and then determine the best sales mix.

Product Models	Edge	Razz
Selling price per unit.	$150	$180
Variable costs per unit	100	120

Capacity Decisions

5. **Segment Elimination**. Badger Co. is considering eliminating its snowboard division as it shows a $5,000 loss for the year (see below). All its variable costs are avoidable, and $25,000 of its fixed costs are avoidable. Compute the income increase or decrease from eliminating this segment. Should the division be eliminated?

Segment Results	Snowboard
Sales	$98,000
Variable costs	75,000
Contribution margin	23,000
Fixed costs	28,000
Income (loss)	$ (5,000)

6. **Keep or Replace**. Buckeye Inc. has an old machine with a book value of $95,000 and a remaining five-year useful life. Buckeye can sell this old machine today for $70,000. The old machine has variable manufacturing costs of $26,000 per year. A new machine can be purchased for $115,000. The new machine would reduce variable manufacturing costs by $16,000 per year over its five-year useful life. Should Buckeye keep or replace the old machine?

Pricing Decisions

7. **Total Cost Pricing**. LA Surf sells surfboards. Each surfboard requires direct materials of $55, direct labor of $35, variable overhead of $20, and variable selling, general, and administrative costs of $20. Fixed overhead costs are $90,000 per year and fixed selling, general, and administrative costs are $120,000 per year. The company plans to produce and sell 1,000 surfboards in the next year. Compute the selling price per unit if LA Surf uses a markup of 20% of total cost.

8. **Special Offer Pricing**. Marlin Co. produces and sells fishing rods for $35 each. Per unit costs follow. A foreign company has

offered to buy 10,000 units at $22 each. If Marlin accepts this special offer, it will incur $2,000 of incremental fixed overhead costs and $5,000 of incremental fixed general and administrative costs. Should Marlin accept the special offer?

Total Costs	Per Unit
Variable costs	
Direct materials	$ 8.00
Direct labor	7.00
Variable overhead	1.50
Fixed costs	
Fixed overhead	2.00
Fixed general and administrative	1.00
Total costs	$19.50

SOLUTION

page 916

1. Make or Buy Decision

Make or Buy Analysis	Make	Buy
Direct materials	$11	—
Direct labor	15	—
Overhead (incremental)	17	—
Cost to buy	—	$40
Cost per unit	$43	$40
Decision: Cost savings to Buy		$3

Buy the part as there is an incremental cost savings of $3 per unit.

2. Sell or Process Further Decision

Sell or Process Analysis	Sell As Is	Process Further
Revenue	$100,000	$220,000
Cost	—	80,000
Income	$100,000	$140,000
Decision: Incremental income to Process Further		$40,000

Process further and earn incremental income of $40,000.

3. Scrap or Rework Decision

Scrap or Rework Analysis	Scrap	Rework
Revenue from scrapped/reworked units	$66,000	$120,000
Cost of reworked units	—	30,000
Income	$66,000	$ 90,000
Decision: Incremental Income to Rework	$24,000	

Rework the units and earn incremental income of $24,000.

4. Sales Mix Decision

Product Contribution margin	Edge	Razz
Selling price per unit	$150	$180
Variable costs per unit	100	120
Contribution margin per unit	$ 50	$ 60
Machine hours per unit	2 hrs.	3 hrs.
Contribution margin per machine hour	$ 25 ($50/2hrs.)	$ 20 ($60/3 hrs.)

With unlimited demand, only make the Edge.
Sales mix and resulting contribution margin follow.

Sales Mix with Unlimited Demand	Contribution Margin	Machine Hours Used
Edge (450 units × $50 per unit)	$22,500	900
Razz (0 units)	0	0
Total	$22,500	900

5. Segment Elimination Decision

Segment Elimination Analysis	Continue	Eliminate	Income Increase (Decrease)
Sales	$98,000	$ 0	
Variable costs	75,000	0	
Contribution margin	23,000	0	
Fixed costs	28,000	3,000	
Income (loss)	$ (5,000)	$(3,000)	$2,000

Eliminate the segment and increase income by $2,000.

6. Keep or Replace Decision

Keep or Replace Analysis	Keep	Replace	Income Increase (Decrease)
Revenues			
Sale of existing machine		$ 70,000	
Costs			
Purchase of new machine		(115,000)	
Variable manufacturing costs	$(130,000)*	(50,000)†	
Income (loss)	$(130,000)	$ (95,000)	$35,000

*$26,000 × 5 years †$10,000 × 5 years

Replace the machine and increase income by $35,000.

7. Total Cost Pricing Decision

1

Product costs		
Direct materials ($55 × 1,000)	$ 55,000	
Direct labor ($35 × 1,000)	35,000	
Variable overhead ($20 × 1,000)	20,000	
Fixed overhead	90,000	$200,000
Selling, general, and administrative costs		
Variable ($20 × 1,000)	20,000	
Fixed	120,000	140,000
Total costs		$340,000
Units to be produced and sold		÷ 1,000
Total cost per unit		$ 340

2

Total cost per unit	$ 340
Markup percentage	× 20%
Markup per unit	$ 68

3

Total cost per unit	$340
Markup per unit	68
Selling price per unit	**$408**

Set the selling price at $408 per unit.

8. Special Offer Pricing Decision

Special Offer Analysis	Per Unit	Total
Sales (10,000 units)	$22.00	$220,000
Variable costs		
Direct materials	8.00	80,000
Direct labor	7.00	70,000
Variable overhead	1.50	15,000
Contribution margin	5.50	55,000
Fixed costs		
Fixed overhead	0.20	2,000
Fixed general and administrative	0.50	5,000
Income	$ 4.80	$ 48,000

Accept the special offer as it increases income by $48,000.

Summary: Cheat Sheet

DECISIONS AND INFORMATION

Revenues and Costs	Relevant?
Incremental revenue: Additional revenues from a decision.	Yes
Incremental cost: Additional costs from a decision.	Yes
Incremental income: Income difference across alternatives.	Yes
Sunk cost: From a past decision and cannot be changed.	No
Out-of-pocket cost: Future outlay of cash.	Yes
Opportunity cost: Potential benefit lost from taking an action when alternatives exist.	Yes

PRODUCTION DECISIONS

Make or Buy

Select action with lower cost.

Make or Buy Analysis	Make	Buy
Direct materials	$0.35	—
Direct labor	0.50	—
Overhead (incremental only)	0.20	—
Cost to buy	—	$1.20
Cost per unit	$1.05	$1.20
Decision: Cost savings to Make	$0.15	

Sell or Process

Select action with higher income.

Sell or Process Analysis	Sell As Is	Process Further
Revenue	$50,000	$150,000
Cost	—	80,000
Income	$50,000	$ 70,000
Decision: Incremental Income to Process Further	$20,000	

Scrap or Rework

Select action with higher income.

Scrap or Rework Analysis	Scrap	Rework
Revenue from scrapped/reworked units	$ 4,000	$15,000
Cost of reworked units		8,000
Income	$4,000	$ 7,000
Decision: Incremental Income to Rework	$3,000	

Sales Mix

Product Contribution Margin	Pro	Max
Selling price per unit	$500	$750
Variable costs per unit	350	550
Contribution margin per unit	$150	$200
Machine hours per unit	1 hr.	2 hrs.
Contribution margin per machine hour	$150 ($150/1 hr.)	$100 ($200/2 hrs.)

Unlimited Demand: Produce product with highest contribution margin per unit of scarce resource

Sales Mix with Unlimited Demand	Contribution Margin	Machine Hours Used
Pro (2,000 units × $150 per unit)	$300,000	2,000
Max (0 units)	0	0
Total	$300,000	2,000

Limited Demand: Produce product with highest contribution margin per unit of scarce resource up to its total demand. Then produce the product with next highest contribution margin, and so forth.

Sales Mix with Limited Demand	Contribution Margin	Machine Hours Used
Pro (1,200 units × $150 per unit)	$180,000	1,200
Max (400 units × $200 per unit)	80,000	800
Total	$260,000	2,000

CAPACITY DECISIONS

Segment Elimination

Eliminate if total income increases; continue segment if total income decreases after segment elimination.

Segment Elimination Analysis	Continue	Eliminate	Income Increase (Decrease)
Sales	$ 40,000	$ 0	
Variable costs	35,000	0	
Contribution margin	5,000	0	
Fixed costs	15,000	11,000	
Income (loss)	$(10,000)	$(11,000)	$(1,000)

Keep or Replace

Replace if income increases; keep asset if income decreases.

Keep or Replace Analysis	Keep	Replace	Income Increase (Decrease)
Revenues			
Sale of existing machine		$ 25,000	
Costs			
Purchase of new machine		(100,000)	
Variable manufacturing costs	$(250,000)†	(180,000)‡	
Income (loss)	$(250,000)	$(255,000)	$(5,000)

†$50,000 × 5 years ‡$36,000 × 5 years

PRICING DECISIONS

Normal Pricing Price must cover all costs plus provide a profit

Total cost

$$\text{Price per unit} = \text{Total cost per unit} + \text{Markup per unit}$$

where Markup per unit = Total cost per unit × Markup percentage

Target cost

$$\text{Target cost} = \text{Expected selling price} - \text{Target profit}$$

Variable cost

$$\text{Price per unit} = \text{Variable cost per unit} + \text{Markup per}$$

where Markup per unit = Variable cost per unit × Markup percentage

Special Offer Pricing

Accept special offer if its income is positive.

Time and Materials Pricing

$$\text{Price} = \text{Direct labor} + \text{Direct materials} + \text{Materials markup}$$

where Direct labor = DLH × Time charge per DLH; Materials markup = Direct materials × Materials markup %

Key Terms

Auction-based pricing (912)

Avoidable cost (908)

Dynamic pricing (912)

Incremental cost (904)

Incremental income (904)

Incremental revenue (903)

Markup (910)

Materials markup (914)

Outsourcing (904)

Price-setter (910)

Price-taker (910)

Time and materials pricing (914)

Time charge (914)

Total cost method (910)

Unavoidable cost (908)

Value-based pricing (912)

Multiple Choice Quiz

1. A cost that cannot be changed because it arises from a past decision and is irrelevant to future decisions is
   - **a.** An uncontrollable cost.
   - **b.** An out-of-pocket cost.
   - **c.** A sunk cost.
   - **d.** An opportunity cost.
   - **e.** An incremental cost.
2. The potential benefit of one alternative that is lost by choosing another is known as
   - **a.** An alternative cost.
   - **b.** A sunk cost.
   - **c.** A differential cost.
   - **d.** An opportunity cost.
   - **e.** An out-of-pocket cost.
3. A company produced 3,000 defective music players. The players cost $12 each to produce. A recycler offers to purchase the defective players “as is” for $8 each. The defects can be reworked for $10 each and the players then sold at their regular market price of $19 each. The company should
   - **a.** Rework the players and sell at the regular price.
   - **b.** Sell the players to the recycler for $8 each.

c. Sell 2,000 to the recycler and rework the rest.

d. Sell 1,000 to the recycler and rework the rest.

e. Throw the defective players away.

4. A company's productive capacity is 480,000 machine hours. Product X requires 10 machine hours to produce; Product Y requires 2 machine hours to produce. Product X sells for $32 per unit and has variable costs of $12 per unit; Product Y sells for $24 per unit and has variable costs of $10 per unit. Assuming that the company can sell as many of either product as it produces, it should

a. Produce 48,000 units of Product X.

b. Produce X and Y in the ratio of 83% X and 17% Y.

c. Produce two of Product X for every one of Product Y.

d. Produce only Product X.

e. Produce only Product Y.

5. A company receives a special one-time order for 3,000 units of its product at $15 per unit. The company has excess capacity and it currently produces and sells the units at $20 each to its regular customers. Production costs are $13.50 per unit, which includes $9 of variable costs. To produce the special order, the company must incur additional fixed costs of $5,000. Should the company accept the special order?

a. Yes, as revenue exceeds costs.

b. No, as costs exceed revenue.

c. No, as the offer is $5 less than the regular price.

d. Yes, as costs exceed revenue.

e. No, because costs exceed $15 per unit when total costs are considered.

ANSWERS TO MULTIPLE CHOICE QUIZ

1. c

2. d

3. a; Reworking provides revenue of $11 per unit ($19 − $8); it costs $10 to rework them. The company is better off by $1 per unit when it reworks and sells these players.

4. e; Product X has a $2 contribution margin per machine hour [($32 − $12)/10 MH]; Product Y has a $7 contribution margin per machine hour [($24 − $10)/2 MH]. It should produce as much of Product Y as possible.

5. a; Revenue = 3,000 units × $15 per unit = $45,000;

   Costs = (3,000 units × $9 per unit) + $5,000 = $32,000.

   Income = $45,000 − $32,000 = $13,000. Accept order.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect.Hints use different numbers, and instructors can turn this feature on or off.

connect

QUICK STUDY

QS 23-1

Identifying relevant costs

C1

Helix Company is approached by a new customer to provide 2,000 units of its product at a special price of $6 per unit. The normal selling price of the product is $8 per unit. Helix is operating at 75% of its capacity of 10,000 units. No incremental fixed overhead will be incurred because of this order. Also, there will be no incremental fixed general and administrative costs because of this order. Identify whether each of the following is relevant or not relevant to accepting this order.

Item	Relevant	Not Relevant
a. Special selling price of $6.00 per unit	_____	_____
b. Direct materials of $1.00 per unit	_____	_____
c. Direct labor of $2.00 per unit	_____	_____
d. Variable overhead of $1.50 per unit	_____	_____
e. Fixed overhead of $0.75 per unit	_____	_____
f. Fixed general and administrative costs of $0.60 per unit	_____	_____

QS 23-2

Special offer **P7**

Refer to the information in QS 23-1. Based on income, should Helix accept this new customer order at the special price?

QS 23-3

Identifying relevant costs

C1

Zycon has produced 10,000 units of raw milk at a $15,000 cost. These units can be sold as is to another manufacturer for $20,000. Instead, Zycon can process the units further and produce yogurt. Processing further will cost an additional $22,000 and will yield revenues of $35,000. Identify whether each of the following is relevant or not relevant to the sell or process further decision.

Item	Relevant	Not Relevant
a. $15,000 cost already incurred to produce milk	_____	_____
b. $20,000 selling price for milk as is	_____	_____
c. $22,000 further processing costs	_____	_____
d. $35,000 revenue from further processing	_____	_____

QS 23-4

Identifying sunk and relevant costs

C1

For these two separate cases, identify each item as a sunk cost, a relevant cost, or a relevant revenue.

1. A company is considering replacing an old machine. The old machine has a book value of $50,000 and a remaining five-year life. The old machine can be sold now for $55,000. The new machine can be purchased for $100,000.

Item	Sunk cost	Relevant cost	Relevant revenue
$50,000 book value of old machine	_____	_____	_____
$55,000 selling price of old machine	_____	_____	_____
$100,000 price of new machine	_____	_____	_____

2. A company spent $2,000 to make shirts. Customer tastes have changed and the shirts cannot be sold for their normal price. The shirts can be sold as is to another manufacturer to make into rags for $1,000. Instead, the company can spend $6,000 to rework the shirts with different designs. The reworked shirts can be sold for $10,000.

Item	Sunk cost	Relevant cost	Relevant revenue
$2,000 already spent to make shirts.	_____	_____	_____
$6,000 cost to rework shirts	_____	_____	_____
$10,000 selling price of reworked shirts	_____	_____	_____

QS 23-5

Make or buy

P1

Kando Company currently pays $7 per unit to buy a part for a product it manufactures. Instead, Kando could make the part for per unit costs of $3 for direct materials, $2 for direct labor, and $1 for incremental overhead. Kando normally applies overhead costs using a predetermined rate of 200% of direct labor cost. (*a*) Prepare a make or buy analysis of costs for this part. (*b*) Should Kando make or buy the part?

QS 23-6

Make or buy

P1

Maya Co. currently buys a component part for $3 per unit. Maya estimates that making the part would require $2.25 per unit of direct materials and $1.00 per unit of direct labor. Maya normally applies overhead using a predetermined overhead rate of 125% of direct labor cost. Maya estimates incremental overhead of $0.75 per unit to make the part. (*a*) Prepare a make or buy analysis of costs for this part. (*b*) Should Maya make or buy the part?

QS 23-7

Sell or process

P2

Holmes Company has already spent $50,000 to harvest peanuts. Those peanuts can be sold as is for $67,500. Alternatively, Holmes can process further into peanut butter at an additional cost of $312,500. If Holmes processes further, the peanut butter can be sold for $468,750. (*a*) Prepare a sell as is or process further analysis of income effects. (*b*) Should Holmes sell as is or process further?

QS 23-8

Sell or process **P2**

A company has already spent $5,000 to harvest tomatoes. The tomatoes can be sold as is for $90,000. Instead, the company could incur further processing costs of $48,000 and sell the resulting salsa for $126,000. (*a*) Prepare a sell as is or process further analysis of income effects. (*b*) Should the company sell as is or process further?

QS 23-9

Scrap or rework

P2

Garcia Company has 10,000 units of its product that were produced at a cost of $150,000. The units were damaged in a rainstorm. Garcia can sell the units as scrap for $20,000, or it can rework the units at a cost of $38,000 and then sell them for $50,000. (*a*) Prepare a scrap or rework analysis of income effects. (*b*) Should Garcia sell the units as scrap or rework them and then sell them?

QS 23-10

Scrap or rework

P2

Rosa Company produced 1,000 defective phones due to a production error. The phones had cost $60,000 to produce. A salvage company will buy the defective phones as scrap for $30,000. It would cost Rosa $80,000 to rework the phones. If the phones are reworked, Rosa could sell them for $120,000. (*a*) Prepare a scrap or rework analysis of income effects. (*b*) Should Rosa scrap or rework the phones?

QS 23-11

Product contribution margin analysis

P3

Estela Company produces skateboards and scooters. Their per unit selling prices and variable costs follow. Skateboards require 2 machine hours per unit. Scooters require 3 machine hours per unit. For each product, compute (*a*) contribution margin per unit and (*b*) contribution margin per machine hour.

	Skateboards	Scooters
Selling price per unit.	$200	$400
Variable costs per unit	120	310

QS 23-12

Sales mix analysis

P3

Surf Company can sell all of the two surfboard models it produces, but it has only 400 direct labor hours available. The Glide model requires 2 direct labor hours per unit. The Ultra model requires 4 direct labor hours per unit. Contribution margin per unit is $200 for Glide and $300 for Ultra. (*a*) Compute the contribution margin per direct labor hour for each product. (*b*) Determine the best sales mix and the resulting contribution margin.

QS 23-13

Segment elimination

P4

A manufacturer is considering eliminating a segment because it shows the following $6,000 loss. All $20,000 of its variable costs are avoidable, and $36,000 of its fixed costs are avoidable. (*a*) Compute the income increase or decrease from eliminating this segment. (*b*) Should the segment be eliminated?

Segment Income (Loss)	
Sales	$60,000
Variable costs	20,000
Contribution margin	40,000
Fixed costs	46,000
Income (loss)	$ (6,000)

QS 23-14

Segment elimination

P4

A segment of a company reports the following loss for the year. All $140,000 of its variable costs are avoidable, and $75,000 of its fixed

costs are avoidable. (*a*) Compute the income increase or decrease from eliminating this segment. (*b*) Should the segment be eliminated?

Segment Income (Loss)	
Sales	$200,000
Variable costs	140,000
Contribution margin	60,000
Fixed costs	80,000
Income (loss)	$ (20,000)

QS 23-15

Keep or replace

P5

Rory Company has an old machine with a book value of $75,000 and a remaining five-year useful life. Rory is considering purchasing a new machine at a price of $90,000. Rory can sell its old machine now for $60,000. The old machine has variable manufacturing costs of $33,000 per year. The new machine will reduce variable manufacturing costs by $13,000 per year over its five-year useful life. (*a*) Prepare a keep or replace analysis of income effects for the machines. (*b*) Should the old machine be replaced?

QS 23-16

Pricing using total cost **P6**

Garcia Co. sells snowboards. Each snowboard requires direct materials of $100, direct labor of $30, variable overhead of $45, and variable selling, general, and administrative costs of $3. The company has fixed overhead costs of $635,000 and fixed selling, general, and administrative costs of $85,000. It expects to produce and sell 10,000 snowboards. What is the selling price per unit if Garcia uses a markup of 20% of total cost?

QS 23-17

Pricing using total cost **P6**

José Ruiz starts a company that makes handcrafted birdhouses. Competitors sell a similar birdhouse for $245 each. José believes he can produce a birdhouse for a total cost of $200 per unit, and he plans a 25% markup on total cost. (*a*) Compute José's planned selling price. (*b*) Is José's price lower than competitors' price?

QS 23-18

Pricing using variable cost

P6

GoSnow sells snowboards. Each snowboard requires direct materials of $110, direct labor of $35, variable overhead of $45, and variable selling, general, and administrative costs of $10. The company has fixed overhead costs of $265,000 and fixed selling, general, and administrative costs of $335,000. The company has a target profit of $200,000. It expects to produce and sell 10,000 snowboards. Compute the selling price per unit using the variable cost method.

QS 23-19

Pricing using target cost **P6**

Raju is in a competitive product market. The expected selling price is $80 per unit, and Raju's target profit is 20% of selling price. Using the target cost method, what is the highest Raju's cost per unit can be?

QS 23-20

Special offer pricing

P7

Radar Company sells bikes for $300 each. The company currently sells 3,750 bikes per year and could make as many as 5,000 bikes per year. The bikes cost $225 each to make: $150 in variable costs per bike and $75 of fixed costs per bike. Radar receives an offer from a potential customer who wants to buy 750 bikes for $250 each.

Incremental fixed costs to make this order are $60 per bike. No other costs will change if this order is accepted. (*a*) Compute the income for the special offer. (*b*) Should Radar accept this offer?

QS 23-21

Time and materials pricing **A1**

Meng uses time and materials pricing. Its time charge per hour of direct labor is $55. Its materials markup is 30%. What price should Meng quote for a job that will take 80 direct labor hours and use $3,800 of direct materials?

QS 23-22

Time and materials pricing

A1

Cheng Co. reports the following information. Determine its (*a*) time charge per hour of direct labor and (*b*) materials markup percentage.

Direct labor rate	$50 per DLH
Non-materials-related overhead	$30 per DLH
Materials-related overhead	7% of direct materials costs
Target profit margin (on both conversion and direct materials)	30%

EXERCISES

Exercise 23-1

Make or buy

P1

Beto Company pays $2.50 per unit to buy a part for one of the products it manufactures. With excess capacity, the company is considering making the part. Making the part would cost $1.20 per unit for direct materials and $1.00 per unit for direct labor. The company normally applies overhead at the predetermined rate of

200% of direct labor cost. Incremental overhead to make the part would be 80% of direct labor cost. (*a*) Prepare a make or buy analysis of costs for this part. (*b*) Should Gilberto make or buy the part?

Exercise 23-2

Make or buy

P1

Gelb Co. currently makes a key part for its main product. Making this part incurs per unit variable costs of $1.20 for direct materials and $0.75 for direct labor. Incremental overhead to make this part is $1.40 per unit. The company can buy the part for $3.50 per unit. (*a*) Prepare a make or buy analysis of costs for this part. (*b*) Should Gelb make or buy the part?

Exercise 23-3

Sell or process

P2

Cobe Co. has manufactured 200 partially finished cabinets at a cost of $50,000. These can be sold as is for $60,000. Instead, the cabinets can be stained and fitted with hardware to make finished cabinets. Further processing costs would be $12,000, and the finished cabinets could be sold for $80,000. (*a*) Prepare a sell as is or process further analysis of income effects. (*b*) Should the cabinets be sold as is or processed further and then sold?

Exercise 23-4

Scrap or rework

P2

A company must decide between scrapping or reworking units that do not pass inspection. The company has 22,000 defective units that have already cost $132,000 to manufacture. The units can be sold as

scrap for $78,000 or reworked for $99,000 and then sold for $187,000. (*a*) Prepare a scrap or rework analysis of income effects. (*b*) Should the company sell the units as scrap or rework them?

Exercise 23-5

Sell or process

P2

Varto Company has 7,000 units of its product in inventory that it produced last year at a cost of $154,000. This year's model is better than last year's, and the 7,000 units cannot be sold at last year's normal selling price of $35 each. Varto has two alternatives for these units: (1) They can be sold as is to a wholesaler for $56,000 or (2) they can be processed further at an additional cost of $125,000 and then sold for $175,000. (*a*) Prepare a sell as is or process further analysis of income effects. (*b*) Should Varto sell the products as is or process further and then sell them?

Exercise 23-6

Sales mix

P3

Colt Company produces two skateboard models. Machine time per unit for Hero is two hours and for Flip is one hour. The machine's capacity is 1,600 hours per year. Colt can sell up to 500 units of Hero and 900 units of Flip per year. Selling prices and variable costs follow. (*a*) Compute the contribution margin per machine hour for each product. (*b*) Determine the best sales mix of products. (*c*) Compute the total contribution margin for the best sales mix.

	Hero	Flip
Selling price per unit	$150	$95
Variable costs per unit	50	55

Exercise 23-7

Sales mix

P3

Chip Company produces three products, Kin, Ike, and Bix. Each product uses the same direct material. Kin uses 4 pounds of the material, Ike uses 3 pounds of the material, and Bix uses 6 pounds of the material. Selling price per unit and variable costs per unit of each product follow. (*a*) Compute contribution margin per pound of material for each product. (*b*) If demand is limited, list the three products in the order in which management should produce and meet demand.

	Kin	Ike	Bix
Selling price per unit	$160	$112	$210
Variable costs per unit	96	85	144

Exercise 23-8

Segment elimination

P4

Marin Company makes several products, including canoes. The company reports a loss from its canoe segment (see below). All its variable costs are avoidable, and $300,000 of its fixed costs are avoidable. (*a*) Compute the income increase or decrease from eliminating this segment. (*b*) Should the segment be eliminated?

Segment Income (Loss)	
Sales	$980,000
Variable costs	700,000
Contribution margin	280,000
Fixed costs	340,000
Income (loss)	$ (60,000)

Exercise 23-9

Segment elimination

P4

Suresh Co. reports the following segment (department) income results for the year.

	Dept. M	Dept. N	Dept. O	Dept. P	Dept. T	Total
Sales	$63,000	$ 35,000	$56,000	$42,000	$ 28,000	$224,000
Expenses						
Avoidable	9,800	36,400	22,400	14,000	37,800	120,400
Unavoidable	51,800	12,600	4,200	29,400	9,800	107,800
Total expenses	61,600	49,000	26,600	43,400	47,600	228,200
Income (loss)	$ 1,400	$(14,000)	$29,400	$ (1,400)	$(19,600)	$ (4,200)

a. If the company plans to eliminate departments that have sales less than avoidable costs, which department(s) would be eliminated?

b. Compute the total increase in income if the departments with sales less than avoidable costs, as identified in part *a*, are eliminated.

Exercise 23-10

Keep or replace

P5

Lopez Co. is considering replacing one of its old manufacturing machines. The old machine has a book value of $45,000 and a remaining useful life of five years. It can be sold now for $52,000. Variable manufacturing costs are $36,000 per year for this old machine. Information on two alternative replacement machines follows. The expected useful life of each replacement machine is five years. (*a*) Compute the income increase or decrease from replacing the old machine with Machine A. (*b*) Compute the income increase or decrease from replacing the old machine with Machine B. (*c*) Should Lopez keep or replace its old machine? (*d*) If the machine should be replaced, which new machine should Lopez purchase?

	Machine A	Machine B
Purchase price	$115,000	$125,000
Variable manufacturing costs per year	19,000	15,000

Exercise 23-11

Pricing using total costs

P6

Skull Co. makes snowboards and uses the total cost method in setting product price. Its costs for producing 10,000 units follow. The company targets a 12.5% markup on total cost.

Variable Costs per Unit	
Direct materials	$100
Direct labor	25
Overhead	20
Selling, general and administrative	5

Fixed Costs (total)	
Overhead	$470,000
Selling, general and administrative	430,000

1. Compute the total cost per unit if 10,000 units are produced.
2. Compute the dollar markup per unit.
3. Compute the selling price per unit.

Exercise 23-12

Pricing using variable costs

P6

Rios Co. makes drones and uses the variable cost method in setting product price. Its costs for producing 20,000 units follow. The company targets a profit of $300,000 on this product.

Variable Costs per Unit	
Direct materials	$70
Direct labor	40
Overhead	25
Selling, general and administrative	15

Fixed Costs (total)	
Overhead	$670,000
Selling, general and administrative	590,000

1. Compute the total variable cost and the markup percentage.
2. Compute the dollar markup per unit on variable cost.
3. Compute the selling price per unit.

Exercise 23-13

Special offer pricing

P7

Farrow Co. reports the following annual results. The company receives a special offer for 15,000 units at $12 per unit. The additional sales would not affect its normal sales. Variable costs per unit would be the same for the special offer as they are for the normal units. The special offer would require incremental fixed overhead of $60,000 and incremental fixed general and administrative costs of $4,500. (*a*) Compute the income for the special offer. (*b*) Should the company accept the special offer?

Contribution Margin Income Statement	Per Unit	Annual Total
Sales (150,000 units)	$15.00	$2,250,000
Variable costs		
Direct materials	2.00	300,000
Direct labor	4.00	600,000
Overhead	2.50	375,000
Contribution margin	6.50	975,000
Fixed costs		
Fixed overhead	2.00	300,000
Fixed general and administrative	1.50	225,000
Income	$ 3.00	$ 450,000

Exercise 23-14

Special offer pricing

P7

Pardo Company produces a single product and has capacity to produce 120,000 units per month. Costs to produce its current monthly sales of 80,000 units follow. The normal selling price of the product is $100 per unit. A new customer offers to purchase 20,000 units for $75 per unit. If the special offer is accepted, there will be no additional fixed overhead and no additional fixed general and administrative costs. The special offer would not affect its normal

sales. (*a*) Compute the income from the special offer. (*b*) Should the company accept the special offer?

	Per Unit	Costs at 80,000 Units
Direct materials	$12.50	$1,000,000
Direct labor	29.00	2,320,000
Variable overhead	10.00	800,000
Fixed overhead	17.50	1,400,000
Fixed general and administrative	13.00	1,040,000
Totals	$82.00	$6,560,000

Exercise 23-15

Time and materials pricing

A1

HH Electric reports the following information.

Direct labor rate	$30 per DLH
Non-materials-related overhead	$15 per DLH
Materials-related overhead	5% of direct materials cost
Target profit margin (on both conversion and direct materials)	20%

a. Compute the time charge per hour of direct labor.

b. Compute the materials markup percentage.

c. What price should the company quote for a job requiring four direct labor hours and $580 in materials?

PROBLEM SET A

Problem 23-1A

Make or buy

P1

Haver Company currently pays an outside supplier $15 per unit for a part for one of its products. Haver is considering two alternative methods of making the part. Method 1 for making the part would require direct materials of $5 per unit, direct labor of $8 per unit, and incremental overhead of $3 per unit. Method 2 for making the part would require direct materials of $5 per unit, direct labor of $2 per unit, and incremental overhead of $7 per unit.

Required

1. Compute the cost per unit for each alternative method of making the part.
2. Should Haver make or buy the part? If Haver makes the part, which production method should it use?

Problem 23-2A

Scrap or rework

P2

Hip Manufacturing produces denim clothing. This year it produced 3,000 denim jackets at a cost of $90,000. These jackets were damaged in the warehouse during storage. Management identified three alternatives for these jackets.

1. Jackets can be sold as scrap to a secondhand clothing shop for $18,000.
2. Jackets can be disassembled at a cost of $6,000 and sold to a recycler for $36,000.
3. Jackets can be reworked and turned into good jackets. The cost of reworking the jackets will be $102,000, and the jackets can then be sold for $135,000.

Required

(1) Compute the income for each alternative. (2) Which alternative should be chosen?

Problem 23-3A

Sales mix strategies

P3

Edge Company produces two models of its product with the same machine. The machine has a capacity of 176 hours per month. The following information is available.

	Standard	Deluxe
Selling price per unit	$120	$160
Variable costs per unit	40	90
Contribution margin per unit	$ 80	$ 70
Machine hours per unit	1 hour	2 hours
Maximum unit sales per month	600 units	200 units

Required

1. Determine the contribution margin per machine hour for each model.
2. How many units of each model should the company produce? How much total contribution margin does this mix produce per month?
3. Assume the maximum demand for the Standard model is 100 units (not 600 units). How many units of each model should the company produce? How much total contribution margin does this mix produce per month?

Problem 23-4A

Pricing using total cost, target cost, and variable cost

P6

Techcom is designing a new smartphone. Each unit of this new phone will require $230 of direct materials; $10 of direct labor; $22 of variable overhead; $18 of variable selling, general, and administrative costs; $30 of fixed overhead costs; and $10 of fixed selling, general, and administrative costs.

1. Compute the selling price per unit if the company uses the total cost method and plans a markup of 180% of total costs.

2. The company is a price-taker and the expected selling price for this type of phone is $800 per unit. Compute the target cost per unit if the company's target profit is 60% of expected selling price.
3. Compute the selling price per unit if the company uses the variable cost method and plans a markup of 200% of variable costs.

Problem 23-5A

Special offer pricing

P7

JART manufactures and sells underwater markers. Its contribution margin income statement follows.

Contribution Margin Income Statement For Year Ended December 31	Per Unit	Annual Total
Sales (400,000 units)	$6.00	$2,400,000
Variable costs		
Direct materials	1.44	576,000
Direct labor	0.36	144,000
Variable overhead	0.60	240,000
Contribution margin	3.60	1,440,000
Fixed costs		
Fixed overhead	0.20	80,000
Fixed general and administrative	0.15	60,000
Income	$3.25	$1,300,000

A potential customer offers to buy 50,000 units for $3.20 each. These sales would not affect the company's sales through its normal channels. Details about the special offer follow.

- Direct materials cost per unit and variable overhead cost per unit would not change.
- Direct labor cost per unit would be $0.54 because the offer would require overtime pay.
- Accepting the offer would require incremental fixed general and administrative costs of $5,000.

- Accepting the offer would require no incremental fixed overhead costs.

Required

1. Compute income from the special offer.
2. Should the company accept or reject the special offer?

Problem 23-6A

Special offer pricing

P7

FURY produces and sells skateboards. Its contribution margin income statement follows.

Contribution Margin Income Statement For Year Ended December 31	Per Unit	Annual Total
Sales (80,000 units)	$50.00	$4,000,000
Variable costs		
Direct materials	20.00	1,600,000
Direct labor	8.00	640,000
Variable overhead	12.00	960,000
Contribution margin	10.00	800,000
Fixed costs		
Fixed overhead	3.00	240,000
Fixed general and administrative	2.00	160,000
Income	$ 5.00	$ 400,000

A potential customer offers to buy 10,000 units for $42.00 each. These sales would not affect the company's sales through its normal channels. Details of the special offer follow.

- Variable costs per unit would not change.
- Accepting the offer would require incremental fixed overhead costs of $10,000.
- Accepting the offer would require incremental fixed general and administrative costs of $15,000.

Required

1. Compute income from the special offer.
2. Should the company accept or reject the special offer?

PROBLEM SET B

Problem 23-1B

Make or buy

P1

Alto Company currently pays an outside supplier $4.50 per unit for a part for one of its products. Alto is considering two alternative methods of making the part. Method 1 of making the part would require direct materials of $1.20 per unit, direct labor of $1.50 per unit, and incremental overhead of $2 per unit. Method 2 of making the part would require direct materials of $1.20 per unit, direct labor of $1 per unit, and incremental overhead of $2.75 per unit.

Required

1. Compute the cost per unit for each alternative method of making the part.
2. Should Alto make or buy the part? If Alto makes the part, which production method should it use?

Problem 23-2B

Scrap or rework

P2

Micron Manufacturing produces telescopes. This month it produced 50 telescopes at a cost of $9,000. These telescopes were damaged in storage. Management has identified three alternatives for these telescopes.

1. They can be sold as scrap to a wholesaler for $3,750.

2. They can be disassembled at a cost of $2,000 and the parts sold to a recycler for $6,500.
3. They can be reworked and turned into good units. The cost of reworking the units will be $3,600, after which the units can be sold for $25,000.

Required

(1) Compute the income for each alternative. (2) Which alternative should management select?

Problem 23-3B

Sales mix strategies

P3

Sung Company produces two models of its product with the same machine. The machine has a capacity of 200 hours per month. The following information is available.

	Standard	Pro
Selling price per unit	$60	$80
Variable costs per unit	20	30
Contribution margin per unit	$40	$50
Machine hours per unit	1 hour	2 hours
Maximum unit sales per month	550 units	175 units

Required

1. Determine the contribution margin per machine hour for each model.
2. How many units of each model should the company produce? How much total contribution margin does this mix produce per month?
3. Assume the maximum demand for the Standard model is 180 units (not 550 units). How many units of each model should the company produce? How much total contribution margin does this mix produce per month?

Problem 23-4B

Pricing using total cost, target cost, and variable cost **P6**

ComPro is designing a new smartphone. Each unit of this new phone will require $285 of direct materials; $10 of direct labor; $30 of variable overhead; $5 of variable selling, general, and administrative costs; $14 of fixed overhead costs; and $16 of fixed selling, general, and administrative costs.

1. Compute the selling price per unit if the company uses the total cost method and plans a markup of 220% of total costs.
2. The company is a price-taker and the expected selling price for this type of phone is $1,000 per unit. Compute the target cost per unit if the company's target profit is 60% of expected selling price.
3. Compute the selling price per unit if the company uses the variable cost method and plans a markup of 250% of variable costs.

Problem 23-5B

Special offer pricing

P7

Ace produces and sells energy drinks. Its contribution margin income statement follows.

Contribution Margin Income Statement For Year Ended December 31	Per Unit	Annual Total
Sales (300,000 units)	$4.00	$1,200,000
Variable costs		
Direct materials	1.28	384,000
Direct labor	0.32	96,000
Variable overhead	0.74	222,000
Contribution margin	1.66	498,000
Fixed costs		
Fixed overhead	0.24	72,000
Fixed general and administrative	0.30	90,000
Income	$1.12	$ 336,000

A potential customer offers to buy 50,000 units for $3.00 each. These sales would not affect the company's sales through its normal channels. Details of the special offer follow.

- Direct materials cost per unit and variable overhead cost per unit would not change.
- Direct labor cost per unit would be $0.48 because the offer would require overtime pay.
- Accepting the offer would require incremental fixed general and administrative costs of $5,000.
- Accepting the offer would require no incremental fixed overhead costs.

Required

1. Compute income from the special offer.
2. Should the company accept or reject the special offer?

Problem 23-6B

Special offer pricing

P7

MAX produces and sells power adapters. Its contribution margin income statement follows.

Contribution Margin Income Statement For Year Ended December 31	Per Unit	Annual Total
Sales (55,000 units)	$8.00	$440,000
Variable costs		
Direct materials	1.50	82,500
Direct labor	2.10	115,500
Variable overhead	1.90	104,500
Contribution margin	2.50	$137,500
Fixed costs		
Fixed overhead	0.50	27,500
Fixed general and administrative	1.20	66,000
Income	$0.80	$ 44,000

A potential customer offers to buy 10,000 units for $5.80 each. These sales would not affect the company's sales through its normal channels. Details of the special offer follow.

- Variable costs per unit would not change.
- Accepting the offer would require incremental fixed overhead costs of $2,200.
- Accepting the offer would require incremental fixed general and administrative costs of $1,800.

Required

1. Compute income from the special offer.
2. Should the company accept or reject the special offer?

SERIAL PROBLEM

Business Solutions

P3

Alexander Image/Shutterstock

This serial problem began in Chapter 1 and continues through most of the book. If previous chapter segments were not completed, the serial problem can begin at this point.

SP 23 Santana Rey sees that **Business Solutions**'s line of computer desks and chairs is popular, and she is finding it hard to keep up with demand. Santana only has 1,015 direct labor hours available. She must determine the best sales mix given her limited hours. Information about the desks and chairs follows.

	Desks	Chairs
Selling price per unit	$1,125	$375
Variable costs per unit	500	200
Contribution margin per unit	$ 625	$175
Direct labor hours per unit	5 hours	4 hours
Maximum demand per quarter	175 desks	50 chairs

Required

Determine the best sales mix and the contribution margin the business will earn at that sales mix.

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments (1) do not require instructors to know Tableau, (2) are accessible to introductory students, (3) do not require Tableau software, and (4) run in **Connect**. All are auto-gradable.

Tableau DA 23-1 Quick Study, Compute contribution margin, **P3**—similar to QS 23-11.

Tableau DA 23-2 Exercise, Sales mix selection, **P3**—similar to QS 23-12 and Exercise 23-6.

Tableau DA 23-3 Mini-case, Analyzing sales mix strategies, **P3**—similar to Problem 23-3A.

Accounting Analysis connect

COMPANY ANALYSIS

A1

APPLE

AA 23-1 **Apple** offers device service and repair through its AppleCare program. Assumed data follow.

Direct labor rate	$40 per direct labor hour
Non-materials-related overhead	$10 per direct labor hour
Materials-related overhead	4% of direct materials cost
Target profit margin (on both conversion and direct materials)	40%

Required

1. Compute time charge per hour of direct labor (in $).
2. Compute materials markup per dollar of direct material cost (in %).
3. Use time and materials pricing to compute the price for a local college. Apple estimates the obligation to this college will require 1,000 direct labor hours and $35,000 of direct materials cost.

COMPARATIVE ANALYSIS

P6

GOOGLE

APPLE

AA 23-2 **Google** wants to develop a laptop to compete with **Apple**'s MacBook Pro. Google believes the price of this model must be no more than Apple's price of $1,199 per unit to be competitive. Google expects to sell 20,000 units of this laptop model and has a target markup percentage of 25%. Assumed data for Google follow. Google uses the total cost method in setting its laptop price.

Variable costs	Per unit
Direct materials	$490
Direct labor	60
Overhead	140
Selling, general, and administrative	10

Fixed costs	Annual total
Overhead	$2,500,000
Selling, general, and administrative	1,500,000

Required

page 930

1. Compute Google's total cost per unit if 20,000 units are produced.
2. Determine Google's dollar markup per unit.
3. Determine Google's selling price per unit.

EXTENDED ANALYSIS

A1

Samsung

APPLE

AA 23-3 **Samsung**'s service and repair program competes with **Apple**'s AppleCare. Assumed data follow.

	Samsung	Apple
Direct labor rate	$38 per direct labor hour	$40 per direct labor hour
Non-materials-related overhead	$10 per direct labor hour	$10 per direct labor hour
Materials-related overhead	6% of direct materials cost	4% of direct materials cost
Target profit margin (on both conversion and direct materials)	40%	40%

Required

1. For both Samsung and Apple, compute time charge per hour of direct labor (in $).
2. For both Samsung and Apple, compute materials markup per dollar of direct material cost (in %).
3. For both Samsung and Apple, use time and materials pricing to compute the price quote for a local college. Both companies

estimate the obligation to this college will require 1,000 direct labor hours and $35,000 of direct materials cost.

Discussion Questions

1. Identify the five steps involved in the managerial decision-making process.
2. Is nonfinancial information ever useful in managerial decision making?
3. What is a relevant cost? Identify the two types of relevant costs.
4. What are incremental revenues?
5. Identify some qualitative factors that should be considered when making managerial decisions.
6. What is an out-of-pocket cost? What is an opportunity cost? Are opportunity costs recorded in the accounting records?
7. Why are sunk costs irrelevant in deciding whether to sell a product as is or to make it into a new product through additional processing?
8. Identify the incremental costs incurred by **Apple** for shipping one additional iPhone from a warehouse to a retail store along with the store's normal order of 75 iPhones.

APPLE

9. **Apple** is considering eliminating one of its stores in a large U.S. city. What are some factors that it should consider in making this decision?

APPLE

10. A company's normal selling price is $100 per unit. Describe a situation in which the company would accept a special offer at a selling price of $80 per unit.
11. Explain how a price-setter differs from a price-taker.

12. What is time and materials pricing?

Beyond the Numbers

ETHICS CHALLENGE

P7

BTN 23-1 Bert Asiago, a salesperson for Convertco, received an order from a potential new customer for 50,000 units of Convertco's single product at a price $25 below its regular selling price of $65. Asiago knows that Convertco has the capacity to produce this order without affecting regular sales. He has spoken to Convertco's controller, Bia Morgan, who has informed Asiago that at the $40 selling price, Convertco will not be covering its variable costs of $42 for the product, and she recommends the order not be accepted. Asiago knows that variable costs include his sales commission of $4 per unit. If he accepts a $2 per unit commission, the sale will produce a contribution margin of zero. Asiago is eager to get the new customer because he believes that this could lead to the new customer becoming a regular customer.

Required

page 931

1. Determine the contribution margin per unit on the order as determined by the controller.
2. Determine the contribution margin per unit on the order as determined by Asiago if he takes the lower commission.
3. Do you recommend Convertco accept the special order? What factors must management consider?

COMMUNICATING IN PRACTICE

C1

BTN 23-2 Assume that you work for Greeble's Sporting Goods, and your manager requests that you outline the pros and cons of discontinuing its Golf department. That department is generating

losses, and your manager believes that discontinuing it will increase overall store profits.

Required

Prepare a memorandum to your manager outlining what management should consider when trying to decide whether to discontinue its Golf department.

TEAMWORK IN ACTION

C1

BTN 23-3 Break into teams and identify costs that an airline such as **Delta Air Lines** would incur on a flight from Green Bay to Minneapolis. (1) Identify the individual costs as variable or fixed. (2) Assume that Delta is trying to decide whether to drop this flight because it seems to be unprofitable. Determine which costs are likely to be saved if the flight is dropped. Set up your answer in the following format.

Cost	Variable or Fixed	Cost Saved If Flight Is Dropped	Rationale

---

ENTREPRENEURIAL DECISION

P3

BTN 23-4 **Eye Symmetry**'s founder Max Stewart makes surfboards in different lengths. He must decide on the best sales mix. Assume Max has a capacity of 240 hours of direct labor time available each month, and he makes two types of boards: Short and Long. Information on these products follows.

Surfboards	Short	Long
Selling price per unit	$700	$900
Variable costs per unit	400	500
Direct labor hours per unit	8 hours	16 hours

Required

1. Assume the markets for both types of surfboards are unlimited. How many Short boards and how many Long boards should Max make each month?
2. How much total contribution margin does the sales mix from part 1 produce each month?
3. Assume the market for Short boards is limited to 20 per month, with no market limit for Long boards. How many Short boards and how many Long boards should Max make each month? How much total contribution margin does this mix produce each month?

24 Capital Budgeting and Investment Analysis

Chapter Preview

PAYBACK PERIOD

P1 Capital budgeting

Payback with equal cash flows

Payback with unequal cash flows

NTK 24-1

ACCOUNTING RATE OF RETURN

P2 Calculation

Decision rule

Evaluation

NTK 24-2

NET PRESENT VALUE (NPV)

P3 Calculation

- Equal cash flows
- Unequal cash flows
- Salvage value
- Profitability index

NTK 24-3

INTERNAL RATE OF RETURN (IRR)

P4 2-step process

- Decision rule
- Comparing projects

A1 Break-even time

NTK 24-4

Learning Objectives

ANALYTICAL

A1 Analyze a capital investment project using break-even time.

PROCEDURAL

P1 Compute payback period and describe its use.

P2 Compute accounting rate of return and explain its use.

P3 Compute net present value and describe its use.

P4 Compute internal rate of return and explain its use.

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Dream Machine

"Solve a big problem"—**JAKE LOOSARARIAN**

PITTSBURGH—As part of his college coursework, Jake Loosararian worked on a team project involving a local power plant. The focus was on making inspections of its plant assets safer, faster, and less costly. "The cost of shutting down the plant [for inspections] is $1 million per day," explains Jake. This experience led Jake to start **Gecko Robotics** (GeckoRobotics.com), a company devoted to robotic industrial inspections.

Jake's robots climb the walls of boilers, tanks, and scrubbers of power companies. The robots work 10 times faster than humans and reduce injuries. "They collect so much more data than humans," says Jake. With these data, companies identify areas of weakness and perform key repairs. This extends the lives of plant assets and impacts capital budgeting decisions.

"I practically lived at power plants to find out their needs," admits Jake. With that information, Jake explains how his robotic data aid management in key investment decisions on asset planning. "We wanted to make a great impact," says Jake. His customers agree, as his sales increased by over 500% in the past year and his employee numbers went from 10 to over 100.

"Follow your customers' feedback," declares Jake. And "launch quickly!"

Gecko Robotics

Sources: *Gecko Robotics website*, January 2021; *Entrepreneur's Handbook*, March 2019; *youtube.com/channel/UCxHRYDh6nW6vDs1Kn6zKgCg*

PAYBACK PERIOD

Capital budgeting is the process of analyzing alternative long-term investments and deciding which assets to acquire or sell. Common examples of capital budgeting decisions include buying a machine or a building or acquiring an entire company. The objective for these decisions is to earn a satisfactory return on investment.

Capital Budgeting Process Exhibit 24.1 summarizes the capital budgeting process.

EXHIBIT$ 24.1

Capital Budgeting Process

The process begins when a manager submits a proposal for a new investment in a plant asset. A capital budget committee evaluates the proposal and recommends approval or rejection. The board of directors, or managers, then approves the capital investments for the year.

Capital budgeting decisions are usually the most difficult and risky that managers make. These decisions are difficult because they require predicting events that will occur well into the future. A capital budgeting decision is risky because

- The outcome is uncertain.
- Large amounts of money are usually involved.
- The investment involves a long-term commitment.
- The decision could be difficult or impossible to reverse.

Capital Investment Cash Flows Managers use several methods to evaluate capital budgeting decisions. Most methods use expected future cash outflows and inflows. Exhibit 24.2 summarizes cash outflows (−) and cash inflows (+) over the life of a typical capital investment.

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EXHIBIT$ 24.2

Capital Investment Cash Flows

An investment begins with an initial cash outflow to buy the asset. Over the asset's life, it generates cash inflows and cash outflows. Cash inflows are from sales. Cash outflows are for materials, labor, and overhead (except depreciation). At the end of their useful lives, some assets can be sold for salvage value, providing another cash inflow. *Salvage value* is an asset's estimated value at the end of its useful life. There are methods to help us choose among investments. Many use *net cash flows*, which is cash inflows minus cash outflows.

Payback Period with Equal Cash Flows

P1

Compute payback period and describe its use.

Payback period (PBP) is a method used to evaluate investment decisions by measuring the expected amount of time to recover the initial investment amount. Managers prefer assets with shorter payback periods to reduce the risk of an unprofitable investment over the long run.

FasTrac, a manufacturer of exercise equipment and supplies, is considering investing in a machine to manufacture a new product. Management gathers the following data.

Initial investment	$16,000	Materials, labor, and overhead (except depreciation)	$16,500
Useful life	8 years	Depreciation—Machinery	$2,000
Salvage value	$0	Selling, general, and administrative expenses	$9,500
Expected sales per year	1,000 units	Selling price per unit	$30

Exhibit 24.3 shows the expected annual income and net cash flow from an investment in this machine during its useful life. We see its

annual income is $2,000, but its net cash flow is $4,000. The difference is because the $2,000 of depreciation expense has no cash outflow.

EXHIBIT$ 24.3

Annual Results from Potential Investment

Annual Results from Investment	Income	Cash Flow
Sales of new product (1,000 × $30)	$30,000	$30,000
Expenses		
Materials, labor, and overhead (except depreciation)	16,500	16,500
Depreciation—Machinery [($16,000 – $0)/8 years]	2,000	–
Selling, general and administrative expenses	9,500	9,500
Income	$ 2,000	
Net cash flow		$ 4,000

Point: Excel for payback.

	A	B
1	Investment	$16,000
2	Cash flow	$4,000
3	Payback period	

=B1/B2 = 4

The formula to compute the payback period of an investment that produces equal net cash flows per period is in Exhibit 24.4. The payback period is the amount of time for the investment to page 935 generate enough net cash flow to pay back the initial investment. The payback period for this machine is 4 years. (Payback period assumes cash flows occur evenly *within* each year.)

EXHIBIT$ 24.4

Payback Period Calculation with Equal Cash Flows

$$\text{Payback period} = \frac{\text{Initial investment}}{\text{Annual net cash flow}} = \frac{\$16{,}000}{\$4{,}000} = 4 \text{ years}$$

Payback Period with Unequal Cash Flows

If net cash flows are unequal, or not the same each period, the payback period is computed using the *cumulative net cash flows. Cumulative* refers to the addition of each period's net cash flows over time. To demonstrate, FasTrac is evaluating an investment in a machine that will generate unequal net cash flows over the next eight years. The data and payback period computation are in Exhibit 24.5.

EXHIBIT$ 24.5

Payback Period Calculation with Unequal Cash Flows

Year	Net Cash Flows per Year	Cumulative Net Cash Flows
Initial investment	$(16,000)	$(16,000)
Year 1	2,000	(14,000)
Year 2	4,000	(10,000)
Year 3	4,000	(6,000)
Year 4	4,000	**(2,000)**
Year 5	**4,000**	**2,000**

Payback occurs between Years 4 and 5.

Payback period = 4 years + ($2,000/$4,000) or 0.5 of Year 5 = 4.5 years

At the beginning of Year 1, there is an initial $16,000 cash outflow to buy the machine. By the end of Year 1, the cumulative net cash flow is $(14,000), computed as the $(16,000) initial cash outflow plus Year 1's $2,000 cash inflow. This process continues over the asset's life.

The cumulative net cash flow changes from negative to positive in Year 5. We see at the end of Year 4, the cumulative net cash flow is $(2,000). When FasTrac receives $2,000 of the $4,000 net cash flow in Year 5, it has fully recovered the $16,000 initial investment. If we assume that cash flows are received evenly *within* each year, receipt of the $2,000 occurs halfway through the fifth year. This is computed as $2,000 divided by Year 5's total net cash flow of $4,000, or 0.5. This yields a payback period of 4.5 years, computed as 4 years plus 0.5 of Year 5.

Evaluating Payback Period Payback period has the following strengths and weaknesses.

Strengths **Weaknesses**

Strengths	Weaknesses
• It uses cash flows. It is easy to compute. •	• It ignores the time value of money. It ignores cash flows after payback period. •

Its weaknesses are serious. To illustrate cash timing, if FasTrac had another $16,000 investment with predicted net cash flows of $6,000, $5,000, $2,000, $1,000, and $4,000 over its five-year life, its payback period would also be 4.5 years. However, this alternative is preferred because it returns cash more quickly. To illustrate longer term cash flows, an investment with a 3-year payback period that stops producing cash after 4 years might not be as good as an alternative with a 5-year payback period that generates increasing net cash flows for 15 years.

Oxygen/Getty Images

Decision Insight

e-Payback Health care providers use electronic systems to improve their operations. With *e-charting*, doctors' orders and notes are saved electronically. Such systems allow for more personalized care plans, more efficient staffing, and reduced costs. Investments in such systems are evaluated on the basis of payback periods and other financial measures. ■

NEED-TO-KNOW 24-1

Payback Period

P1

A company is considering purchasing equipment costing $75,000. Expected annual net cash flows from this equipment are $30,000,

$25,000, $18,000, $10,000, and $5,000. What is this investment's payback period?

Solution

Year	Net Cash Flows per Year	Cumulative Net Cash Flows
Initial investment	$(75,000)	$(75,000)
Year 1	30,000	(45,000)
Year 2	25,000	(20,000)
Year 3	18,000	(2,000)
Year 4	10,000	8,000
Year 5	5,000	13,000

Payback occurs between Years 3 and 4.

Payback period = 3.2 years, computed as 3 years plus 0.2 of Year 4.

Explanation: Once cumulative net cash flow reaches $0 during Year 4, the initial investment is paid back. This occurs 0.2 of the way through Year 4 ($2,000/$10,000 = 0.2).

Do More: QS 24-1, QS 24-4, E 24-1, E 24-3, E 24-4

ACCOUNTING RATE OF RETURN

P2

Compute accounting rate of return and explain its use.

Accounting rate of return (ARR) is an investment's annual income divided by the average investment in it. To illustrate, we return to FasTrac's $16,000 machine investment described in Exhibit 24.3.

We find the average investment by using the formula in Exhibit 24.6. For this machine, we take the initial investment at the start of the asset's life of $16,000 plus the salvage value at the end of the asset's life of $0, and then divide by 2. This gives an "average" investment over the asset's life of $8,000.

EXHIBIT$ 24.6

Average Investment Calculation

$$\text{Average investment} = \frac{\text{Initial investment} + \text{Salvage value}}{2} = \frac{\$16{,}000 + \$0}{2} = \$8{,}000$$

Using the $8,000 average investment and the annual income of $2,000 from Exhibit 24.3, FasTrac calculates accounting rate of return in Exhibit 24.7.

EXHIBIT$ 24.7

Accounting Rate of Return Calculation

$$\text{Accounting rate of return} = \frac{\text{Annual income}}{\text{Average investment}} = \frac{\$2{,}000}{\$8{,}000} = 25.0\%$$

ARR Decision Rule Management uses this 25% to compare with alternative investments. Managers prefer investments with a higher accounting rate of return, and they normally set a minimum required rate of return.

Point: Excel for ARR.

	A	B
1	Investment	$16,000
2	Salvage value	$0
3	Income	$2,000
4	Acctg rate of return	
	=B3/((B1+B2)/2) =	25%

Evaluating Accounting Rate of Return The accounting rate of return's strength is its easy computation. It does, however, have two weaknesses.

- It ignores the time value of money.
- It does not directly consider cash flows and their timing.

NEED-TO-KNOW 24-2

Accounting Rate of Return

P2

Compute the accounting rate of return for the machine investment below.

Initial investment	$180,000
Salvage value	20,000
Income (annual)	40,000

Solution

Average investment = ($180,000 + $20,000)/2 = $100,000
Accounting rate of return = $40,000/$100,000 = 40%

Do More: Do More: QS 24-5, QS 24-6, QS 24-7, E 24-5

NET PRESENT VALUE (NPV)

P3

Compute net present value and describe its use.

Net present value analysis applies the "time value of money" to future cash inflows and cash outflows of a project to assess its desirability. Appendix B explains the present value concept, which is often summarized as: *A dollar tomorrow is worth less than a dollar today*. Assignments that use present value are solved using Appendix B tables, Excel, or a calculator.

Net present value (NPV) is the discounted future net cash flows from the investment at the required rate of return, then minus the initial investment. A company's required rate of return, often called its **hurdle rate**, or its **cost of capital**, is an average of the rate the company must pay to its lenders and investors.

NPV Demo: Equal Cash Flows A company is considering a $20,000 investment in a machine that is expected to provide $10,000 annual net cash flows for the next three years. Assume net cash flows from this machine occur at each year-end and the company requires a 9% return. Net present value is computed in Exhibit 24.8. The initial investment occurs at the beginning of Year 1.

EXHIBIT$ 24.8

Net Present Value Calculation with Equal Cash Flows

	Net Cash Flows	Present Value of 1 at 9%†	Present Value of Net Cash Flows
Year 1	$10,000	0.9174	$ 9,174
Year 2	10,000	0.8417	8,417
Year 3	10,000	0.7722	7,722
Totals	$30,000		25,313
Initial investment			(20,000)
Net present value			**$ 5,313**

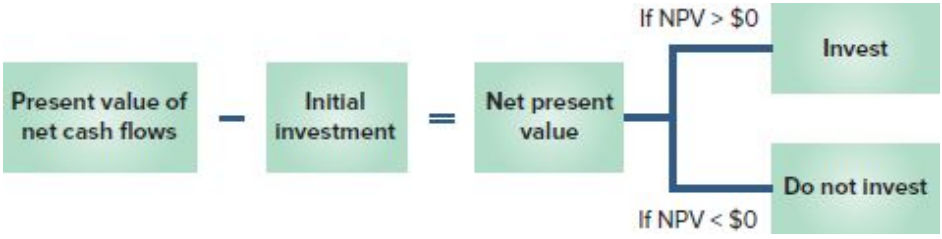
†Present value of 1 factors are taken from Table B.1 in Appendix B.

Exhibit 24.8 shows annual net cash flows and a column of present value of 1 factors, also called *discount factors*, taken from Table B.1 in Appendix B. *(To simplify present value computations and for all assignments, we assume that net cash flows occur at year-end.)* Annual net cash flows are multiplied by the discount factors to give present values of annual net cash flows in the far-right column. The present values are added to get total present value of net cash flows of $25,313.

The $20,000 initial investment is subtracted from the $25,313 total present value to get this asset's NPV of $5,313. We interpret this to mean the $25,313 present value of future net cash flows exceeds the initial $20,000 investment by $5,313. FasTrac should invest in this machine.

Net Present Value Decision Rule The decision rule in page 938 applying NPV is:

- If an asset's future net cash flows yield a *positive* net present value, then invest.
- When comparing projects with similar initial investments and risk, invest in the one with the highest net present value.



Annuity Assumption NPV is simplified if annual net cash flows are equal. A series of cash flows of equal amount is called an **annuity**. Table B.3 in Appendix B gives the present value of an annuity of 1 to be received for different periods. To compute the present value of net cash flows in Exhibit 24.8 discounted at 9%, go down the 9% column of Table B.3 to the factor on the third line. This discount factor, also known as an *annuity* factor, is 2.5313. We compute the $25,313 present value as 2.5313 × $10,000. We visually show the calculations in Exhibit 24.8 as follows.

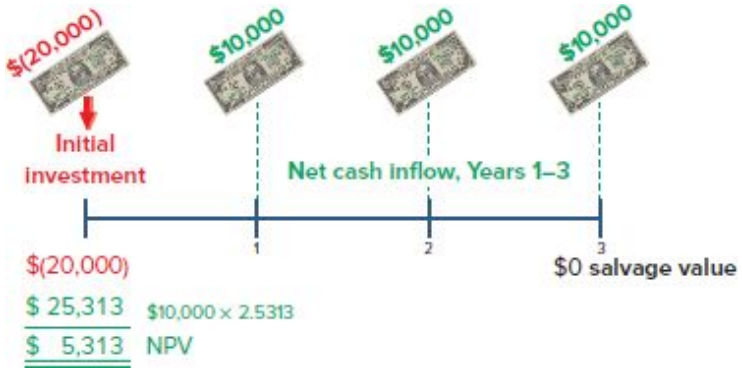
Point: Excel for NPV.

	A	B
1	Investment	$20,000
2	Cash flow	$10,000
3	Periods	3
4	Interest rate	9%
5	NPV	

=PV(B4,B3,–B2)–B1 = $5,313

Point: NPV with calculator:

N 3
I/Y 9
PMT 10000
CPT PV
Multiply $–25,313 answer by –1 for money received, and subtract initial investment of $20,000 to get NPV of $5,313.



Applying Annuity Assumption to Strategic Plans NPV analysis can be used to help assess the value of strategic plans such as whether to automate a production process. For example, an eyewear manufacturer is considering investing in an $80,000 automated

manufacturing system. If the investment is made, the company can reduce its labor costs by $15,000 per year of the 10-year useful life of the system. All other costs and revenues are unchanged. The NPV analysis, using a 10% discount rate and no salvage value, is in Exhibit 24.9. The $92,169 present value of the cash flows from reduced labor costs exceeds the $80,000 cost of the new system. The company should automate its production process.

EXHIBIT$ 24.9

Net Present Value Calculation Using Annuity Factor

	Net Cash Flows	Present Value of an Annuity at 10%†	Present Value of Net Cash Flows
Years 1–10	$15,000	6.1446	$ 92,169
Initial Investment . . .			(80,000)
Net present value . . .			$ 12,169

†6.1446 is the present value of an annuity of 1, where $n = 10$, $i = 10\%$ (from Table B.3).

NPV Demo: Unequal Cash Flows Net present value analysis can be used when net cash flows are unequal. Assume a company can choose only one capital investment: Project A or Project B. Each project requires a $12,000 initial investment. Exhibit 24.10 shows Projects A and B have equal total net cash flows of $15,000. Project A is expected to produce equal amounts of $5,000 each year. Project B is expected to produce a larger amount in the first year and a smaller amount in the third year.

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Exhibit 24.10 shows the present value of 1 factors from Table B.1 assuming a 10% required return. Computations in the two rightmost columns show that Project A has a $435 NPV, but Project B has a higher NPV of $908 because it has a larger cash flow in Year 1. Projects with higher cash flows in earlier years generally yield higher net present values. If only one project can be accepted, Project B is better because of its higher NPV.

EXHIBIT$ 24.10

Net Present Value Calculation with Unequal Cash Flows

	Net Cash Flows		Present Value of 1 at 10%	Present Value of Net Cash Flows	
	A	B		A	B
Year 1	$ 5,000	$ 8,000	0.9091	$ 4,546	$ 7,273
Year 2	5,000	5,000	0.8264	4,132	4,132
Year 3	5,000	2,000	0.7513	3,757	1,503
Totals	$15,000	$15,000		12,435	12,908
Initial investment				(12,000)	(12,000)
Net present value				$ 435	$ 908

NPV: With Salvage Value Many assets have salvage values. If so, this amount is an additional net cash inflow at the end of the asset's life.

Point: NPV of annuity with salvage value

	A	B
1	Investment	$80,000
2	Salvage value	$10,000
3	Cash flow	$15,000
4	Periods	10
5	Interest rate	10%
6	PV annuity	
7	PV salvage	
8	NPV	

=PV(B5,B4,–B3)= $92,169
=PV(B5,B4,0,–B2)= $3,855
=B6+B7–B1)= $16,024

Example To illustrate, an asset requires an initial investment of $80,000 and generates $15,000 of net cash flows for each of the next ten years. It has a salvage value of $10,000 at the end of its 10-year life. The net present value computation, using a 10% discount rate, follows.

	Net Cash Flows	Present Value of Factor at 10%*	Present Value of Net Cash Flows
Years 1–10	$15,000	6.1446	$ 92,169
Salvage value at Year 10	10,000	0.3855	3,855
Total			96,024
Initial investment			(80,000)
Net present value			$ 16,024

*6.1446 = Present value of an annuity of 1, where $n = 10$, $i = 10\%$ (from Table B.3).
0.3855 = Present value of 1, where $n = 10$, $i = 10\%$ (from Table B.1).

NPV: Comparing Projects When comparing projects of *similar* initial investments and risk levels, we can rank them on NPV. However, if the initial investments *differ* across projects, we need a different method. One way to compare projects, especially when a company cannot fund all positive net present value projects, is to use the **profitability index**.

Example: When is it appropriate to use different discount rates for different projects? *Answer:* When risk levels are different.

$$\text{Profitability index} = \frac{\text{Present value of net cash flows}}{\text{Initial investment}}$$

Exhibit 24.11 illustrates computation of the profitability index for three potential investments. A profitability index less than 1 indicates an investment with a *negative* net present value. This means we drop Project 3 from consideration. Both Projects 1 and 2 have profitability indexes greater than 1, meaning they have positive net present values. If forced to choose, we select the project with the higher profitability index. Project 2 returns $1.50 NPV per dollar invested, whereas Project 1 returns only $1.20 NPV per dollar invested. **Rule:** Invest in the project with the highest profitability index (must exceed 1.0).

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EXHIBIT$ 24.11

Profitability Index Analysis

Potential Projects	Project 1	Project 2	Project 3
Present value of net cash flows . . .	$900,000	$375,000	$270,000
Initial investment	750,000	250,000	300,000
Profitability Index	**1.2**	**1.5**	**0.9**

NEED-TO-KNOW 24-3

Net Present Value

P3

A company is considering two potential projects. Each project requires a $20,000 initial investment and is expected to generate

annual net cash flows as follows. Assuming a discount rate of 10%, compute the net present value of each project. If only one project can be selected, which is chosen?

Year	Net Cash Flows	
	Project A	Project B
1	$12,000	$ 4,500
2	8,500	8,500
3	4,000	13,000

Solution

Net present values follow. Because the projects have the same initial investment and similar risk, we compare their net present values. Project A should be selected because of its higher positive NPV.

		Project A		Project B	
Year	Present Value of 1 at 10%*	Net Cash Flows	Present Value of Net Cash Flows	Net Cash Flows	Present Value of Net Cash Flows
1	0.9091	$12,000	$ 10,909	$ 4,500	$ 4,091
2	0.8264	8,500	7,024	8,500	7,024
3	0.7513	4,000	3,005	13,000	9,767
Totals		$24,500	20,938	$26,000	20,882
Initial investment			(20,000)		(20,000)
Net present value			$ 938		$ 882

*Present value of 1 factors are taken from Table B.1 in Appendix B.

Do More: Do More: QS 24-10, QS 24-11, E 24-7, E 24-8

INTERNAL RATE OF RETURN (IRR)

P4

Compute internal rate of return and explain its use.

Another way to evaluate investments is to use the **internal rate of return (IRR)**, which is the discount rate that yields an NPV of zero.

IRR: Equal Cash Flows Assume an asset requires a $12,009 initial investment and is expected to generate $5,000 net cash flows in each year of its 3-year life. Below is the two-step process for finding IRR with equal cash flows.

Point: Excel for IRR.

	A	B
1	Investment	–$12,009
2	Cash flow Year 1	5,000
3	Cash flow Year 2	5,000
4	Cash flow Year 3	5,000
5	Internal rate of return	

=IRR(B1:B4) = 12%

***Step 1:* Compute present value factor for investment**.

$$\text{Present value factor} = \frac{\text{Initial investment}}{\text{Annual net cash flows}} = \frac{\$12{,}009}{\$5{,}000} = 2.4018$$

***Step 2:* Identify rate (IRR) yielding the present value factor**.

Search Table B.3 (partially shown below) for a present value factor of 2.4018 in the 3-period row (the period is the 3-year project life). A present value factor of 2.4018 is in the 12% column. This means IRR is 12%.

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Present Value of an Annuity of 1 for Three Periods

	Discount Rate				
Periods	1%	5%	10%	12%	15%
3	2.9410	2.7232	2.4869	**2.4018**	2.2832

IRR with a financial calculator:
Student steps are in Blue; what the calculator returns is in Black.

CF
CF_0 = 12009 +/– ENTER
C01 = 5000 ENTER
F01 = 3 ENTER
C02
IRR CPT
IRR = 12.0

IRR: Unequal Cash Flows If net cash flows are unequal, it is best to use a calculator or spreadsheet software to compute IRR. We show the use of Excel in this chapter's appendix.

IRR Decision Rule To use IRR to evaluate a project, we compare it to a predetermined *hurdle rate*, which is a minimum acceptable rate of return. If the IRR is greater than the hurdle rate, invest in the project. If the IRR is less than the hurdle rate, do not invest.

Rule: If IRR > Hurdle rate, then invest.

Internal rate of return	>	Hurdle rate	→	Invest
Internal rate of return	<	Hurdle rate	→	Do not invest

IRR: Comparing Projects Multiple projects are often ranked by the extent IRR exceeds the hurdle rate. IRR can be used to compare projects with different amounts invested because the IRR is expressed as a percent rather than as a dollar value as in NPV.

Decision Insight

Manager Bonus and IRR A survey reported that 41% of top managers would reject a project with an internal rate of return *above* the cost of capital *if* the project would cause the company to miss its earnings forecast. The roles of benchmarks and manager bonuses based on earnings must be considered in capital budgeting decisions. ■

NEED-TO-KNOW 24-4

Internal Rate of Return

P4

A machine costing $58,880 is expected to generate net cash flows of $8,000 for each of the next 10 years. The company's hurdle rate is 6.5%.

1. Find the machine's internal rate of return (IRR).
2. Using IRR, should the company purchase this machine?

Solution

1. PV factor = Initial investment/Annual net cash flows = $58,880/$8,000 = 7.36. Scanning the "Periods equal 10" row in Table B.3 for a present value factor near 7.36 indicates the IRR is 6%.
2. The machine should not be purchased because its IRR (6%) is less than the company's hurdle rate (6.5%).

Do More: QS 24-21, QS 24-22, QS 24-23, E 24-15

Comparing Capital Budgeting Methods

Exhibit 24.12 compares the four methods shown in this chapter.

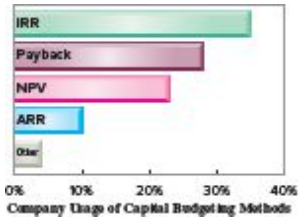
EXHIBIT$ 24.12

Comparing Capital Budgeting Methods

	Payback Period	Accounting Rate of Return	Net Present Value	Internal Rate of Return
Focus	• Cash flows	• Income	• Cash flows	• Cash flows
Yields	• Years	• Percent	• Dollars	• Percent
Strengths	• Easy to compute	• Easy to compute	• Reflects time value of money • Reflects changing risks over project's life	• Reflects time value of money • Allows comparisons of projects
Weaknesses	• Ignores time value of money • Ignores cash flows after payback period	• Ignores time value of money • Ignores cash flows	• Difficult to compare projects	• Ignores changing risks over project's life

- Payback period is the simplest method. page 942
- Accounting rate of return is simple but not commonly used in practice.
- Net present value considers all net cash flows from a project. It can be applied to equal and unequal cash flows and can reflect changes in the level of risk over a project's life. Because NPV is in dollars, comparing projects with different initial investment amounts is difficult. The profitability index can be used in this case.

- Internal rate of return considers all cash flows from a project. Because IRR is a percent, it can be used to compare projects with different investment amounts. However, IRR does not reflect changes in risk over a project's life.



Decision Insight

And the Winner Is . . . How do we choose among the methods for evaluating capital investments? Management surveys consistently show internal rate of return (IRR) as the most popular method, followed by payback period and net present value (NPV). Few companies use accounting rate of return (ARR), but nearly all use more than one method. ■

CORPORATE SOCIAL RESPONSIBILITY

Net present value calculations extend to investments in sustainable energy. To illustrate, consider a potential investment of $11,000 in a solar panel system in Phoenix. The system is expected to last for 30 years and require $100 of maintenance costs per year. The typical home uses 14,000 kilowatt hours (kWh) of electricity per year, at a cost of $0.12 per kilowatt hour. According to the **National Renewable Energy Laboratory** (pvwatts.nrel.gov), a typical solar panel system in Phoenix could supply 8,642 kilowatt hours (kWh) of electricity per year. The net present value of a potential investment in a solar panel system, using a 6% discount rate, is computed in Exhibit 24.13. The NPV is $1,898, indicating the investment should be accepted.

EXHIBIT$ 24.13

NPV of Solar Investment

Annual amounts, years 1–30	
Electricity cost savings (8,642 kWh × $0.12)	$ 1,037
Maintenance costs	(100)
Net cash flows	$ 937
Present value of net cash flows ($937 × 13.7648*)	$12,898
Initial investment	(11,000)
Net present value	$ 1,898

*From Table B.3: using 30 periods at 6%

Gecko Robotics

Gecko Robotics, this chapter's feature company, makes robots to inspect power plants. These robots enable human workers to perform safer and more interesting tasks, like data analysis. This investment increases profits *and* increases employee satisfaction, which can increase morale and decrease turnover.

Decision Analysis — Break-Even Time (BET)

A1

Analyze a capital investment project using break-even time.

Break-even time is a measure of the expected time until the *present value* of the net cash flows from an investment equals the initial investment. It overcomes the payback period's limitation of ignoring the time value of money. It is computed like the payback period but uses discounted cash flows.

To illustrate, we consider a $12,000 investment in machinery. The annual net cash flows from this investment are $4,100 for 5 years. Exhibit 24.14 shows the computation of break-even time for this investment using a 10% discount rate.

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EXHIBIT$ 24.14

Break-Even Time Analysis

Year	Net Cash Flows	Present Value of 1 at 10%*	Present Value of Net Cash Flows	Cumulative Present Value of Net Cash Flows	
Initial investment	$(12,000)	1.0000	$(12,000)	$(12,000)	
1.....	4,100	0.9091	3,727	(8,273)	
2.....	4,100	0.8264	3,388	(4,885)	
3.....	4,100	0.7513	3,080	(1,805)	Break-even time
4.....	4,100	0.6830	2,800	995	
5.....	4,100	0.6209	2,546	**3,541**	Net present value

*Present value of 1 factors from Table B.1 in Appendix B.

The rightmost column of this exhibit shows that break-even time is between 3 and 4 years, or about 3.64 years. This is computed as 3 years plus $1,805/$2,800 or 0.64 of year 4 (rounded). Cash flows earned after the break-even time contribute to a positive net present value that, in this case, eventually amounts to $3,541.

Break-even time is useful because it identifies the point in time when cash flows begin to yield net positive returns. The method allows managers to compare and rank alternative investments, giving the project with the shortest break-even time the highest rank.

NEED-TO-KNOW 24-5

COMPREHENSIVE

Evaluating Investments

West Company can invest in one of two projects, T1 or T2. Each project requires an initial investment of $101,250 and produces the following net cash flows.

	Net Cash Flows	
Year	T1	T2
Year 1	$ 20,000	$ 40,000
Year 2	30,000	40,000
Year 3	70,000	40,000
Totals.....	$120,000	$120,000

Required

1. Compute the payback period for both projects. Which project has the shorter payback period?
2. The company requires a 10% return from its investments. Compute the net present value of each project. Determine which project, if any, should be chosen.
3. Compute the internal rate of return for Project T2. Based on its internal rate of return, should Project T2 be chosen?

SOLUTION

1. **T1:** Determining the payback period for a series of unequal cash flows (as in Project T1) requires us to compute the cumulative net cash flows from the project at the end of each year. The payback period calculation follows. The cumulative net cash flow for Project T1 changes from negative to positive in Year 3. When net cash flow of $51,250 is received during year 3, the initial investment is fully recovered. Assuming cash flows are received evenly within each year, this occurs about 0.73 ($51,250/$70,000) or 0.73 of the way through the third year. The payback period is then 2.73 years, computed as 2 years plus 0.73 of year 3.

Year	Net Cash Flows per Year	Cumulative Net Cash Flows
Initial investment.....	$(101,250)	$(101,250)
1	20,000	(81,250)
2	30,000	(51,250)
3	70,000	18,750

Break-even time

T2: The payback period for a project with a series of equal cash flows is computed as follows. The company expects to recover its investment in 2.53 years.

$$\text{Payback period} = \frac{\text{Initial investment}}{\text{Annual net cash flow}} = \frac{\$101{,}250}{\$40{,}000} = \mathbf{2.53\ years}\ \text{(rounded)}$$

2. **T1:**

Year	Net Cash Flows	Present Value of 1 at 10%	Present Value of Net Cash Flows
Year 1	$ 20,000	0.9091	$ 18,182
Year 2	30,000	0.8264	24,792
Year 3	70,000	0.7513	52,591
Totals	$120,000		95,565
Initial investment			(101,250)
Net present value			$ (5,685)

T2:

Year	Net Cash Flows	Present Value of 1 at 10%	Present Value of Net Cash Flows
Year 1	$ 40,000	0.9091	$ 36,364
Year 2	40,000	0.8264	33,056
Year 3	40,000	0.7513	30,052
Totals	$120,000		99,472
Initial investment			(101,250)
Net present value			$ (1,778)

Decision: The company should not invest in either project. Both are expected to yield a negative net present value, and it should invest only in positive net present value projects.

3. To compute Project T2's internal rate of return, we first compute a present value factor as follows.

$$\text{Present value factor} = \frac{\text{Initial investment}}{\text{Net cash flow}} = \frac{\$101{,}250}{\$40{,}000} = 2.5313 \text{ (rounded)}$$

Then, we search Table B.3 for the discount rate that corresponds to the present value factor of 2.5313 for three periods. From Table B.3, this discount rate is 9%. Project T2's internal rate of return of **9%** is below this company's hurdle rate of 10%. Project T2 should *not* be chosen.

APPENDIX

24A Using Excel to Compute Internal Rate of Return

Internal rate of return calculations for unequal annual cash flows can be made easier by using Excel. To illustrate, a company is considering investing in a new machine with the expected cash flows shown in the following spreadsheet. Cash outflows are entered as negative numbers, and cash inflows are entered as positive numbers.

IRR To compute the internal rate of return the following is entered into cell C11:

$$=\text{IRR}(C1:C10)$$

This instructs Excel to use its IRR function to compute the internal rate of return of the unequal cash flows in cells C1 through C10. The IRR equals 14.47%.

	A	B	C
1	Initial Investment		−16000
2	Annual cash flows received at year-end		
3		1	3000
4		2	4000
5		3	4000
6		4	4000
7		5	5000
8		6	3000
9		7	2000
10		8	2000
11			=IRR(C1:C10)

Summary: Cheat Sheet

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PAYBACK PERIOD

Payback period: Expected time to recover initial investment.

Payback period with equal cash flows:

$$\text{Payback period} = \frac{\text{Initial investment}}{\text{Annual net cash flow}} = \frac{\$16{,}000}{\$4{,}000} = 4 \text{ years}$$

Excel for Payback.

	A	B
1	Investment	$16,000
2	Cash flow	$4,000
3	Payback period	

=B1/B2 = 4

Payback period with unequal cash flows: Determine when cumulative net cash flows change from negative to positive.

Year	Net Cash Flows per Year	Cumulative Net Cash Flows
Initial Investment	$(16,000)	$(16,000)
Year 1	2,000	(14,000)
Year 2	4,000	(10,000)
Year 3	4,000	(6,000)
Year 4	4,000	(2,000)
Year 5	4,000	2,000

Payback occurs between Years 4 and 5.

Payback period = 4 years + ($2,000/$4,000) or 0.5 of Year 5 = 4.5 years

ACCOUNTING RATE OF RETURN

Accounting rate of return (ARR): Percentage accounting return on average investment.

$$\text{Average investment} = \frac{\text{Initial investment} + \text{Salvage value}}{2} = \frac{\$16{,}000 + \$0}{2} = \$8{,}000$$

$$\text{Accounting rate of return} = \frac{\text{Annual income}}{\text{Average investment}} = \frac{\$2{,}000}{\$8{,}000} = 25.0\%$$

Excel for ARR.

	A	B
1	Investment	$16,000
2	Salvage value	$0
3	Income	$2,000
4	Acctg rate of return	

=B3/((B1+B2)/2) = 25%

NET PRESENT VALUE (NPV)

Net present value (NPV): Discounted net cash flows − Initial investment.

Cost of capital (*hurdle rate*): Required rate of return on a potential investment.

Net present value decision rule: If NPV > 0, then invest.

Annuity: Series of cash flows of equal dollar amounts.

NPV with equal cash flows:

	Net Cash Flows	Present Value of 1 at 9%*	Present Value of Net Cash Flows
Year 1	$10,000	0.9174	$ 9,174
Year 2	10,000	0.8417	8,417
Year 3	10,000	0.7722	7,722
Totals	$30,000		25,313
Initial investment			(20,000)
Net present value			$ 5,313

*Present value of 1 factors are taken from Table B.1 in Appendix B.

Excel for NPV.

	A	B
1	Investment	$20,000
2	Cash flow	$10,000
3	Periods	3
4	Interest rate	9%
5	Net present value	

=PV(B4,B3,–B2)–B1 = $5,313

NPV with unequal cash flows:

	Net Cash Flows		Present Value of 1 at 10%	Present Value of Net Cash Flows	
	A	B		A	B
Year 1	$ 5,000	$ 8,000	0.9091	$ 4,546	$ 7,273
Year 2	5,000	5,000	0.8264	4,132	4,132
Year 3	5,000	2,000	0.7513	3,757	1,503
Totals	$15,000	$15,000		12,435	12,908
Initial investment				(12,000)	(12,000)
Net present value				$ 435	$ 908

NPV with salvage value:

	Net Cash Flows	Present Value of Factor at 10%*	Present Value of Net Cash Flows
Years 1–10	$15,000	6.1446	$ 92,169
Salvage value at Year 10	10,000	0.3855	3,855
Total			96,024
Initial investment			(80,000)
Net present value			$ 16,024

*6.1446 = Present value of an annuity of 1, where $n = 10$, $i = 10\%$ (from Table B.3).
0.3855 = Present value of 1, where $n = 10$, $i = 10\%$ (from Table B.1).

NPV: Comparing projects with profitability index:

$$\text{Profitability index} = \frac{\text{Present value of net cash flows}}{\text{Initial investment}}$$

Rule: Pick project with highest profitability index (must exceed 1.0).

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INTERNAL RATE OF RETURN (IRR)

IRR: Discount rate that yields NPV of zero for an investment.

Internal rate of return decision rule: If IRR > Hurdle rate, then invest.

$$\text{Present value factor} = \frac{\text{Initial investment}}{\text{Annual net cash flows}} = \frac{\$12{,}009}{\$5{,}000} = 2.4018$$

Search for 2.4018 in Table B.3, $n = 3$. IRR is 12.0%.

Excel for IRR.

	A	B
1	Investment	–$12,009
2	Cash flow Year 1	5,000
3	Cash flow Year 2	5,000
4	Cash flow Year 3	5,000
5	Internal rate of return	

=IRR(B1:B4) = 12%

Key Terms

Accounting rate of return (ARR) (936)

Annuity (938)

Break-even time (BET) (942)

Capital budgeting (933)

Cost of capital (937)

Hurdle rate (937)

Internal rate of return (IRR) (940)

Net present value (NPV) (937)

Payback period (PBP) (934)

Profitability index (939)

Multiple Choice Quiz

1. A company is considering the purchase of equipment for $270,000. Projected annual net cash flow from this equipment is $61,200 per year. The payback period is
   - **a.** 0.2 years.
   - **b.** 5.0 years.
   - **c.** 4.4 years.
   - **d.** 2.3 years.
   - **e.** 3.9 years.
2. A disadvantage of using the payback period to compare investment alternatives is that it
   - **a.** Ignores cash flows beyond the payback period.
   - **b.** Cannot be used to compare alternatives with different initial investments.
   - **c.** Cannot be used when cash flows are not uniform.
   - **d.** Involves the time value of money.
   - **e.** Cannot be used if a company records depreciation.
3. A company buys a machine for $180,000 that has an expected life of nine years and no salvage value. The company expects

an annual income of $8,550. What is the accounting rate of return?

a. 4.75%

b. 42.75%

c. 2.85%

d. 9.50%

e. 6.65%

4. The minimum acceptable rate of return for an investment decision is called the

a. Hurdle rate.

b. Payback rate.

c. Internal rate of return.

d. Average rate of return.

e. Break-even rate of return.

5. A company is considering the purchase of a machine costing $90,000. The annual net cash flow from the machine is $33,600. Assume cash flows are received at each year-end, and the machine has a useful life of three years with zero salvage value. Management requires a 12% return on its investments. What is the net present value of this machine?

a. $60,444

b. $80,700

c. $(88,560)

d. $90,000

e. $(9,300)

ANSWERS TO MULTIPLE CHOICE QUIZ

1. c; Payback = $270,000/$61,200 per year = 4.4 years

2. a

3. d; Accounting rate of return = $8,550/[($180,000 + $0)/2] = 9.5%

4. a

5. e;

	Net Cash Flows	Present Value of an Annuity of 1 at 12%	Present Value of Net Cash Flows
Years 1–3	$33,600	2.4018	$ 80,700
Initial investment			(90,000)
Net present value ...			$ (9,300)

A Superscript letter A denotes assignments based on Appendix 24A.

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

connect

QUICK STUDY

QS 24-1

Payback period and equal cash flows **P1**

Park Co. is considering an investment of $27,000 that provides net cash flows of $9,000 annually for four years. What is the investment's payback period?

QS 24-2

Payback period and equal cash flows **P1**

Project A requires a $280,000 initial investment for new machinery. Project A is expected to yield income of $20,000 per year and net cash flow of $70,000 per year for the next five years. Compute Project A's payback period.

QS 24-3

Analyzing paybackperiods

P1

Howard Co. is considering two alternative investments. The payback period is 3.5 years for Investment A and 4 years for Investment B.

a. If management uses payback period, which investment is preferred?

b. Will an investment with a shorter payback period always be chosen over an investment with a longer payback period?

QS 24-4

Payback period and unequal cash flows

P1

Compute the payback period for an investment with the following net cash flows.

Year	Net Cash Flows per Year	Cumulative Net Cash Flows
Initial investment	$(100,000)	$(100,000)
1.....	10,000	(90,000)
2.....	20,000	(70,000)
3.....	20,000	(50,000)
4.....	30,000	(20,000)
5.....	40,000	20,000
6.....	40,000	60,000

QS 24-5

Interpreting accounting rate of return; no calculations

P2

A company is considering three alternative investment projects. Accounting rate of return computations are calculated using Excel and are shown below. If the company can choose only one project, which will it choose on the basis of accounting rate of return?

Potential Projects	Project A	Project B	Project C
Average investment	$16,000	$90,000	$60,000
Annual income	$ 4,000	$18,000	$13,200
Accounting rate of return. . .	**25%**	**20%**	**22%**

QS 24-6

Accounting rate of return

P2

Project A requires a $280,000 initial investment for new machinery with a five-year life and a salvage value of $30,000. Project A is expected to yield annual income of $20,000 per year and net cash flow of $70,000 per year for the next five years. Compute Project A's accounting rate of return.

QS 24-7

Accounting rate of return **P2**

Peng Company is considering buying a machine that will yield income of $1,950 and net cash flow of $14,950 per year for three years. The machine costs $45,000 and has an estimated $6,000 salvage value. Compute the accounting rate of return for this investment.

QS 24-8

Net present value analysis, no calculations

P3

Net present values for three alternative investment projects follow. (*a*) If the company accepts all positive net present value investments, which of these projects will it accept? (*b*) If the company can choose only one project, which will it choose?

Potential Projects	Project A	Project B	Project C
Net present value	$12,000	$20,000	$(5,000)

QS 24-9

Net present value analysis; no present value calculations

P3

A company is considering three alternative investment projects with different net cash flows. The present value of net cash flows is calculated using Excel and the results follow.

Potential Projects	Project A	Project B	Project C
Present value of net cash flows.. (excluding initial investment)	$10,832	$11,876	$9,870
Initial investment	(10,000)	(10,000)	(10,000)

a. Compute the net present value of each project.

b. If the company accepts all positive net present value projects, which of these will it accept?

c. If the company can choose only one project, which will it choose on the basis of net present value?

QS 24-10

Net present value of annuity (PV factors given)

P3

Ibez Co. is considering a project that requires an initial investment of $60,000 and will generate net cash flows of $16,000 per year for 6 years. Ibez requires a return of 9% on its investments. The present value factor of an annuity for 6 years at 9% is 4.4859.

a. Compute the net present value of the project.

b. Determine whether the project should be accepted on the basis of net present value.

QS 24-11

Net present value (PV factors given)

P3

Dax Co. is considering an investment with the following information.

Year	Net Cash Flows	Present Value of 1 at 12%	Present Value of Net Cash Flows
1.	$ 8,000	0.8929	$
2.	10,000	0.7972	
3.	12,000	0.7118	
Totals	$30,000		
Initial investment			(25,000)
Net present value			$

a. Compute the net present value of the investment.

b. Determine whether the investment should be accepted on the basis of net present value.

QS 24-12

Net present value analysis with salvage value; no present value calculations

P3

A company is considering two alternative machines with different net cash flows and salvage values. Present value amounts are calculated using Excel and the results follow.

Potential Machine Investments	A	B
Present value of net cash flows (excluding initial investment and salvage)	$19,902	$20,800
Present value of net cash flow from salvage value	2,100	552
Initial investment	(20,000)	(20,000)

a. Compute the net present value of each machine A and B.

b. If the company can choose only one machine, which will it choose on the basis of net present value?

QS 24-13

Profitability index analysis, no calculations

P3

The profitability indexes for three alternative investment projects follow. Each project has a five-year life. (*a*) Which project(s) will the company accept on the basis of profitability index? (*b*) If the company can choose only one project, which will it choose?

Potential Projects	Project A	Project B	Project C
Profitability index	0.80	1.40	1.20

QS 24-14

Net present value of an annuity **P3**

Pena Co. is considering an investment of $27,000 that provides net cash flows of $9,000 annually for four years. (*a*) If Pena Co. requires a 10% return on its investments, what is the net present value of this investment? (*b*) Based on net present value, should Pena Co. make this investment?

QS 24-15

Net present value of an annuity **P3**

A company is considering investing in a new machine that requires an initial investment of $47,947. The machine will generate annual net cash flows of $21,000 for the next three years. The company uses an 8% discount rate. Compute the net present value of this investment.

QS 24-16

Net present value of annuity and salvage value **P3**

Quail Co. is considering buying a food truck that will yield net cash inflows of $10,000 per year for seven years. The truck costs $50,000 and has an estimated $6,000 salvage value at the end of the seventh

year. What is the net present value of this investment assuming a required 10% return?

QS 24-17

Net present value of annuity and salvage value

P3

Pablo Company is considering buying a machine that will yield income of $1,950 and net cash flow of $14,950 per year for three years. The machine costs $45,000 and has an estimated $6,000 salvage value. Pablo requires a 15% return on its investments. Compute the net present value of this investment.

QS 24-18

Profitability index

P3

Yokam Company is considering two alternative projects. Project 1 requires an initial investment of $400,000 and has a present value of net cash flows of $1,100,000. Project 2 requires an initial investment of $4 million and has a present value of net cash flows of $6 million. (*a*) Compute the profitability index for each project. (*b*) Based on the profitability index, which project should the company select?

QS 24-19

Net present value with unequal cash flows

P3

Following is information on an investment in a manufacturing machine. The machine has zero salvage value. The company requires a 12% return from its investments. Compute this machine's net present value.

Initial investment	$(200,000)
Net cash flows: Year 1 . .	100,000
Year 2 . .	90,000
Year 3 . .	75,000

QS 24-20

Net present value with uneven cash flows and salvage value **P3**

Refer to the information in QS 24-19 and instead assume the machine has a salvage value of $20,000 at the end of its three-year life. Compute the machine's net present value.

QS 24-21

Internal rate of return analysis, no calculations

P4

Internal rates of return for three alternative investment projects follow. Each project has a five-year life. The company requires a 12% rate of return on its investments. (*a*) Which project(s) will the company accept on the basis of internal rate of return? (*b*) If the company can choose only one project, which will it choose?

Potential Projects	Project X	Project Y	Project Z
Internal rate of return	13%	11%	15%

QS 24-22

Internal rate of return **P4**

A company is considering investing in a new machine that requires an initial investment of $47,947. The machine will generate annual net cash flows of $21,000 for the next three years. What is the internal rate of return of this machine?

QS 24-23

Internal rate of return **P4**

Perez Co. is considering an investment of $27,336 that provides net cash flows of $9,000 annually for four years. (*a*) What is the internal rate of return of this investment? (*b*) The hurdle rate is 10%. Should the company invest in this project on the basis of internal rate of return?

QS 24-24

Break-even time

A1

A $100,000 initial investment will generate the following present values of net cash flows. What is the break-even time for this investment?

Year	Present Value of Net Cash Flows	Cumulative Present Value of Net Cash Flows
Initial investment . . .	$(100,000)	$(100,000)
1.	36,364	(63,636)
2.	33,056	(30,580)
3.	25,116	(5,464)
4.	27,320	21,856
5.	24,836	46,692

EXERCISES

Exercise 24-1

Payback period, equal cash flows, and depreciation adjustment

P1

Information for two alternative projects involving machinery investments follows. Project 1 requires an initial investment of $140,000. Project 2 requires an initial investment of $90,000. Compute (*a*) annual net cash flow and (*b*) payback period for each investment.

Annual Amounts	Project 1	Project 2
Sales of new product	$100,000	$80,000
Expenses		
Materials, labor, and overhead (except depreciation)	64,000	35,000
Depreciation—Machinery	20,000	18,000
Selling, general, and administrative expenses	8,000	20,000
Income	$ 8,000	$ 7,000

Exercise 24-2

Payback period, equal cash flows, and depreciation adjustment **P1**

Quary Co. is considering an investment in machinery with the following information. Compute the investment's (*a*) annual income *and* annual net cash flow and (*b*) payback period.

Initial investment	$200,000	Materials, labor, and overhead (except depreciation)	$45,000
Useful life	9 years	Depreciation—Machinery	20,000
Salvage value	$20,000	Selling, general, and administrative expenses	5,000
Expected sales per year	10,000 units	Selling price per unit	$10

Exercise 24-3

Payback period and unequal cash flows **P1**

Beyer Company is considering buying an asset for $180,000. It is expected to produce the following net cash flows. Compute the payback period for this investment.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net cash flows	$60,000	$40,000	$70,000	$125,000	$35,000

Exercise 24-4

Payback period, unequal cash flows, and depreciation adjustment

P1

A machine can be purchased for $150,000 and used for five years, yielding the following income. This income computation includes annual depreciation expense of $30,000. Compute the machine's payback period.

	Year 1	Year 2	Year 3	Year 4	Year 5
Income	$10,000	$25,000	$50,000	$37,500	$100,000

Exercise 24-5

Accounting rate of return

P2

Information for two alternative projects involving machinery investments follows.

	Project 1	Project 2
Initial investment	$(120,000)	$(90,000)
Salvage value	0	10,000
Annual income	15,000	12,000

a. Compute accounting rate of return for each project.

b. Based on accounting rate of return, which project is preferred?

Exercise 24-6

Payback period, equal cash flows, and accounting rate of return

P1 P2

B2B Co. is considering the purchase of equipment that would allow the company to add a new product to its line. The equipment costs $360,000 and has a 12-year life and no salvage value. The expected annual income for each year from this equipment follows. Compute the (*a*) annual net cash flow, (*b*) payback period, and (*c*) accounting rate of return for this equipment.

Sales of new product	$225,000
Expenses	
Materials, labor, and overhead (except depreciation)	120,000
Depreciation—Equipment	30,000
Selling, general, and administrative expenses	38,250
Income	$ 36,750

Exercise 24-7

Net present value and unequal cash flows **P3**

Gomez is considering a $180,000 investment with the following net cash flows. Gomez requires a 10% return on its investments. (*a*) Compute the net present value of this investment. (*b*) Should Gomez accept the investment?

	Year 1	Year 2	Year 3	Year 4	Year 5
Net cash flows	$60,000	$40,000	$70,000	$125,000	$35,000

Exercise 24-8

Net present value and unequal cash flows **P3**

A company is considering a $150,000 investment in machinery with the following net cash flows. The company requires a 10% return on its investments. (*a*) Compute the net present value of this investment. (*b*) Should the machinery be purchased?

	Year 1	Year 2	Year 3	Year 4	Year 5
Net cash flows	$10,000	$25,000	$50,000	$37,500	$100,000

Exercise 24-9

Payback period; net present value; unequal cash flows

P1 P3

Gonzalez Co. is considering two new projects with the following net cash flows. The company's required rate of return on investments is

10%.

Year	Net Cash Flows	
	Project 1	Project 2
Initial investment	$(60,000)	$(60,000)
1	30,000	35,000
2	30,000	20,000
3	5,000	20,000

a. Compute payback period for each project. Based on payback period, which project is preferred?

b. Compute net present value for each project. Based on net present value, which project is preferred?

Exercise 24-10

Net present value, unequal cash flows, and profitability index

P3

Following is information on two alternative investment projects being considered by Tiger Co. The company requires a 4% return from its investments. Compute each project's (*a*) net present value and (*b*) profitability index. Round present value calculations to the nearest dollar and round the profitability index to two decimals. (*c*) If the company can choose only one project, which should it choose on the basis of profitability index?

	Project X1	Project X2
Initial investment	$(80,000)	$(120,000)
Net cash flows: Year 1	25,000	60,000
Year 2	35,500	50,000
Year 3	60,500	40,000

Exercise 24-11

Net present value, unequal cash flows, and profitability index **P3**

Refer to the information in Exercise 24-10. The company instead requires a 12% return on its investments. Compute each project's (*a*)

net present value and (*b*) profitability index. Round present value calculations to the nearest dollar and round the profitability index to two decimals. (*c*) If the company can choose only one project, which should it choose on the basis of profitability index?

Exercise 24-12

Net present value, unequal cash flows, profitability index, and service company

P3

Following is information on two alternative investments. Beachside Resort is considering building a new pool or spa. The company requires a 10% return from its investments. For each investment project, compute (*a*) net present value and (*b*) profitability index. (*c*) If the company can only select one project, which should it choose on the basis of profitability index?

	Pool	Spa
Initial investment	$(160,000)	$(105,000)
Net cash flows: Year 1	40,000	32,000
Year 2	56,000	50,000
Year 3	80,295	66,000
Year 4	90,400	72,000
Year 5	65,000	24,000

Exercise 24-13

Net present value of an annuity **P3**

Refer to the information in Exercise 24-6. B2B Co. requires at least an 8% return on this investment. (*a*) Compute the net present value of this investment. (*b*) Should the investment be accepted on the basis of net present value?

Exercise 24-14

Net present value of an annuity **P3**

Refer to the information in Exercise 24-1. Project 1 has a seven-year useful life, and Project 2 has a five-year useful life. Assume the company requires a 10% rate of return on its investments. Compute the net present value of each potential investment.

Exercise 24-15

Internal rate of return

P4

GTO Inc. is considering an investment costing $214,170 that results in net cash flows of $30,000 annually for 11 years. (*a*) What is the internal rate of return of this investment? (*b*) The hurdle rate is 9.5%. Should the company invest in this project on the basis of internal rate of return?

Exercise 24-16

Investment decisions; no calculations

P1 P3 P4

Lopez Co. is considering three alternative investment projects below. Which project is preferred if management makes its decision based on (*a*) payback period, (*b*) net present value, and (*c*) internal rate of return?

	Project 1	Project 2	Project 3
Payback period	3.5 years	4.0 years	3.2 years
Net present value	$25,000	$32,000	$18,000
Internal rate of return	12.5%	11.4%	10.8%

Exercise 24-17

NPV and IRR for strategic investment

P3 P4

OptiLux is considering investing in an automated manufacturing system. The system requires an initial investment of $4 million, has a 20-year life, and will have zero salvage value. If the system is implemented, the company will save $500,000 per year in direct labor costs. The company requires a 10% return from its investments.

a. Compute the proposed investment's net present value.

b. Using the answer from part *a*, is the investment's internal rate of return higher or lower than 10%? *Hint:* It is not necessary to compute IRR to answer this question.

Exercise 24-18

Net present value, unequal cash flows, and internal rate of return

P3 P4

Phoenix Company is considering investments in projects C1 and C2. Both require an initial investment of $228,000 and would yield the following annual net cash flows.

Net cash flows	Project C1	Project C2
Year 1	$ 12,000	$ 96,000
Year 2	108,000	96,000
Year 3	168,000	96,000
Totals	$288,000	$288,000

a. The company requires a 12% return from its investments. Compute net present values using factors from Table B.1 in Appendix B to determine which projects, if any, should be accepted.

b. Using the answer from part *a*, is the internal rate of return higher or lower than 12% for (i) Project C1 and (ii) Project C2? *Hint:* It is not necessary to compute IRR to answer this question.

Exercise 24-19

Net present value; internal rate of return; equal cash flows **P3 P4**

Refer to the information in Exercise 24-2. The company's required rate of return is 12%.

a. Compute the investment's net present value.

b. Using the answer from part *a*, is the investment's internal rate of return higher or lower than 12%? *Hint:* It is not necessary to compute the IRR to answer this question.

Exercise 24-20[A]

IRR for investment using Excel **P4**

Refer to the information in Exercise 24-17. Create an Excel spreadsheet to compute the internal rate of return for the proposed investment.

Exercise 24-21[A]

Internal rate of return using Excel **P4**

Refer to the information in Exercise 24-10. (*a*) Create an Excel spreadsheet to compute the internal rate of return for each of the projects. (*b*) Based on internal rate of return, determine whether the company should accept either of the two projects.

Exercise 24-22[A]

Using Excel to compute IRR **P4**

Refer to the information in Exercise 24-12. Create an Excel spreadsheet to compute the internal rate of return for each of the projects.

Exercise 24-23

Break-even time

A1

A shoe manufacturer is evaluating new equipment that would custom fit athletic shoes. The new equipment costs $90,000 and will generate $35,000 in net cash flows for five years. Determine the break-even time for this equipment.

Year	Net Cash Flows	Present Value of 1 at 10%	Present Value of Net Cash Flows	Cumulative Present Value of Net Cash Flows
Initial investment	$(90,000)	1.0000	_____	_____
1	35,000	0.9091	_____	_____
2	35,000	0.8264	_____	_____
3	35,000	0.7513	_____	_____
4	35,000	0.6830	_____	_____
5	35,000	0.6209	_____	_____

PROBLEM SET A

Problem 24-1A

Payback period, net present value, and net cash flow calculation

P1 P3

Factor Company is planning to add a new product to its line. To manufacture this product, the company needs to buy a new machine at a $480,000 cost with an expected four-year life and a $20,000 salvage value. Additional annual information for this new product line follows.

Sales of new product	$1,840,000
Expenses	
Materials, labor, and overhead (except depreciation)	1,488,000
Depreciation—Machinery	115,000
Selling, general, and administrative expenses	183,100

Required

1. Determine income and net cash flow for each year of this machine's life.

2. Compute this machine's payback period, assuming that cash flows occur evenly throughout each year.
3. Compute net present value for this machine using a discount rate of 7%.

Problem 24-2A

Payback period, accounting rate of return, net present value, and net cash flow calculation

P1 P2 P3

Project Y requires a $350,000 investment for new machinery with a four-year life and no salvage value. The project yields the following annual results. Cash flows occur evenly within each year.

Annual Amounts	Project Y
Sales of new product	$350,000
Expenses	
Materials, labor, and overhead (except depreciation)	157,500
Depreciation—Machinery	87,500
Selling, general, and administrative expenses	49,000
Income	$ 56,000

Required

1. Compute Project Y's annual net cash flows.
2. Determine Project Y's payback period.
3. Compute Project Y's accounting rate of return.
4. Determine Project Y's net present value using 8% as the discount rate.

Problem 24-3A

Applying payback period, accounting rate of return, and net present value

P1 P2 P3

Garcìa Co. can invest in one of two alternative projects. Project Y requires a $360,000 initial investment for new machinery with a four-year life and no salvage value. Project Z requires a $360,000 initial investment for new machinery with a three-year life and no salvage value. The two projects yield the following annual results. Cash flows occur evenly within each year.

Annual Amounts	Project Y	Project Z
Sales of new product	$400,000	$500,000
Expenses		
Materials, labor, and overhead (except depreciation)	190,000	200,000
Depreciation—Machinery	90,000	120,000
Selling, general, and administrative expenses	50,000	50,000
Income	$ 70,000	$130,000

Required

1. Compute each project's annual net cash flows.
2. Compute each project's payback period. If the company bases investment decisions solely on payback period, which project will it choose?
3. Compute each project's accounting rate of return. If the company bases investment decisions solely on accounting rate of return, which project will it choose? page 955
4. Compute each project's net present value using 8% as the discount rate. If the company bases investment decisions solely on net present value, which project will it choose?

Problem 24-4A

Applying net present value and profitability index

P3

Rowan Co. is considering two alternative investment projects. Each requires a $250,000 initial investment. Project A is expected to generate net cash flows of $60,000 per year over the next six years. Project B is expected to generate net cash flows of $50,000 per year

over the next seven years. Management requires an 8% rate of return on its investments.

Required

1. Compute each project's net present value.
2. Compute each project's profitability index.
3. If the company can choose only one project, which should it choose, based on profitability index?

Problem 24-5A

Payback period, break-even time, and net present value

A1 P1 P3

Salsa Company is considering an investment in technology to improve its operations. The investment costs $250,000 and will yield the following net cash flows. Management requires a 10% return on investments.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net cash flows	$47,000	$52,000	$75,000	$94,000	$125,000

Required

1. Determine the payback period for this investment.
2. Determine the break-even time for this investment.
3. Determine the net present value for this investment.

Analysis Component

4. Should management invest in this project based on net present value?

Problem 24-6A

Net present value of alternate investments

P3

Interstate Manufacturing is considering either overhauling an old machine or replacing it with a new machine. Information about the two alternatives follows. Management requires a 10% rate of return on its investments.

Alternative 1: Keep the old machine and have it overhauled. This requires an initial investment of $150,000 and results in $50,000 of net cash flows in each of the next five years. After five years, it can be sold for a $15,000 salvage value.

Alternative 2: Sell the old machine for $29,000 and buy a new one. The new machine requires an initial investment of $300,000 and can be sold for a $20,000 salvage value in five years. It would yield cost savings and higher sales, resulting in net cash flows of $65,000 in each of the next five years.

Required

1. Determine the net present value of alternative 1.
2. Determine the net present value of alternative 2.
3. Which alternative should management select based on net present value?

PROBLEM SET B

Problem 24-1B

Payback period, net present value, and net cash flow calculation

P1 P3

Cortino Company is planning to add a new product to its line. To manufacture this product, the company needs to buy a new machine at a $300,000 cost with an expected four-year life and a $20,000 salvage value. Additional annual information for this new product line follows.

Sales of new product	$1,150,000
Expenses	
Materials, labor, and overhead (except depreciation)	930,000
Depreciation—Machinery	70,000
Selling, general, and administrative expenses	115,000

Required

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1. Determine income and net cash flow for each year of this machine's life.
2. Compute this machine's payback period, assuming that cash flows occur evenly throughout each year.
3. Compute net present value for this machine using a discount rate of 7%.

Problem 24-2B

Payback period, accounting rate of return, net present value, and net cash flow calculation

P1 P2 P3

Project A requires a $240,000 investment for new machinery with a four-year life and no salvage value. The project yields the following annual results. Cash flows occur evenly within each year.

Annual Amounts	Project A
Sales of new product	$250,000
Expenses	
Materials, labor, and overhead (except depreciation)	115,000
Depreciation—Machinery	60,000
Selling, general, and administrative expenses	35,100
Income	$ 39,900

Required

1. Compute Project A's annual net cash flows.
2. Determine Project A's payback period.
3. Compute Project A's accounting rate of return.

4. Determine Project A's net present value using 8% as the discount rate.

Problem 24-3B

Applying payback period, accounting rate of return, and net present value

P1 P2 P3

Lopez Co. can invest in one of two alternative projects. Project Y requires a $240,000 initial investment for new machinery with a four-year life and no salvage value. Project Z requires a $240,000 initial investment for new machinery with a three-year life and no salvage value. The two projects yield the following annual results. Cash flows occur evenly within each year.

Annual Amounts	Project Y	Project Z
Sales of new product	$320,000	$350,000
Expenses		
Materials, labor, and overhead (except depreciation)	146,000	150,000
Depreciation—Machinery	60,000	70,000
Selling, general, and administrative expenses	50,000	40,000
Income	$ 64,000	$ 90,000

Required

1. Compute each project's annual net cash flows.
2. Compute each project's payback period. If the company bases investment decisions solely on payback period, which project will it choose?
3. Compute each project's accounting rate of return. If the company bases investment decisions solely on accounting rate of return, which project will it choose?
4. Compute each project's net present value using 9% as the discount rate. If the company bases investment decisions solely on net present value, which project will it choose?

Problem 24-4B

Applying net present value and profitability index

P3

Milan Co. is considering two alternative investment projects. Each requires a $300,000 initial investment. Project A is expected to generate net cash flows of $90,000 per year over the next five years. Project B is expected to generate net cash flows of $80,000 per year over the next six years. Management requires an 8% rate of return on its investments.

Required

1. Compute each project's net present value.
2. Compute each project's profitability index.
3. If the company can choose only one project, which will it choose, based on profitability index?

Problem 24-5B

Payback period, break-even time, and net present value

A1 P1 P3

Aster Company is considering an investment in technology to improve its operations. The investment costs $800,000 and yields the following net cash flows. Management requires a 10% return on its investments.

	Year 1	Year 2	Year 3	Year 4
Net cash flows . .	$300,000	$350,000	$400,000	$450,000

Required

1. Determine the payback period for this investment.
2. Determine the break-even time for this investment.
3. Determine the net present value for this investment.

Analysis Component

4. Should management invest in this project based on net present value?

Problem 24-6B

Net present value of alternate investments

P3

Archer Foods is considering whether to overhaul an old freezer or replace it with a new freezer. Information about the two alternatives follows. Management requires a 10% rate of return on its investments.

Alternative 1: Keep the old freezer and have it overhauled. This requires an initial investment of $50,000, resulting in $10,000 of net cash flows in each of the next eight years. After eight years, it can be sold for a $4,000 salvage value.

Alternative 2: Sell the old freezer for $5,000 and buy a new one. The new freezer requires an initial investment of $150,000 and can be sold for an $8,000 salvage value in eight years. The new freezer is larger, would increase sales, and would result in net cash flows of $40,000 in each of the next eight years.

Required

1. Determine the net present value of alternative 1.
2. Determine the net present value of alternative 2.
3. Which alternative should management select based on net present value?

SERIAL PROBLEM

Business Solutions

P1 P2 P4

Alexander Image/Shutterstock

This serial problem began in Chapter 1 and continues through most of the book. If previous chapter segments were not completed, the serial problem can begin at this point.

SP 24 Santana Rey is considering the purchase of equipment for **Business Solutions** that would allow the company to add a new product to its computer furniture line. The equipment is expected to cost $300,000 and to have a six-year life and no salvage value. The equipment is expected to generate income of $12,939 and net cash flow of $62,939 in each year of its six-year life. Santana requires an 8% return on all investments.

Required

1. Compute payback period, net present value, and internal rate of return for this equipment.
2. If Santana requires investments to have payback periods of four years or less, should she invest in this equipment?
3. If Santana requires investments to have at least an 8% internal rate of return, should she invest in this equipment?

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments (1) do not require

instructors to know Tableau, (2) are accessible to introductory students, (3) do not require Tableau software, and (4) run in **Connect**. All are auto-gradable.

Tableau DA 24-1 Quick Study, Payback period, **P1**—similar to QS 24-1 and QS 24-4.

Tableau DA 24-2 Exercise, Internal rate of return, **P4**—similar to QS 24-22, Exercise 24-15.

Tableau DA 24-3 Mini-case, Net present value and profitability index, **P3**—Similar to Exercise 24-10.

Accounting Analysis connect

COMPANY ANALYSIS

A1

APPLE

AA 24-1 **Apple** invested $10,495 in the current year to expand its manufacturing capacity. Assume that these assets have a 10-year life and generate net cash flows of $3,000 per year, and that Apple requires a 7% return on its investments. (Apple $s in millions.)

Required

1. Compute break-even time.
2. Compute the net present value of this investment.

COMPARATIVE ANALYSIS

A1

GOOGLE

APPLE

AA 24-2 Information on assumed capital investments in the current year for **Google** and Apple follow.

$ millions	Google	Apple
Initial investment	$(23,548)	$(10,495)
Annual net cash flows, years 1–10	$4,000	$3,000
Required rate of return on investment	6%	7%

Required

1. Compute break-even time for both companies.
2. Based on break-even time, which company can expect its investment to more quickly yield positive net cash flows?

EXTENDED ANALYSIS

A1

Samsung

AA 24-3 **Samsung** invested $21,766 in the current year to expand its manufacturing capacity. Assume that these assets have an 8-year life and generate net cash flows of $4,000 per year, and that Samsung requires a 7% return on its investments. (Samsung $s in millions.)

Required

Compute break-even time.

Discussion Questions

1. What is capital budgeting?
2. Identify four reasons that capital budgeting decisions are risky.
3. Describe the cash inflows and outflows that occur over the life of a typical capital expenditure.
4. Identify two weaknesses of the payback period method.
5. Why is an investment more attractive if it has a shorter payback period?

6. What is the average amount invested in a machine during its predicted five-year life if it costs $200,000 and has a $20,000 salvage value?

7. If the present value of the net cash flows from a machine, discounted at 10%, exceeds the initial investment, what can you say about the investment's internal rate of return? What can you say about the internal rate of return if the present value of the net cash flows, discounted at 10%, is less than the initial investment?

8. Why is the present value of $100 that you expect to receive one year from today worth less than $100 received today? page 959

9. If a potential investment's internal rate of return is above the company's hurdle rate, should the investment be made?

10. **Samsung** is planning to invest in a new companywide computerized inventory tracking system. What makes this potential investment risky?

Samsung

11. **Google** is planning to acquire new equipment to manufacture tablet computers. What are some of the cash flows that would be included in Google's analysis?

GOOGLE

12. **Apple** is considering expanding a store. Identify three methods management can use to evaluate whether to expand.

APPLE

13. Discuss the advantage of break-even time over the payback period.

Beyond the Numbers

ETHICS CHALLENGE

P3 

BTN 24-1 Management requires purchases above $5,000 to be submitted with cash flow projections for capital budget approval. As systems manager, you want to upgrade your computers at a $25,000 cost. You consider submitting several orders, each under $5,000 to avoid the approval process. You believe the computers will increase income and wish to avoid a delay.

Required

As systems manager, is your plan to submit several separate orders appropriate? What should you do?

COMMUNICATING IN PRACTICE

P1 P3

BTN 24-2 Payback period and net present value are common methods to evaluate capital investment opportunities. Assume that your manager asks you to explain why net present value is better than payback period for making investment choices. Present your response in memorandum format of less than one page.

TEAMWORK IN ACTION

P1 P3

BTN 24-3 Assume an airline is considering an investment in a new baggage handling system. Separate into teams and identify at least three *qualitative* factors that should be considered in this investment decision.

ENTREPRENEURIAL DECISION

P1 P2 P3 P4

BTN 24-4 Read the chapter opener about Jake Loosararian and his company, **Gecko Robotics**. Suppose Jake's business continues to grow, and he builds a massive new manufacturing facility and warehousing center to make the business more efficient and reduce costs.

Required

1. What are some of the management tools that Jake can use to evaluate whether the new manufacturing facility and warehousing center will be a good investment?
2. What information does Jake need to use the tools that you identified in your answer to part 1?
3. What are some of the strengths and weaknesses of each tool identified in your answer to part 1?

Glossary

Absorption costing Costing method that assigns both variable and fixed manufacturing costs to products; this method is required under U.S. GAAP; also called *full costing*. (721, 741)

Accelerated depreciation method Method that produces larger depreciation charges in the early years of an asset's life and smaller charges in its later years. (318)

Account Record within an accounting system in which increases and decreases are entered and stored in a specific asset, liability, equity, revenue, or expense. (45)

Account balance Difference between total debits and total credits (including the beginning balance) for an account. (49)

Account form balance sheet Balance sheet that lists assets on the left side and liabilities and equity on the right.

Account payable Liability created by buying goods or services on credit; backed by the buyer's general credit standing.

Accounting Information and measurement system that identifies, records, and communicates relevant information about a company's business activities. (3)

Accounting cycle Recurring steps performed each accounting period, starting with analyzing transactions and continuing through the post-closing trial balance (or optional reversing entries). (103)

Accounting equation Equality involving a company's assets, liabilities, and equity; Assets = Liabilities + Equity; also called *balance sheet equation*. (9)

Accounting information system People, records, and methods that collect and process data from transactions and events, organize them in useful reports, and communicate results to decision makers.

Accounting period Length of time covered by financial statements; also called *reporting period*. (85)

Accounting rate of return (ARR) Rate used to evaluate the acceptability of an investment; equals the after-tax periodic income from a project divided by the average investment in the asset; also called *rate of return on a verage investment.* (936)

Accounts payable ledger Subsidiary ledger listing individual creditor (supplier) accounts.

Accounts receivable Amounts due from customers for credit sales; backed by the customer's general credit standing. (281)

Accounts receivable ledger Subsidiary ledger listing individual customer accounts.

Accounts receivable turnover Measure of both the quality and liquidity of accounts receivable; indicates how often receivables are received and collected during the period; computed by dividing net sales by average accounts receivable. (295)

Accrual basis accounting Accounting system that recognizes revenues when goods or services are provided and expenses when incurred; the basis for GAAP. (86)

Accrued expenses Costs incurred in a period that are both unpaid and unrecorded; adjusting entries for recording accrued expenses involve increasing expenses and increasing liabilities. (92)

Accrued revenues Revenues earned in a period that are both unrecorded and not yet received in cash (or other assets); adjusting entries for recording accrued revenues involve increasing assets and increasing revenues. (94)

Accumulated depreciation Cumulative sum of all depreciation-expense recorded for an asset. (89)

Acid-test ratio Ratio used to assess a company's ability to settle its current debts with its most liquid assets; defined as quick assets (cash, short-term investments, and current receivables) divided by current liabilities. (168)

Activity An event that causes the consumption of overhead resources in an entity. (672)

Activity-based budgeting (ABB) Budget system based on expected activities.

Activity-based costing (ABC) Cost allocation method that focuses on activities performed; traces costs to activities and then assigns them to cost objects. (672)

Activity-based management (ABM) Approach that uses the link between activities and costs for better management decisions. (677)

Activity cost driver Variable that causes an activity's cost to go up or down; a causal factor. (673)

Activity cost pool Temporary account that accumulates costs a company incurs to support an activity. (673)

Activity overhead (cost pool) rate Overhead rate for a pool of costs driven by the same activity.

Activity rate The overhead rate in activity-based costing; computed as the total budgeted activity cost divided by the budgeted activity-base usage. (673)

Adjusted trial balance List of accounts and balances prepared after period-end adjustments are recorded and posted. (97)

Adjusting entry Journal entry at the end of an accounting period to bring an asset or liability account to its proper amount and update the related expense or revenue account. (87)

Aging of accounts receivable Process of classifying accounts receivable by how long they are past due for purposes of estimating uncollectible accounts. (288)

Allowance for Doubtful Accounts Contra asset account with a balance approximating uncollectible accounts receivable; also called *Allowance for Uncollectible Accounts*. (285)

Allowance for Sales Discounts Contra asset account that is reported on the balance sheet as a reduction to Accounts

Receivable; this allowance account has a normal credit balance. (177)

Allowance method Procedure that (a) estimates and matches bad debts expense with its sales for the period and/or (b) reports accounts receivable at estimated realizable value. (285)

Amortization Process of allocating the cost of an intangible asset to expense over its estimated useful life. (326)

Annual financial statements Financial statements covering a oneyear period; often based on a calendar year, but any consecutive 12-month (or 52-week) period is acceptable. (85)

Annual report Summary of a company's financial results for the year along with its current financial condition and future plans; directed to external users of financial information.

Annuity Series of equal payments at equal intervals. (938)

Appropriated retained earnings Retained earnings separately-reported to inform stockholders of funding needs. (437)

Asset book value Asset's acquisition costs less its accumulated depreciation (or depletion, or amortization); also sometimes used synonymously as the *carrying value* of an account; also called *book value.* (316)

Assets Resources a business owns or controls that are expected to provide current and future benefits to the business. (9)

Auction-based pricing Prices are set by potential buyers' bids. (912)

Audit Analysis and report of an organization's accounting system, its records, and its reports using various tests. (7)

Auditors Individuals hired to review financial reports and information systems. *Internal auditors* of a company are employed to assess and evaluate its system of internal controls, including the resulting reports. *External auditors* are independent of a company

and are hired to assess and evaluate the “fairness” of financial statements (or to perform other contracted financial services). (6)

Authorized stock Total amount of stock that a corporation’s charter authorizes it to issue. (425)

Available-for-sale (AFS) securities Investments in debt securities that are not classified as trading securities or held-to-maturity securities. (C-6)

Average cost Method for assigning inventory cost to sales; the cost of available-for-sale units is divided by the number of units available to determine per unit cost prior to each sale, which is then multiplied by the units sold to yield the cost of that sale; also called *weighted average.* (206)

Avoidable expense Expense (or cost) that is relevant for decision making; expense that is not incurred if a department, product, or service is eliminated. (908)

Backflush costing Product costing system that flushes costs of unfinished products from Cost of Goods Sold to Work in Process Inventory at the end of the period.

Bad debts Accounts of customers who do not pay what they have promised to pay; an expense of selling on credit; also called *uncollectible accounts*. (283)

Balance column account Account with debit and credit columns for recording entries and another column for showing the balance of the account after each entry. (51)

Balance sheet Financial statement that lists types and dollar amounts of assets, liabilities, and equity at a specific date. (15)

Balance sheet equation Equality involving a company’s assets, liabilities, and equity; Assets = Liabilities + Equity; also called *accounting equation.*

Balanced scorecard A system of performance measurement that collects information on several key performance indicators within each of four perspectives: customer, internal processes, innovation and learning, and financial. (875)

Bank reconciliation Report that explains the difference between the book (company) balance of cash and the cash balance reported on the bank statement, for purposes of computing the adjusted cash balance. (257)

Bank statement Bank report on the depositor's beginning and ending cash balances, and a listing of its changes, for a period. (256)

Basic earnings per share Net income less any preferred dividends and then divided by weighted-average common shares outstanding. (438)

Batch-level activities Activities that are performed each time a batch of goods is handled or processed, regardless of how many units are in a batch; the amount of resources used depends on the number of batches run rather than on the number of units in the batch. (676)

Batch processing Accumulating source documents for a period of time and then processing them all at once such as once a day, week, or month.

Batch size (lot size) The number of units produced after a machine setup. (D-2)

Bearer bonds Bonds made payable to whoever holds them (the *bearer*); also called *unregistered bonds*. (398)

Benchmarking Practice of comparing and analyzing company financial performance or position with other companies or standards. (827)

Betterments Expenditures to make a plant asset more efficient or productive; also called *i mprovements*. (321)

Blockchain Technology used to create a secure ledger of transactions. (247)

Bond Written promise to pay the bond's par (or face) value and interest at a stated contract rate; often issued in denominations of $1,000. (387)

Bond certificate Document containing bond specifics such as issuer's name, bond par value, contract interest rate, and maturity date. (388)

Bond indenture Contract between the bond issuer and the bondholders; identifies the parties' rights and obligations. (388)

Book value Asset's acquisition costs less its accumulated depreciation (or depletion, or amortization); also sometimes used synonymously as the *carrying value* of an account; also called *asset book value.* (89)

Book value per common share Recorded amount of equity applicable to common shares divided by the number of common shares outstanding.

Book value per preferred share Equity applicable to preferred shares (equals its call price [or par value if it is not callable] plus any cumulative dividends in arrears) divided by the number of preferred shares outstanding.

Bookkeeping Part of accounting that involves recording transactions and events, either manually or electronically; also called *recordkeeping.* (3)

Break-even point Output level at which sales equal fixed plus variable costs; where income equals zero. (711)

Break-even time (BET) Time-based measurement used to page G-3 evaluate the acceptability of an investment; equals the time expected to pass before the present value of the net cash flows from an investment equals its initial cost. (942)

Budget Formal statement of future plans, usually expressed in monetary terms. (773)

Budget report Report comparing actual results to planned objectives; sometimes used as a progress report. (821)

Budgetary control Management use of budgets to monitor and control company operations. (773)

Budgeted balance sheet Accounting report that presents predicted amounts of the company's assets, liabilities, and equity balances as of the end of the budget period. (786)

Budgeted income statement Accounting report that presents predicted amounts of the company's revenues and expenses for the budget period. (785)

Budgeting Process of planning future business actions and expressing them as formal plans. (773)

Business An organization of one or more individuals selling products and/or services for profit.

Business entity assumption Principle that requires a business to be accounted for separately from its owner(s) and from any other entity. (8)

Business segment Part of a company that can be separately identified by the products or services that it provides or by the geographic markets that it serves; also called *segment*. (521)

C corporation Corporation that does not qualify for nor elect to be treated as a proprietorship or partnership for income tax purposes and therefore is subject to income taxes; also called *C corp.*

Call price Amount that must be paid to call and retire a callable preferred stock or a callable bond.

Callable bonds Bonds that give the issuer the option to retire them at a stated amount prior to maturity. (399)

Callable preferred stock Preferred stock that the issuing corporation, at its option, may retire by paying the call price plus any dividends in arrears.

Canceled checks Checks that the bank has paid and deducted from the depositor's account. (256)

Capital budgeting Process of analyzing alternative investments and deciding which assets to acquire or sell. (933)

Capital expenditures Additional costs of plant assets that provide material benefits extending beyond the current period; also called

balance sheet expenditures. (321)

Capital expenditures budget Plan that lists dollar amounts to be both received from disposal of plant assets and spent to purchase plant assets. (781)

Capital lease Long-term lease in which the lessor transfers substantially all risks and rewards of ownership to the lessee; not acceptable under GAAP after 2019.

Capital rationing Financing constraints that limit firms from accepting all positive net present value projects.

Capital stock General term referring to a corporation's stock used in obtaining capital (owner financing). (425)

Capitalize Record the cost as part of a permanent account and allocate it over later periods.

Carrying (book) value of bonds Net amount at which bonds are reported on the balance sheet; equals the par value of the bonds less any unamortized discount or plus any unamortized premium; also called *carrying amount* or *book value*. (390)

Cash Includes currency, coins, and amounts on deposit in bank checking or savings accounts. (249)

Cash basis accounting Accounting system that recognizes revenues when cash is received and records expenses when cash is paid. (86)

Cash budget Plan that shows expected cash inflows and outflows during the budget period, including receipts from loans needed to maintain a minimum cash balance and repayments of such loans. (781)

Cash conversion cycle The average time it takes to convert cash outflows into cash inflows from customers. (878)

Cash discount Reduction in the price of merchandise granted by a seller to a buyer when payment is made within the discount period. (155)

Cash dividend Corporation's distribution of cash to its owners. (428)

Cash equivalents Short-term investment assets that are readily convertible to a known cash amount or sufficiently close to their maturity date (usually within 90 days) so that market value is not sensitive to interest rate changes. (249)

Cash flow on total assets Ratio of operating cash flows to average total assets; not sensitive to income recognition and measurement; partly reflects on earnings quality. (473)

Cash Over and Short Income statement account used to record cash overages and cash shortages arising from errors in cash receipts or payments. (250)

Cash payments journal Special journal normally used to record all payments of cash; also called *cash disbursements journal*.

Cash receipts journal Special journal normally used to record all receipts of cash.

Change in an accounting estimate Change in an accounting estimate that results from new information, subsequent developments, or improved judgment that impacts current and future periods. (319, 437)

Chart of accounts List of accounts used by a company; includes an identification number for each account. (48)

Check Document signed by a depositor instructing the bank to pay a specified amount to a designated recipient. (255)

Check register Another name for a cash payments journal when the journal has a column for check numbers. (263)

Classified balance sheet Balance sheet that presents assets and-liabilities in relevant subgroups, including current and noncurrent classifications. (104)

Closed-loop supply chain Products are built using only renewable resources or recycled material. (D-10)

Closing entries Entries recorded at the end of each accounting period to transfer end-of-period balances in revenue, gain, expense, loss, and withdrawals (dividends for a corporation) accounts to the capital account (or retained earnings for a corporation). (100)

Closing process Necessary end-of-period steps to prepare the accounts for recording the transactions of the next period. (100)

Columnar journal Journal with more than one column. page G-4

Committee of Sponsoring Organizations (COSO) Committee of Sponsoring Organizations of the Treadway Commission (or COSO) is a joint initiative of five private sector organizations and is dedicated to providing thought leadership through the development of frameworks and guidance on enterprise risk management, internal control, and fraud deterrence. (245)

Common stock Corporation's basic ownership share; also generically called *cap ital stock.* (8, 10, 424)

Common-size financial statement Statement that expresses each amount as a percent of a base amount. In the balance sheet, total assets is usually the base and is expressed as 100%. In the income statement, net sales is usually the base. (508)

Comparative financial statement Statement with data for two or more successive periods placed in side-by-side columns, often with changes shown in dollar amounts and percents. (504)

Compatibility principle Information system principle that prescribes an accounting system to conform with a company's activities, personnel, and structure.

Complex capital structure Any company that issues preferred stock or more than one class of common stock.

Components of accounting systems Five basic components of accounting systems are source documents, input devices, information processors, information storage, and output devices.

Composite unit Generic unit that summarizes the sales mix and contribution margins of each product; used in multiproduct break-even analysis.

Compound journal entry Journal entry that affects at least three accounts. (54)

Comprehensive income Net change in equity for a period, excluding owner investments and distributions. (C-13)

Computer hardware Physical equipment in a computerized accounting information system.

Computer network Linkage giving different users and different computers access to common databases and programs.

Computer software Programs that direct operations of computer hardware.

Conceptual framework The basic concepts that underlie the preparation and presentation of financial statements for external users; can serve as a guide in developing future standards and resolving accounting issues that are not addressed directly in current standards using the definitions, recognition criteria, and measurement concepts for assets, liabilities, revenues, and expenses. (7)

Conservatism constraint Principle that prescribes the less optimistic estimate when two estimates are about equally likely.

Consignee Receiver of goods owned by another who holds them for purposes of selling them for the owner. (201)

Consignor Owner of goods held by another party who will sell them for the owner. (201)

Consistency concept Principle that prescribes use of the same accounting method(s) over time so that financial statements are comparable across periods.

Consolidated financial statements Financial statements that show all (combined) activities under the parent's control, including those of any subsidiaries. (C-13)

Contingent liability Obligation to make a future payment if, and only if, an uncertain future event occurs. (358)

Continuous budgeting Practice of preparing budgets for a selected number of future periods and revising those budgets as each period is completed. (774)

Continuous improvement Concept requiring every manager and employee continually to look to improve operations. (554)

Contra account Account linked with another account and having an opposite normal balance; reported as a subtraction from the other account's balance. (89)

Contract rate Interest rate specified in a bond indenture (or note); multiplied by the par value to determine the interest paid each period; also called *coupon rate, stated rate,* or *nominal rate*. (389)

Contributed capital Total amount of cash and other assets received from stockholders in exchange for stock; also called *paid-in capital*. (10)

Contributed capital in excess of par value Difference between the par value of stock and its issue price when issued at a price above par.

Contribution format Income statement that separately reports variable costs and fixed costs.

Contribution margin Selling price minus variable cost; measures how revenues cover variable costs; the remainder (or *contribution*) is for fixed costs and any resulting income. (710, 743)

Contribution margin income statement Income statement that separates variable and fixed costs; highlights the contribution margin, which is sales less variable expenses. (743)

Contribution margin per unit Amount that the sale of one unit contributes toward recovering fixed costs and earning profit; defined as sales price per unit minus variable costs per unit. (710)

Contribution margin ratio Product's contribution margin divided by its sale price. (710, 751)

Control Process of monitoring planning decisions and evaluating the organization's activities and employees. (542)

Control principle Information system principle that prescribes an accounting system to aid managers in controlling and monitoring business activities.

Controllable costs Costs that a manager has the power to control or at least strongly influence. (866)

Controllable variance Actual total overhead incurred minus budgeted total overhead. Equals the sum of both overhead spending variances (variable and fixed) and the variable overhead efficiency variance. (833)

Controlling account General ledger account, the balance of which (after posting) equals the sum of the balances in its related subsidiary ledger.

Conversion cost per equivalent unit The combined costs of direct labor and factory overhead per equivalent unit. (614)

Conversion cost rate Rate used in applying estimated conversion costs to production in lean accounting. (D-8)

Conversion costs Expenditures incurred in converting raw materials to finished goods; includes direct labor costs and overhead costs. (545, 622)

Convertible bonds Bonds that bondholders can exchange for a set number of the issuer's shares. (399)

Convertible preferred stock Preferred stock with an option to-exchange it for common stock at a specified rate.

Copyright Right giving the owner the exclusive privilege to publish and sell a musical, literary, or artistic work during the creator's life plus 70 years. (327)

page G-5

Corporate social responsibility (CSR) Explicit consideration of the demands of stakeholders other than just shareholders and creditors in company decisions. (555)

Corporation Business that is a separate legal entity under state or federal laws; its owners are referred to as *shareholders* or *stockholders*. (8, 423)

Cost All normal and reasonable expenditures necessary to get an asset in place and ready for its intended use. (314)

Cost accounting system Accounting system for manufacturing activities based on the perpetual inventory system. (575)

Cost-based transfer pricing A transfer pricing system based on the cost of goods or services being transferred across divisions within the same company. (877)

Cost-benefit constraint The notion that the benefit of a disclosure exceeds the cost of that disclosure. (8)

Cost-benefit principle Information system principle that prescribes the benefits from an activity in an accounting system must outweigh the costs of that activity.

Cost center Department that incurs costs but generates no revenues; common example is the accounting or legal department. (865)

Cost constraint The notion that the benefit of a disclosure exceeds the cost of that disclosure. (8)

Cost object Product, process, department, or customer to which costs are assigned. (544, 668)

Cost of capital Rate the company must pay to its long-term creditors and shareholders. (937)

Cost of goods available for sale Consists of beginning inventory plus net purchases (or cost of goods manufactured) of a period.

Cost of goods manufactured Total manufacturing costs (direct materials, direct labor, and factory overhead) for the period plus beginning work in process less ending work in process; also called *net cost of goods manufactured* or *cost of goods completed.* (551)

Cost of goods sold Cost of inventory sold to customers during a period; also called *cost of sales*. (153, 576)

Cost of goods sold budget A budget of total manufacturing costs for goods expected to be sold in the period. (779)

Cost-plus pricing Pricing method where target price equals cost plus a markup. (587)

Cost principle Accounting principle that prescribes financial statement information be based on actual costs incurred in business transactions. (7)

Cost of quality report Report that summarizes the costs of quality, classified by prevention, appraisal, internal failure, and external failure costs. (D-10)

Cost of Services Provided Account that records the costs of fully completed services. (590)

Cost per equivalent unit Costs of beginning work in process inventory plus costs added this period, all divided by equivalent units of production. (624)

Cost variance Difference between the actual incurred cost and the standard cost. (826)

Cost-volume-profit (CVP) analysis Planning method that includes predicting the volume of activity, the costs incurred, sales earned, and profits received. (705)

Cost-volume-profit (CVP) chart Graphic representation of cost-volume-profit relations. (712)

Costs of quality Costs resulting from manufacturing defective products or providing services that do not meet customer expectations. (D-9)

Coupon bonds Bonds with interest coupons attached to their certificates; bondholders detach coupons when they mature and present them to a bank or broker for collection. (398)

Credit Recorded on the right side; an entry that decreases an asset or expense account, or increases a liability, revenue, or equity account; abbreviated *Cr*. (49)

Credit memorandum Notification that the issuer (sender) has credited the recipient's account in the sender's records.

Credit period Time period that can pass before a customer's payment is due. (155)

Credit risk ratio Ratio of the Allowance for Doubtful Accounts divided by Accounts Receivable; the higher this ratio, the higher is credit risk.

Credit terms Description of the amounts and timing of payments that a buyer (debtor) agrees to make in the future. (155)

Creditors Individuals or organizations entitled to receive payments. (47)

Cumulative preferred stock Preferred stock on which undeclared dividends accumulate until paid; common stockholders cannot receive dividends until cumulative dividends are paid. (433)

Current assets Cash and other assets expected to be sold, collected, or used within one year or the company's operating cycle, whichever is longer. (105)

Current liabilities Obligations due to be paid or settled within one year or the company's operating cycle, whichever is longer. (106, 347)

Current portion of long-term debt Portion of long-term debt due within one year or the operating cycle, whichever is longer; reported under current liabilities. (355)

Current ratio Ratio used to evaluate a company's ability to pay its short-term obligations, calculated by dividing current assets by current liabilities. (107)

Curvilinear cost Cost that changes with volume but not at a constant rate. (700)

Customer orientation Company position that its managers and employees be in tune with the changing wants and needs of consumers. (554)

Cycle efficiency (CE) A measure of production efficiency, which is defined as value-added (process) time divided by total cycle time. (D-6)

Cycle time (CT) A measure of the time to produce a product or service, which is the sum of process time, inspection time, move time, and wait time; also called *throughput time*. (D-3)

Data analytics A process of analyzing data to identify meaningful relations and trends; in accounting, data analytics helps individuals make informed business decisions. (5)

Data visualization A graphical presentation of data to help people understand its significance and draw reliable inferences. (5)

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Date of declaration Date the directors vote to pay a dividend. (428)

Date of payment Date the corporation makes the dividend payment. (428)

Date of record Date the directors specify for identifying stockholders to receive dividends. (428)

Days' payable outstanding Average number of days that payables are deferred until payment is made; delaying payment allows the buyer to increase the available cash; computed by dividing accounts payable by cost of goods sold, and then multiplying this quotient by 365; also called *days' sales in accounts payable*. (D-11)

Days' sales in inventory Estimate of number of days needed to convert inventory into receivables or cash; equals ending inventory divided by cost of goods sold and then multiplied by 365; also called *days' stock on hand. (213)*

Days' sales in raw materials inventory Measure of how much raw materials inventory is available in terms of the number of days' sales; defined as ending raw materials inventory divided by raw materials used and that quotient multiplied by 365 days. (556)

Days' sales in work in process inventory A measure of production efficiency. Computed as Work in process inventory/Cost of goods sold, multiplied by 365. (D-6)

Days' sales uncollected Measure of the liquidity of receivables, computed by dividing the current balance of receivables by the

annual credit (or net) sales and then multiplying by 365; also called *days' sales in receivables*. (260)

Debit Recorded on the left side; an entry that increases an asset or expense account, or decreases a liability, revenue, or equity account; abbreviated *Dr.* (49)

Debit memorandum Notification that the issuer (sender) has debited the recipient's account in the sender's records.

Debt ratio Ratio of total liabilities to total assets; used to reflect risk associated with a company's debts. (61)

Debt-to-equity ratio Defined as total liabilities divided by total equity; shows the proportion of a company financed by nonowners (creditors) in comparison with that financed by owners. (399)

Debtors Individuals or organizations that owe money. (47)

Decentralized organization Organization divided into smaller units for managerial decision-making purposes. (865)

Declining-balance method Method that determines depreciation charge for the period by multiplying a depreciation rate (often twice the straight-line rate) by the asset's beginning-period book value. (318)

Deferred income tax liability Corporate income taxes that are deferred until future years because of temporary differences between GAAP and tax rules. (368)

Degree of operating leverage (DOL) Ratio of contribution margin divided by pretax income; used to assess the effect on income of changes in sales. (718)

Departmental accounting system Accounting system that provides information useful in evaluating the profitability or cost-effectiveness of a department.

Departmental contribution to overhead Amount by which a department's revenues exceed its direct expenses. (872)

Departmental income statements Income statements prepared for each operating department within a decentralized organization.

(868)

Depletion Process of allocating the cost of natural resources to periods when they are consumed and sold. (324)

Deposit ticket Lists items such as currency, coins, and checks deposited and their corresponding dollar amounts. (255)

Deposits in transit Deposits recorded by the company but not yet recorded by its bank. (257)

Depreciable cost Cost of a plant asset less its salvage value. (316)

Depreciation Expense created by allocating the cost of plant and equipment to periods in which they are used; represents the expense of using the asset. (89, 315)

Digital manufacturing Combines machines, computers, and-human control to manufacture products. (553)

Diluted earnings per share Earnings per share calculation that requires dilutive securities be added to the denominator of the basic EPS calculation.

Dilutive securities Securities having the potential to increase common shares outstanding; examples are options, rights, convertible bonds, and convertible preferred stock.

Direct costing Costing method that includes only variable manufacturing costs (direct materials, direct labor, and variable manufacturing overhead) in unit product costs; also called *variable* or *marginal costing.*

Direct costs Costs incurred for the benefit of one specific cost object. (544)

Direct expenses Expenses traced to a specific department (object) that are incurred for the sole benefit of that department. (868)

Direct labor Work of employees who physically convert materials to finished product. (545)

Direct labor budget Report showing budgeted costs for direct labor necessary to satisfy estimated production for the period. (778)

Direct labor costs Wages and salaries for direct labor that are separately traced through the production process to finished goods. (545)

Direct materials Raw material that physically becomes part of the product and is clearly identified with specific products or batches of product. (545)

Direct materials budget Report showing budgeted costs for direct materials necessary to satisfy estimated production for the period. (777)

Direct materials costs Expenditures for direct materials that are separately and readily traced through the production process to finished goods. (545)

Direct method Presentation of net cash from operating activities for the statement of cash flows that lists major operating cash receipts less major operating cash payments. (463)

Direct write-off method Method that records the loss from an uncollectible account receivable at the time it is determined to be uncollectible; no attempt is made to estimate bad debts. (283)

Discount on bonds payable Difference between a bond's par value and its lower issue price or carrying value; occurs when the contract rate is less than the market rate. (390)

Discount on note payable Difference between the face value of a note payable and the (lesser) amount borrowed; reflects the added interest to be paid on the note over its life.

Discount on stock Difference between the par value of stock and its issue price when issued at a price below par value. (427)

Discount period Time period in which a cash discount is available and the buyer can make a reduced payment. (156)

Discount rate Expected rate of return on investments; also called *cost of capital, hurdle rate,* or *required rate of return*.

Discounts lost Expenses resulting from not taking advantage of cash discounts on purchases. (178)

Dividend in arrears Unpaid dividend on cumulative preferred stock; must be paid before any regular dividends on preferred stock and before any dividends on common stock. (433)

Dividend yield Ratio of the annual amount of cash dividends distributed to common shareholders relative to the common stock's market value (price). (438)

Dividends Corporation's distributions of assets to its owners. (10, 47)

Dodd-Frank Wall Street Reform and Consumer Protection Act Congressional act to promote accountability and transparency in the financial system, to end the notion of *too big to fail,* to protect the taxpayer by ending bailouts, and to protect consumers from abusive financial services.

Double-declining-balance (DDB) depreciation Depreciation equals beginning book value multiplied by 2 times the straight-line rate.

Double-entry accounting Accounting system in which each transaction affects at least two accounts and has at least one debit and one credit. (49)

Double taxation Corporate income is taxed, and then its later distribution through dividends is normally taxed again for shareholders.

Dynamic pricing System where prices vary depending on changing market conditions or demand. (912)

Earnings Amount earned after subtracting all expenses necessary for and matched with sales for a period; also called *net income,- income,* or *profit.*

Earnings per share (EPS) Amount of income earned by each share of a company's outstanding common stock; also called *net income per share*. (438)

Effective interest method Allocates interest expense over the bond life to yield a constant rate of interest; interest expense for a period is found by multiplying the balance of the liability at the

beginning of the period by the bond market rate at issuance; also called *interest method.* (403)

Efficiency Company's productivity in using its assets; usually measured relative to how much revenue a certain level of assets generates. (503)

Efficiency variance Difference between the actual quantity of an input and the standard quantity of that input. (840)

Electronic funds transfer (EFT) Use of electronic communication to transfer cash from one party to another. (255)

Employee benefits Additional compensation paid to or on behalf of employees, such as premiums for medical, dental, life, and disability insurance and contributions to pension plans. (356)

Employee earnings report Record of an employee's net pay, gross pay, deductions, and year-to-date payroll information. (365)

Enterprise resource planning (ERP) software Programs that manage a company's vital operations, which range from order taking to production to accounting.

Enterprise risk management (ERM) Systems and processes used to reduce risk to an organization.

Entity Organization that, for accounting purposes, is separate from other organizations and individuals.

Environmental profit and loss (EP&L) account A report in monetary terms of the impact on human welfare from an entity's activities. (751)

EOM Abbreviation for *end of month;* used to describe credit terms for credit transactions.

Equity Owner's claim on the assets of a business; equals the residual interest in an entity's assets after deducting liabilities; also called *net assets* or *owner's equity*. (9)

Equity method Accounting method used for long-term investments when the investor has "significant influence" over the investee. (C-10)

Equity ratio Portion of total assets provided by equity, computed as total equity divided by total assets. (514)

Equity securities with controlling influence Long-term investment when the investor is able to exert controlling influence over the investee; investors owning 50% or more of voting stock are presumed to exert controlling influence. (C-12)

Equity securities with significant influence Long-term investment when the investor is able to exert significant influence over the investee; investors owning 20% or more (but less than 50%) of voting stock are presumed to exert significant influence. (C-10)

Equivalent units of production (EUP) Number of units that would be completed if all effort during a period had been applied to units that were started and finished. (622)

Estimated liability Obligation of an uncertain amount that can be reasonably estimated. (355)

Estimated line of cost behavior Line drawn on a graph to visually fit the relation between cost and sales. (708)

Ethics Codes of conduct by which actions are judged as right or wrong, fair or unfair, honest or dishonest. (6, 543)

Events Happenings that both affect an organization's financial position and can be reliably measured. (10)

Expanded accounting equation Expanded version of: Assets = Liabilities + Equity. For a noncorporation: Equity = Owner's capital − Owner's withdrawals + Revenues − Expenses. [For a corporation: Equity = Contributed capital + Retained earnings + Revenues −- Expenses − Dividends.] (10)

Expense recognition (or **matching) principle** Prescribes expenses to be reported in the same period as the revenues that were earned as a result of the expenses. (7, 86)

Expenses Outflows or using up of assets as part of operations of a business to generate sales. (10)

External transactions Exchanges of economic value between one entity and another entity. (10)

External users Persons using accounting information who are not directly involved in running the organization. (4)

Extraordinary repairs Major repairs that extend the useful life of a plant asset beyond prior expectations; treated as a capital expenditure. (322)

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Facility-level activities Activities that relate to overall production and cannot be traced to specific products; costs associated with these activities pertain to a plant's general manufacturing process. (676)

Factory overhead Factory activities supporting the production process that are not direct materials or direct labor; also called *overhead* and *manufacturing overhead*. (545)

Factory overhead budget Report showing budgeted costs for factory overhead necessary to satisfy the estimated production for the period. (779)

Factory overhead costs Expenditures for factory overhead that cannot be separately or readily traced to finished goods; also called *overhead costs*. (545)

Fair Value Adjustment An asset account used to adjust an asset's cost to its fair (market) value; the account has a debit balance when fair value exceeds cost, or it has a credit balance (contra-asset) when fair value is less than cost. *Fair value* is the estimated price that an asset can be sold in an orderly transaction to a third party. (C-3)

Fair value option (FVO) Option to measure eligible items at fair value; eligible items include *financial assets,* such as HTM, AFS, and equity method investments, and *financial liabilities*. FVO is applied "instrument by instrument" and is elected when the eligible item is "first recognized"; once FVO is elected, the decision is "irrevocable." When FVO is elected, it is measured at "fair value" and unrealized gains and losses are recognized in earnings.

Favorable variance Difference in actual revenues or expenses from the budgeted amount that contributes to a higher income. (822)

Federal depository bank Bank authorized to accept deposits of amounts payable to the federal government. (363)

Federal income taxes withheld Amount of tax that an employer is required to withhold from an employee's paycheck; amount is determined by the number of exemptions that an employee claims and the income that is paid. (366)

Federal Insurance Contributions Act (FICA) taxes Taxes assessed on both employers and employees; for Social Security and Medicare programs. (352)

Federal Unemployment Tax Act (FUTA) Payroll taxes on employers assessed by the federal government to support its unemployment insurance program. (369)

FIFO (first-in, first-out) method Method to assign cost to inventory that assumes items are sold in the order acquired; earliest items purchased are the first sold. (205, 621)

Finance lease Long-term lease where the lessee receives substantially all remaining benefits of the asset (one or more of five criteria must be met); a finance lease is similar to the financing of an asset purchase. (404)

Financial accounting Area of accounting aimed mainly at serving external users. (4)

Financial Accounting Standards Board (FASB) Independent group of full-time members responsible for setting accounting rules. (7)

Financial leverage Amount of debt that an entity uses to fund its assets; goal is to earn a higher return on equity by paying dividends on preferred stock or interest on debt at a rate lower than the return earned with the assets from issuing preferred stock or debt; also called *trading on the equity*. (433)

Financial reporting Process of communicating information relevant for making investment, credit, and business decisions. (504)

Financial statement analysis Application of analytical tools to financial statements and related data for making business decisions. (503)

Financial statements Includes the balance sheet, income statement, statement of owner's (or stockholders') equity, and statement of cash flows.

Financing activities Transactions with owners and creditors that include obtaining cash from issuing debt, repaying amounts borrowed, and obtaining cash from or distributing cash to owners. (460)

Finished Goods Inventory Account that controls the finished goods files, which acts as a subsidiary ledger (of the Inventory account) in which the costs of finished goods that are ready for sale are recorded. (548, 576)

First-in, first-out (FIFO) Method to assign cost to inventory that assumes items are sold in the order acquired; earliest items purchased are the first sold. (205, 621)

Fiscal year Consecutive 12-month (or 52-week) period chosen as the organization's annual accounting period. (85)

Fixed budget Planning budget based on a single predicted amount of volume; unsuitable for evaluations if the actual volume differs from predicted volume; also called a *static budget*. (821)

Fixed budget performance report Report that compares actual revenues and costs with fixed budgeted amounts and identifies the differences as favorable or unfavorable variances. (822)

Fixed cost Cost that does not change in total with changes in the volume of activity. (706)

Fixed overhead cost deferred in inventory The portion of the fixed manufacturing overhead cost of a period that goes into inventory under the absorption costing method as a result of production exceeding sales.

Fixed overhead cost recognized from inventory The portion of the fixed manufacturing overhead cost of a prior period that

becomes an expense of the current period under the absorption costing method as a result of sales exceeding production.

Flexibility principle Information system principle that prescribes an accounting system be able to adapt to changes in the company, business operations, and needs of decision makers.

Flexible budget Planning budget based on several predicted amounts of sales or other activity measure; also called a *variable budget.* (821)

Flexible budget performance report Report that compares actual revenues and costs with their variable budgeted amounts based on actual sales volume (or other level of activity) and identifies the differences as variances. (823)

FOB Abbreviation for *free on board;* the point when ownership of goods passes to the buyer; *FOB shipping point* (or *factory*) means the buyer pays shipping costs and accepts ownership of goods when the seller transfers goods to the carrier; *FOB destination* means the seller pays shipping costs and the buyer accepts ownership of goods at the buyer's place of business. (158)

Foreign exchange rate Price of one currency stated in page G-9 terms of another currency.

Form 10-K (or **10-KSB)** Annual report form filed with the SEC by businesses (small businesses) with publicly traded securities.

Form 940 IRS form used to report an employer's federal unemployment taxes (FUTA) on an annual filing basis. (363)

Form 941 IRS form filed to report FICA taxes owed and remitted. (362)

Form W-2 Annual report by an employer to each employee showing the employee's wages subject to FICA and federal income taxes along with amounts withheld. (363)

Form W-4 Withholding allowance certificate, filed with the employer, identifying the number of withholding allowances claimed. (366)

Franchises Privileges granted by a company or government to sell a product or service under specified conditions; also *called licenses*. (327)

Fraud triangle Highlights three factors that push a person to commit fraud: opportunity, pressure, and rationalization. (247)

Full costing Costing method that assigns both variable and fixed manufacturing costs to products; this method is required under U.S. GAAP; also called *absorption costing*.

Full disclosure principle Principle that prescribes financial statements (including notes) to report all relevant information about an entity's operations and financial condition. (8)

GAAP (generally accepted accounting principles) Rules that specify acceptable accounting practices. (6)

General accounting system Accounting system for manufacturing activities based on the *periodic* inventory system.

General and administrative expense budget Plan that shows predicted operating expenses not included in the selling expenses or manufacturing budgets. (780)

General and administrative expenses Expenses that support the operating activities of a business. (166)

General journal All-purpose journal for recording the debits and credits of transactions and events. (51)

General ledger Record containing all accounts (with amounts) for a business; also called *ledger.* (576)

General partner Partner who assumes unlimited liability for the debts of the partnership; responsible for partnership management.

General partnership Partnership in which all partners have mutual agency and unlimited liability for partnership debts.

General-purpose financial statements Statements published periodically for use by a variety of interested parties; include the income statement, balance sheet, statement of owner's equity (or

statement of retained earnings for a corporation), statement of cash flows, and notes to these statements. (504)

Generally accepted accounting principles (GAAP) Rules that specify acceptable accounting practices. (6)

Generally accepted auditing standards (GAAS) Rules that specify acceptable auditing practices.

Going-concern assumption Principle that prescribes financial statements to reflect the assumption that the business will continue operating. (8)

Goodwill Amount by which a company's (or a segment's) value exceeds the value of its individual assets less its liabilities. (327)

Gross margin Net sales minus cost of goods sold; also called *gross profit.* (154)

Gross margin ratio Gross margin (net sales minus cost of goods sold) divided by net sales; also called *gross profit ratio*. (169)

Gross method Method of recording purchases at the full invoice price without deducting any cash discounts. (156)

Gross pay Total compensation earned by an employee. (352)

Gross profit Net sales minus cost of goods sold; also called *gross margin*. (154)

Gross profit method Procedure to estimate inventory by using the past gross profit rate to estimate cost of goods sold, which is then subtracted from the cost of goods available for sale. (225)

Held-to-maturity (HTM) securities Debt securities that a company has the intent and ability to hold until they mature. (C-5)

High-low method Procedure that yields an estimated line of cost behavior by using the costs associated with the highest and lowest sales volume. (709)

Horizontal analysis Comparison of a company's financial condition and performance across time. (504)

Hurdle rate Minimum acceptable rate of return (set by management) for an investment. (937)

Hybrid costing system A costing system that contains features of both process and job order costing systems; also called *operation costing system*. (633)

Impairment Permanent diminishment of an asset's value. (326)

Imprest system Method to account for petty cash; maintains a constant balance in the fund, which equals cash plus petty cash receipts.

Inadequacy Condition in which the capacity of plant assets is too small to meet the company's production demands. (316)

Income Amount earned after subtracting all expenses necessary for and matched with sales for a period; also called *net income, profit,* or *earnings.*

Income statement Financial statement that subtracts expenses from revenues to yield a net income or loss over a specified period of time; also includes any gains or losses. (15)

Income Summary Temporary account used only in the closing process to which the balances of revenue and expense accounts (including any gains or losses) are transferred; its balance is transferred to the capital account (or retained earnings for a corporation). (101)

Incremental cost Additional cost incurred only if a company pursues a specific course of action. (904)

Incremental income Incremental revenues minus incremental costs. (904)

Incremental revenue Additional revenue generated by taking one course of action over another. (903)

Indefinite life Asset life that is not limited by legal, regulatory, contractual, competitive, economic, or other factors. (326)

Indirect costs Costs incurred for the benefit of more than one cost object. (544)

Indirect expenses Expenses incurred for the joint benefit of more than one department (or cost object). (868) page G-10

Indirect labor Work of production employees who do not work specifically on converting direct materials into finished products and who are not clearly identified with specific units or batches of product. (545)

Indirect labor costs Labor costs that cannot be physically traced to production of a product or service; included as part of overhead. (545)

Indirect materials Materials used to support the production process but not clearly identified with products or batches of product. (545)

Indirect method Presentation that reports net income and then adjusts it by adding and subtracting items to yield net cash from operating activities on the statement of cash flows. (463)

Information processor Component of an accounting system that interprets, transforms, and summarizes information for use in analysis and reporting.

Information storage Component of an accounting system that keeps data in a form accessible to information processors.

Infrequent gain or loss Gain or loss not expected to recur given the operating environment of the business.

Input device Means of capturing information from source documents that enables its transfer to information processors.

Installment note Liability requiring a series of periodic payments to the lender. (395)

Institute of Management Accountants (IMA) A professional association of management accountants. (543)

Intangible assets Long-term assets (resources) used to produce or sell products or services; usually lack physical form and have uncertain benefits. (106, 326)

Integrated reporting A short report that shows how an organization's strategy, governance, and performance relate to

value creation. (836)

Interest Charge for using money (or other assets) loaned from one entity to another. (291)

Interim financial statements Financial statements covering periods of less than one year; usually based on one-, three-, or six-month periods. (85, 224)

Interim statements Financial statements covering periods of less than one year; usually based on one-, three-, or six-month periods; also called *interim financial statements.*

Internal controls or **internal control system** All policies and procedures used to protect assets, ensure reliable accounting, promote efficient operations, and urge adherence to company policies. (6, 245, 543)

Internal rate of return (IRR) Rate used to evaluate the acceptability of an investment; equals the rate that yields a net present value of zero for an investment. (940)

Internal transactions Activities within an organization that can affect the accounting equation. (10)

Internal users Persons using accounting information who are directly involved in managing the organization. (4)

International Accounting Standards Board (IASB) Group that identifies preferred accounting practices and encourages global acceptance; issues International Financial Reporting Standards (IFRS). (7)

International Financial Reporting Standards (IFRS) Set of international accounting standards explaining how types of transactions and events are reported in financial statements; IFRS are issued by the International Accounting Standards Board. (7)

International Integrated Reporting Council A global coalition that is establishing integrated reporting guidelines. (836)

Inventory Goods a company owns and expects to produce and/or sell in its normal operations. (154)

Inventory Returns Estimated Current asset account reporting the inventory estimated to be returned; this account has a normal debit balance. (175)

Inventory turnover Number of times a company's average inventory is sold during a period; computed by dividing cost of goods sold by average inventory; also called *merchandise turnover*. (213)

Investing activities Transactions that involve purchasing and selling long-term assets; includes making and collecting notes receivable and investments in other than cash equivalents. (460)

Investment center Center of which a manager is responsible for revenues, costs, and asset investments. (865)

Investment turnover The efficiency with which a company generates sales from its available assets; computed as sales divided by average invested assets. (874)

Invoice Itemized record of goods prepared by the vendor that lists the customer's name, items sold, sales prices, and terms of sale. (263)

Invoice approval Document containing a checklist of steps necessary for approving the recording and payment of an invoice; also called *check authorization*. (263)

ISO 9000 standards International standards for quality management and quality assurance. (554)

Job Production of a customized product or service. (575)

Job cost sheet Separate record maintained for each job. (576)

Job lot Production of more than one unit of a customized product or service. (575)

Job order costing system Cost accounting system to determine the cost of producing each job or job lot. (576)

Job order production Production of special-order products; also called *customized production*. (575)

Joint cost Cost incurred to produce or purchase two or more products at the same time. (882)

Journal Record in which transactions are entered before they are posted to ledger accounts; also called *book of original entry.* (50)

Journalizing Process of recording transactions in a journal. (50)

Just-in-time (JIT) manufacturing Process of acquiring or producing inventory only when needed. (554)

Known liabilities Obligations of a company with little uncertainty; set by agreements, contracts, or laws; also called *definitely determinable liabilities*. (348)

Land improvements Assets that increase the benefits of land, have a limited useful life, and are depreciated. (314)

Large stock dividend Stock dividend that is more than 25% of the previously outstanding shares. (429)

Last-in, first-out (LIFO) Method for assigning cost to inventory that assumes costs for the most recent items purchased are sold first and charged to cost of goods sold. (205)

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Lean accounting System designed to eliminate waste in the accounting process and better reflect the benefits of lean manufacturing techniques. (D-7)

Lean business model Practice of eliminating waste while meeting customer needs and yielding positive company returns. (554, D-2)

Lease Contract specifying the rental of property. (327, 404)

Leasehold Rights the lessor grants to the lessee under the terms of a lease. (327)

Leasehold improvements Alterations or improvements to leased property such as partitions and storefronts. (328)

Least-squares regression Statistical method for deriving an estimated line of cost behavior that is more precise than the high-low method and the scatter diagram. (709)

Ledger Record containing all accounts (with amounts) for a business; also called *general ledger*. (45)

Lessee Party to a lease who secures the right to possess and use the property from another party (the lessor). (327)

Lessor Party to a lease who grants another party (the lessee) the right to possess and use its property. (327)

Liabilities Creditors' claims on an organization's assets; involves a probable future payment of assets, products, or services that a company is obligated to make due to past transactions or events. (9)

Licenses Privileges granted by a company or government to sell a product or service under specified conditions; also called *franchises.* (327)

Limited liability Owner can lose no more than the amount invested.

Limited liability company (LLC) Organization form that combines select features of a corporation and a limited partnership; provides limited liability to its members (owners), is free of business tax, and allows members to actively participate in management. (8)

Limited liability partnership (LLP) Partnership in which a partner is not personally liable for malpractice or negligence unless that partner is responsible for providing the service that resulted in the claim.

Limited life Length of time an asset will be productively used in the operations of a business; also called *service life* or *useful life.* (326)

Limited partners Partners who have no personal liability for partnership debts beyond the amounts they invested in the partnership.

Limited partnership Partnership that has two classes of partners, limited partners and general partners.

Liquid assets Resources such as cash that are easily converted into other assets or used to pay for goods, services, or liabilities. (248)

Liquidating cash dividend Distribution of assets that returns part of the original investment to stockholders; deducted from contributed capital accounts.

Liquidation Process of going out of business; involves selling assets, paying liabilities, and distributing the remainder to owners.

Liquidity Availability of resources to meet short-term cash-requirements. (248, 503)

List price Catalog (full) price of an item before any trade discount is deducted.

Long-term investments Long-term assets not used in operating activities such as notes receivable and investments in stocks and bonds. (105, C-2)

Long-term liabilities Obligations not due to be paid within one year or the operating cycle, whichever is longer. (106, 348)

Lower of cost or market (LCM) Required method to report inventory at market replacement cost when that market cost is lower than recorded cost. (210)

Maker of the note Entity who signs a note and promises to pay it at maturity. (291)

Management by exception Management process that focuses on significant variances and gives less attention to areas where performance is close to the standard. (825)

Managerial accounting Area of accounting aimed mainly at serving the decision-making needs of internal users; also called *management accounting*. (4, 541)

Manufacturer Company that uses labor and operating assets to convert raw materials to finished goods.

Manufacturing budget Plan that shows the predicted costs for direct materials, direct labor, and overhead to be incurred in manufacturing units in the production budget.

Manufacturing margin Sales minus variable production costs.

Margin of safety Excess of expected sales over the level of break-even sales. (714)

Marginal costing Costing method that includes only variable manufacturing costs (direct materials, direct labor, and variable manufacturing overhead) in unit product costs; also called *direct* or *variable costing.*

Market-based transfer price A transfer pricing system based on the market price of the goods or services being transferred across divisions within the same company. (877)

Market prospects Expectations (both good and bad) about a company's future performance as assessed by users and other interested parties. (503)

Market rate Interest rate that borrowers are willing to pay and lenders are willing to accept for a specific lending agreement given the borrowers' risk level. (389)

Market value per share Price at which stock is bought or sold. (425)

Markup Amount added to cost per unit in computing a selling price. (748, 910)

Master budget Comprehensive business plan that includes specific plans for expected sales, product units to be produced, merchandise (or materials) to be purchased, expenses to be incurred, plant assets to be purchased, and amounts of cash to be borrowed or loans to be repaid, as well as a budgeted income statement and balance sheet. (775)

Matching (or **expense recognition) principle** Prescribes expenses to be reported in the same period as the revenues that were earned as a result of the expenses. (7, 86)

Materiality constraint Prescribes that an entity account for items that significantly impact financial statements.

Materials consumption report Document that summarizes the materials a department uses during a

reporting period; replaces materials requisitions when materials move continuously through a process. (632)

Materials ledger card Perpetual record updated each time-materials are purchased or issued for production use. (578)

Materials markup A percentage of materials cost that includes materials-related overhead costs and a profit margin. Used in time and materials pricing. (914)

Materials requisition Source document production managers use to request materials for production; used to assign materials costs to specific jobs or overhead. (579)

Maturity date of a note Date when a note's final principal payment is due. (291)

Measurement principle Principle that prescribes financial statement information, and its underlying transactions and events, be based on relevant measures of valuation; also called the *cost principle.* (7)

Members Owners of a limited liability company (LLC); rights and responsibilities are specified in the operating agreement and by state LLC regulations. (8)

Merchandise Goods that a company owns and expects to sell to customers; also called *merchandise inventory* or *inventory.* (153)

Merchandise inventory Goods that a company owns and expects to sell to customers; also called *merchandise* or *inventory*. (154)

Merchandise purchases budget Plan that shows the units or costs of merchandise to be purchased by a merchandising company during the budget period. (795)

Merchandiser Entity that earns income by buying and selling merchandise. (153)

Merit rating Rating assigned to an employer by a state based on the employer's record of employment. (354)

Minimum legal capital Amount of assets defined by law that stockholders must (potentially) invest in a corporation; usually

defined as par value of the stock; intended to protect creditors. (425)

Mixed cost Cost that includes both fixed and variable costs. (707)

Modified Accelerated Cost Recovery System (MACRS) Depreciation system required by federal income tax law. (319)

Monetary unit assumption Principle that assumes transactions and events can be expressed in money units. (8)

Mortgage Legal loan agreement that protects a lender by giving the lender the right to be paid from the cash proceeds from the sale of a borrower's assets identified in the mortgage. (397)

Multinational Company that operates in several countries.

Multiple-step income statement Income statement format that shows subtotals between sales and net income, categorizes expenses, and often reports the details of net sales and expenses. (166)

Mutual agency Legal relationship among partners whereby each partner is an agent of the partnership and is able to bind the partnership to contracts within the scope of the partnership's business.

Natural business year Twelve-month period that ends when a company's sales activities are at their lowest point. (85)

Natural resources Assets physically consumed when used; examples are timber, mineral deposits, and oil and gas fields; also called *wasting assets*. (324)

Negotiated transfer price A system where division managers negotiate to determine the price to use to record transfers of goods or services across divisions within the same company. (878)

Net assets Owner's claim on the assets of a business; equals the residual interest in an entity's assets after deducting liabilities; also called *equity* or *owner's equity.*

Net income Amount earned after subtracting all expenses necessary for and matched with sales for a period; also called *income, profit,* or *earnings*. (17)

Net loss Excess of expenses over revenues for a period. (17)

Net method Method of recording purchases at the full invoice price less any cash discounts. (160)

Net pay Gross pay less all deductions; also called *take-home pay*. (352)

Net present value (NPV) Dollar estimate of an asset's value that is used to evaluate the acceptability of an investment; computed by discounting future cash flows from the investment at the hurdle rate and then subtracting the initial cost of the investment. (937)

Net realizable value Expected selling price (value) of an item minus the cost of making the sale. (202)

Noncumulative preferred stock Preferred stock on which the right to receive dividends is lost for any period when dividends are not declared. (433)

Noninterest-bearing note Note with no stated (contract) rate of interest; interest is implicitly included in the note's face value.

Nonparticipating preferred stock Preferred stock on which dividends are limited to a maximum amount each year.

Nonsufficient funds (NSF) check Maker's bank account has insufficient money to pay the check; also called *bounced check* or *hot check*.

Non-value-added time The portion of cycle time that is not directed at producing a product or service; equals the sum of inspection time, move time, and wait time. (D-3)

No-par value stock Stock class that has not been assigned a par (or stated) value by the corporate charter. (425)

Note Written promise to pay a specified amount either on demand or at a definite future date; is a *note receivable* for the lender but a *note payable* for the lendee; also called *promissory note.*

Note payable Liability expressed by a written promise to pay a definite sum of money on demand or on a specific future date(s).

Note receivable Asset consisting of a written promise to receive a definite sum of money on demand or on a specific future date(s).

Objectivity Concept that prescribes independent, unbiased evidence to support financial statement information.

Obsolescence Condition in which, because of new inventions and improvements, a plant asset can no longer be used to produce goods or services with a competitive advantage. (316)

Off-balance-sheet financing Acquisition of assets by agreeing to liabilities not reported on the balance sheet.

Online processing Approach to inputting data from source documents as soon as the information is available.

Operating activities Activities that involve the production or purchase of merchandise and the sale of goods or services to customers, including expenditures related to administering the business. (460)

Operating cycle Normal time between paying cash for merchandise or employee services and receiving cash from customers. (105)

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Operating lease Short-term (or cancelable) lease in which the lessor retains risks and rewards of ownership. (405)

Operating leverage Extent, or relative size, of fixed costs in the total cost structure.

Operation costing system A costing system that contains features of both process and job order costing systems; also called *hybrid costing sys tem.* (633)

Opportunity cost Potential benefit lost by choosing a specific action from two or more alternatives. (904)

Ordinary repairs Repairs to keep a plant asset in normal, good operating condition; treated as a revenue expenditure and immediately expensed. (321)

Organization expenses (costs) Costs such as legal fees and promoter fees to bring an entity into existence. (424)

Other comprehensive income Net change in equity for a period, excluding owner investments and distributions; also called *comprehensive income.* (C-13)

Out-of-pocket cost Cost incurred or avoided as a result of management's decisions. (904)

Output devices Means by which information is taken out of the accounting system and made available for use.

Outsourcing Manager decision to buy a product or service from another entity; part of a make or buy decision; also called *make or buy*. (904)

Outstanding checks Checks written and recorded by the depositor but not yet paid by the bank at the bank statement date. (257)

Outstanding stock Corporation's stock held by its shareholders.

Overapplied overhead Amount by which the overhead applied to production in a period using the predetermined overhead rate exceeds the actual overhead cost incurred in a period. (588)

Overhead cost variance Difference between the total overhead cost applied to products and the total overhead cost actually incurred. (833)

Owner, Capital Account showing the owner's (sole proprietor or partner) claim on company assets; equals owner investments plus net income (or less net losses) minus owner withdrawals since the company's inception; also referred to as *equity.*

Owner, Withdrawals Account used to record asset distributions to the owner (sole proprietor or partner); also called *withdrawals.*

Owner investments Assets put into the business by the owner. (10)

Owner withdrawals Resources such as cash that an owner (sole proprietor or partner) takes from the company for personal use.

Owner's equity Owner's claim on the assets of a business; equals the residual interest in an entity's assets after deducting liabilities; also called *equity* or *net assets.*

Paid-in capital Total amount of cash and other assets received from stockholders in exchange for stock; also called *contributed capital.* (425)

Paid-in capital in excess of par value Amount received from issuance of stock that is in excess of the stock's par value. (426)

Par value Value assigned a share of stock by the corporate charter when the stock is authorized. (425)

Par value of a bond Amount the bond issuer agrees to pay at maturity and the amount on which cash interest payments are based; also called *face amount* or *face value* of a bond. (387)

Par value stock Class of stock assigned a par value by the corporate charter. (425)

Parent Company that owns a controlling interest in a corporation (requires more than 50% of voting stock). (C-13)

Participating preferred stock Preferred stock that shares with common stockholders any dividends paid in excess of the percent stated on preferred stock.

Partner return on equity Partner net income divided by average partner equity for the period.

Partnership Unincorporated association of two or more persons to pursue a business for profit as co-owners. (8)

Partnership contract Agreement among partners that sets terms under which the affairs of the partnership are conducted; also called *articles of partnership.*

Partnership liquidation Dissolution of a partnership by (1) selling noncash assets and allocating any gain or loss according to partners' income-and-loss ratio, (2) paying liabilities, and (3) distributing any remaining cash according to partners' capital balances.

Patent Exclusive right granted to its owner to produce and sell an item or to use a process for 20 years. (326)

Payback period (PBP) Time-based measurement used to evaluate the acceptability of an investment; equals the time expected to pass before an investment's net cash flows equal its initial cost. (934)

Payee of the note Entity to whom a note is made payable. (291)

Payroll bank account Bank account used solely for paying employees; each pay period, an amount equal to the total employees' net pay is deposited in it and the payroll checks are drawn on it. (366)

Payroll deductions Amounts withheld from an employee's gross pay; also called *withholdings*. (352)

Payroll register Record for a pay period that shows the pay period dates, regular and overtime hours worked, gross pay, net pay, and deductions. (364)

Pension plan Contractual agreement between an employer and its employees for the employer to provide benefits to employees after they retire; expensed when incurred. (406)

Period costs Expenditures identified more with a time period than with finished product costs; include selling and general administrative expenses. (546)

Periodic inventory system Method that records the cost of inventory purchased but does not continuously track the quantity available or sold to customers; records are updated at the end of each period to reflect the physical count and costs of goods available. (154)

Permanent accounts Accounts that reflect activities related to one or more future periods; balance sheet accounts whose balances are not closed. (100)

Perpetual inventory system Method that maintains continuous-records of the cost of inventory available and the cost of goods sold. (154)

Petty cash Small amount of cash in a fund to pay minor expenses; accounted for using an imprest system. (252)

Planning Process of setting goals and preparing to achieve them. (541)

Plant asset age Plant asset age is an approximation of page G-14 the age of plant assets, which is estimated by dividing accumulated depreciation by depreciation expense.

Plant asset useful life Ratio that estimates the productive life of an asset; equals the plant asset cost divided by depreciation expense.

Plant assets Tangible long-lived assets used to produce or sell products and services; also called *property, plant and equipment (PP&E)* or *fixed assets.* (88, 313)

Pledged assets to secured liabilities Ratio of the book value of a company's pledged assets to the book value of its secured liabilities.

Post-closing trial balance List of permanent accounts and their balances from the ledger after all closing entries are journalized and posted. (103)

Postaudit An evaluation of a project's actual results versus its projected results.

Posting Process of transferring journal entry information to the ledger; computerized systems automate this process. (50)

Posting reference (PR) column A column in journals in which individual ledger account numbers are entered when entries are posted to those ledger accounts. (51)

Predetermined overhead rate Rate established prior to the beginning of a period that divides estimated overhead cost by an estimated activity base, such as estimated direct labor; used to apply overhead cost to production. (582)

Preemptive right Stockholders' right to maintain their proportionate interest in a corporation with any additional shares issued. (424)

Preferred stock Stock with a priority status over common stockholders in one or more ways, such as paying dividends or distributing assets. (432)

Premium on bonds Difference between a bond's par value and its higher carrying value; occurs when the contract rate is higher than the market rate; also called *bond premium*. (392)

Premium on stock Difference between the par value of stock and its issue price when issued at a price above par; also called *contributed capital in excess of par value.* (426)

Prepaid expenses Items paid for in advance of receiving their benefits; classified as assets. (87)

Price-earnings (PE) ratio Ratio of a company's current market value per share to its earnings per share; also called *price-to-earnings*. (438)

Price-setter Entity with more control to set prices due to its unique prices and brands. (910)

Price-taker Entity with no control to set prices. (910)

Price variance Difference between actual and budgeted revenue or cost caused by the difference between the actual price per unit and the budgeted price per unit. (828)

Prime costs Expenditures directly identified with the production of finished goods; include direct materials costs and direct labor costs. (545)

Principal of a note Amount that the signer of a note agrees to pay back when it matures, not including interest. (291)

Principles of internal control Principles prescribing management to establish responsibility, maintain records, insure assets, separate recordkeeping from custody of assets, divide responsibility for related transactions, apply technological controls, and perform reviews. (246)

Prior period adjustment Correction of an error in a prior year that is reported in the statement of retained earnings (or statement of stockholders' equity) net of any income tax effects. (437)

Pro forma financial statements Statements that show the effects of proposed transactions and events as if they had occurred.

Process cost summary Report of costs charged to a department, its equivalent units of production achieved, and the costs assigned to its output; also called *production cost report*. (626)

Process costing system System of assigning direct materials, direct labor, and overhead to specific processes; total costs associated with each process are then divided by the number of units passing through that process to determine the cost per equivalent unit.

Process operations Processing of products in a continuous (sequential) flow of steps; also called *process manufacturing* or *process production*. (575, 619)

Product costs Costs that are capitalized as inventory because they produce benefits expected to have future value; include direct materials, direct labor, and overhead. (546)

Product-level activities Activities that relate to specific products that must be carried out regardless of how many units are produced and sold or batches run. (676)

Production budget Plan that shows the units to be produced each period. (776)

Production cost report Summarizes the four steps of process costing: physical flow of units, equivalent units of production, costs per equivalent unit, and assignment of costs transferred out and to ending work in process inventory. (626)

Profit Amount earned after subtracting all expenses necessary for and matched with sales for a period; also called *net income, income,* or *earnings*.

Profit center Business unit that incurs costs and generates revenues. (865)

Profit margin Ratio of a company's net income to its net sales; the percent of income in each dollar of revenue; also called *net profit margin*. (107, 874, C-14)

Profitability Company's ability to generate an adequate return on invested capital. (503)

Profitability index Relation between the expected benefits of a project and its investment, computed as the present value of expected future cash flows from the investment divided by the cost of the investment; a higher value (above 1) indicates a more desirable investment, and a value below 1 indicates an unacceptable project. (939)

Promissory note (or note) Written promise to pay a specified amount either on demand or at a definite future date; it is a *note receivable* for the lender but a *note payable* for the lendee. (291)

Proprietorship Business owned by one person that is not organized as a corporation; also called *sole proprietorship*. (8)

Proxy Legal document giving a stockholder's agent the power to exercise the stockholder's voting rights. (424)

Pull production A production system that begins with a customer order. Goods are pulled in a just-in-time method and delivered directly to customers upon completion. (D-2)

Purchase order Document used by the purchasing page G-15 department to place an order with a seller (vendor). (262)

Purchase requisition Document listing merchandise needed by a department and requesting it be purchased. (262)

Purchases discount Term used by a purchaser to describe a cash discount granted to the purchaser for paying within the discount period. (155)

Purchases journal Journal normally used to record all purchases on credit.

Push production A production system that begins with a sales forecast. Goods are produced and pushed into Finished Goods Inventory. (D-2)

Quantity variance Difference between actual and budgeted revenue or cost caused by the difference between the actual number of units and the budgeted number of units. (828)

Ratio analysis Determination of key relations between financial statement items as reflected in numerical measures. (504)

Raw materials inventory Goods a company acquires to use in making products. (548)

Raw materials inventory turnover Measure of how many times a company turns over (uses in production) its raw materials inventory during a period; defined as raw materials used divided by average raw materials inventory. (556)

Realizable value Expected proceeds from converting an asset into cash. (285)

Receiving report Form used to report that ordered goods were received and to describe their quantity and condition. (263, 578)

Recordkeeping Part of accounting that involves recording transactions and events, either manually or electronically; also called *bookkeeping*. (3)

Registered bonds Bonds owned by investors whose names and addresses are recorded by the issuer; interest payments are made to the registered owners. (398)

Relevance principle Information system principle prescribing that its reports be useful, understandable, timely, and pertinent for decision making.

Relevant benefits Additional or incremental revenue generated by selecting a particular course of action over another.

Relevant range of operations Company's normal operating range; excludes extremely high and low volumes not likely to occur. (707)

Report form balance sheet Balance sheet that lists accounts vertically in the order of assets, liabilities, and equity.

Research and development costs Research expenditures are those incurred in gaining new knowledge, and development expenditures are the application of knowledge before commercial production or use; examples of research costs are tests of new vaccines or any other scientific or technical knowledge, and

examples of development costs are plans or designs for improved materials, devices, processes, or services. (328)

Residual income The net income an investment center earns above a target return on average invested assets. (873)

Responsibility accounting System that provides information that management can use to evaluate the performance of a department's manager. (865)

Responsibility accounting budget Report of expected costs and expenses under a manager's control.

Responsibility accounting performance report Report that compares actual costs and expenses for a department with budgeted amounts. (866)

Restricted retained earnings Retained earnings not available for dividends because of legal or contractual limitations. (437)

Retail inventory method Method for estimating ending inventory based on the ratio of the amount of goods for sale at cost to the amount of goods for sale at retail. (224)

Retailer Intermediary that buys products from manufacturers or wholesalers and sells them to consumers. (153)

Retained earnings Cumulative income less cumulative losses and dividends. (10, 425)

Retained earnings deficit Debit (abnormal) balance in Retained Earnings; occurs when cumulative losses and dividends exceed cumulative income; also called *ac cumulated deficit*.

Return Monies received from an investment; often in percent form. (21)

Return on assets (ROA) Ratio reflecting operating efficiency; defined as net income divided by average total assets for the period; also called *return on total assets* or *return on investment*. (18)

Return on equity Ratio of net income to average equity for the-period.

Return on investment (ROI) Ratio reflecting operating efficiency; defined as net income divided by average total assets for the period; also called *return on assets* or *return on total assets*. (873)

Return on total assets Ratio reflecting operating efficiency; defined as net income divided by average total assets for the period; also called *return on assets* or *return on investment*. (C-14)

Revenue expenditures Expenditures reported on the current income statement as an expense because they do not provide benefits in future periods. (321)

Revenue per employee A measure of workforce effectiveness in generating revenue, computed as total revenue divided by total employees. (788)

Revenue recognition principle The principle prescribing that revenue is recognized when goods or services are delivered to customers. (7, 86)

Revenues Gross increase in equity from a company's business activities that earn income; also called *sales*. (10)

Reverse stock split Occurs when a corporation calls in its stock and replaces each share with less than one new share; increases both market value per share and any par or stated value per share.

Reversing entries Optional entries recorded at the beginning of a period that prepare the accounts for the usual journal entries as if adjusting entries had not occurred in the prior period. (113)

Risk Uncertainty about an expected return.

Rolling budget New set of budgets a firm adds for the next period (with revisions) to replace the ones that have lapsed. (774)

S corporation Corporation that meets special tax qualifications to be treated like a partnership for income tax purposes.

Safety stock Quantity of inventory or materials over the minimum needed to satisfy budgeted demand. (776)

Sales Gross increase in equity from a company's business activities that earn income; also called *revenues*.

Sales budget Plan showing the units of goods to be sold or services to be provided; the starting point in the budgeting process for most departments. (776)

Sales discount Term used by a seller to describe a cash discount granted to buyers who pay within the discount period. (156)

Sales journal Journal normally used to record sales of goods on credit.

Sales mix Ratio of sales volumes for the various products sold by a company. (716)

Sales Refund Payable A current liability account reflecting the amount of sales expected to be refunded to customers. (175)

Sales Returns and Allowances Refunds or credits given to customers for unsatisfactory merchandise are recorded (debited) in Sales Returns and Allowances, a contra account to Sales. In addition, estimates of future sales returns and allowances (related to current-period sales) are made with an adjusting entry that debits Sales Returns and Allowances; this results in sales being recorded net of expected returns and allowances. Sales Returns and Allowances is a temporary account that is closed each period. (161)

Salvage value Estimate of amount to be recovered at the end of an asset's useful life; also called *residual value* or *scrap value*. (315)

Sarbanes-Oxley Act (SOX) Legislation that created the *Public Company Accounting Oversight Board,* regulates analyst conflicts, imposes corporate governance requirements, enhances accounting and control disclosures, impacts insider transactions and executive loans, establishes new types of criminal conduct, and expands penalties for violations of federal securities laws. (245)

Scatter diagram Graph used to display data about past cost behavior and sales as points on a diagram. (708)

Schedule of accounts payable List of the balances of all accounts in the accounts payable ledger and their totals.

Schedule of accounts receivable List of the balances of all accounts in the accounts receivable ledger and their totals.

Schedule of cost of goods manufactured Report that summarizes the types and amounts of costs incurred in a company's production process for a period; also called *manufacturing statement* or *cost of goods manufactured statement. (551)*

Section 404 (of SOX) Section 404 of SOX requires management and the external auditor to report on the adequacy of the company's internal control on financial reporting, which is the most costly aspect of SOX for companies to implement as documenting and testing important financial manual and automated controls require enormous efforts. Section 404 also requires management to produce an "internal control report" as part of each annual SEC report that affirms "the responsibility of management for establishing and maintaining an adequate internal control structure and procedures for financial reporting."

Secured bonds Bonds that have specific assets of the issuer pledged as collateral. (398)

Securities and Exchange Commission (SEC) Federal agency Congress has charged to set reporting rules for organizations that sell ownership shares to the public. (7)

Segment return on assets Segment operating income divided by segment average (identifiable) assets for the period.

Selling expense budget Plan that lists the types and amounts of selling expenses expected in the budget period. (780)

Selling expenses Expenses of promoting sales, such as displaying and advertising merchandise, making sales, and delivering goods to customers. (166)

Serial bonds Bonds consisting of separate amounts that mature at different dates. (398)

Service company Organization that provides services instead of tangible products.

Service life Length of time an asset will be productively used in the operations of a business; also called *limited life* or *useful life*.

Services in Process Inventory Account that records the cost of partially completed services. (590)

Services Overhead Account that records the overhead costs of providing services. (590)

Setup time The amount of time to prepare a process for production. (D-3)

Shareholders Owners of a corporation; also called *stockholders*. (8)

Shares Equity of a corporation divided into ownership units; also called *stock*. (8)

Short-term investments Debt and equity securities that management expects to convert to cash within the next 3 to 12 months (or the operating cycle if longer); also called *temporary investments* or *marketable securities*. (C-2)

Short-term lease Lease with a term of 12 months or less that does not have a long-term purchase option; the lessee records such lease payments as expenses. (406)

Short-term note payable Current obligation in the form of a written promissory note. (349)

Shrinkage Inventory losses that occur as a result of theft or deterioration. (163)

Signature card Includes the signature of each person authorized to sign checks on the bank account. (255)

Simple capital structure Capital structure that consists of only common stock and nonconvertible preferred stock; consists of no dilutive securities.

Single-step income statement Income statement format that subtracts total expenses, including cost of goods sold, from total revenues with no other subtotals. (167)

Sinking fund bonds Bonds that require the issuer to make deposits to a separate account; bondholders are repaid at maturity from that account. (398)

Small stock dividend Stock dividend that is 25% or less of a corporation's previously outstanding shares. (429)

Social responsibility Being accountable for the impact that one's actions might have on society.

Sole proprietorship Business owned by one person that is not organized as a corporation; also called *proprietorship.* (8)

Solvency Company's long-run financial viability and its ability to cover long-term obligations. (503)

Source documents Source of information for accounting entries that can be in either paper or electronic form; also called *business papers*. (45)

Special journal Any journal used for recording and posting transactions of a similar type.

Specific identification (SI) Method for assigning cost to inventory when the purchase cost of each item in inventory is identified and used to compute cost of goods sold and/or cost of inventory. (204)

Spending variance Difference between the actual price of an item and its standard price. (840)

Spreadsheet Computer program that organizes data by means of formulas and format; also called *electronic work sheet.*

Standard costing income statement Income statement that reports sales and cost of goods sold at their standard amounts and then lists the individual sales and cost variances to compute gross profit at actual cost. (843)

Standard costs Costs that should be incurred under normal conditions to produce a product or component or to perform a service. (825)

State Unemployment Tax Act (SUTA) State payroll taxes on employers to support its unemployment programs. (369)

Stated value stock No-par stock assigned a stated value per share; this amount is recorded in the stock account when the stock is issued. (425)

Statement of cash flows A financial statement that lists cash inflows (receipts) and cash outflows (payments) during a period; arranged by operating, investing, and financing. (15, 459)

Statement of owner's equity Report of changes in equity over a period; adjusted for increases (owner investment and net income) and for decreases (withdrawals and net loss).

Statement of partners' equity Financial statement that shows total capital balances at the beginning of the period, any additional investment by partners, the income or loss of the period, the partners' withdrawals, and the partners' ending capital balances; also called *statement of partners' capital*.

Statement of retained earnings Report of changes in retained earnings over a period; adjusted for increases (net income), for decreases (dividends and net loss), and for any prior period adjustment. (15)

Statement of stockholders' equity Financial statement that lists the beginning and ending balances of each major equity account and describes all changes in those accounts. (437)

Statements of Financial Accounting Standards (SFAS) FASB publications that establish U.S. GAAP.

Step-wise cost Cost that remains fixed over limited ranges of volumes but changes by a lump sum when volume changes occur outside these limited ranges. (707)

Stock Equity of a corporation divided into ownership units; also called *shares*. (8)

Stock dividend Corporation's distribution of its own stock to its stockholders without the receipt of any payment. (429)

Stock options Rights to purchase common stock at a fixed price over a specified period of time.

Stock split Occurs when a corporation calls in its stock and replaces each share with more than one new share; decreases both the market value per share and any par or stated value per share. (431)

Stock subscription Investor's contractual commitment to purchase unissued shares at future dates and prices.

Stockholders Owners of a corporation; also called *shareholders*. (8)

Stockholders' equity A corporation's equity; also called *shareholders' equity* or *corporate capital*. (425)

Straight-line bond amortization Method allocating an equal amount of bond interest expense to each period of the bond life. (391)

Straight-line depreciation Method that allocates an equal portion of the depreciable cost of plant asset (cost minus salvage) to each accounting period in its useful life. (89, 316)

Subsidiary Entity controlled by another entity (parent) in which the parent owns more than 50% of the subsidiary's voting stock. (C-13)

Subsidiary ledger List of individual subaccounts and amounts with a common characteristic; linked to a controlling account in the general ledger.

Subsidiary records In job order costing, the job cost sheets that store job-specific cost data. (576)

Sunk cost Cost already incurred that cannot be avoided or changed. (904)

Supplementary records Information outside the usual accounting records; also called *supplemental records*. (159)

Supply chain Linkages of services or goods extending from suppliers, to the company itself, and on to customers.

Supply chain management The coordination and control of goods, services, and information as they move from suppliers to consumers. (680, D-5)

Sustainability The ability of an item or activity to continue endlessly; for a business, it usually refers to that company's environmental, social, and governance aspects.

Sustainability Accounting Standards Board (SASB) A nonprofit entity engaged in creating and disseminating sustainability accounting standards for use by companies. (555)

T-account Tool used to show the effects of transactions and events on individual accounts; shaped in the form of a T. (49)

Target cost Maximum allowable cost for a product or service; defined as expected selling price less the desired profit. (577)

Temporary accounts Accounts used to record revenues, expenses, and withdrawals (dividends for a corporation); they are closed at the end of each period. (100)

Term bonds Bonds scheduled for payment (maturity) at a single specified date. (398)

Throughput time A measure of the time to produce a product or service, which is the sum of process time, inspection time, move time, and wait time; also called *cycle time.*

Time and materials pricing Method used in pricing services; price is based on direct labor, direct materials, and overhead costs, plus a desired profit margin. (914)

Time charge Dollar amount per hour of direct labor that includes a charge for non-materials-related overhead costs plus a target profit. (914)

Time period assumption Assumption that an organization's activities can be divided into specific time periods such as months, quarters, or years. (8, 85)

Time ticket Source document used to report the time an employee spent working on a job or on overhead activities and then to determine the amount of direct labor to charge to the job or the amount of indirect labor to charge to overhead. (580)

Times interest earned Ratio of income before interest expense (and any income taxes) divided by interest expense; reflects risk of covering interest commitments when income varies. (360)

Total asset turnover Measure of a company's ability to use its assets to generate sales; computed by dividing net sales by average total assets. (329, C-14)

Total cost method A pricing method in which all of the costs of a good or service are included in determining the selling price. (910)

Total quality management (TQM) Concept calling for all managers and employees at all stages of operations to strive toward higher standards and reduce the number of defects. (554)

Trade discount Reduction from a list or catalog price that can vary for wholesalers, retailers, and consumers.

Trademark or **trade (brand) name** Symbol, name, phrase, or jingle identified with a company, product, or service. (327)

Trading on the equity Earning a higher return on equity by paying dividends on preferred stock or interest on debt at a rate lower than the return earned with the assets from issuing preferred stock or debt; also is the aim of *financial leverage.*

Trading securities Investments in debt securities that the company intends to actively trade for profit. (C-3)

Transaction Exchange of economic consideration affecting an entity's financial position that can be reliably measured.

Transfer price The price used to record transfers of goods or services across divisions within the same company. (877)

Treasury stock Corporation's own stock that it reacquired and still holds. (434)

Trial balance List of ledger accounts and their balances (either debit or credit) at a point in time; total debit balances equal total credit balances. (58)

Triple bottom line A framework for reporting an organization's performance on social ("people"), environmental ("planet"), and financial factors ("profits"). (555)

Unadjusted trial balance List of accounts and balances prepared before accounting adjustments are recorded and posted. (97)

Unavoidable expense Expense (or cost) that is not relevant for business decisions; an expense that would continue even if a department, product, or service were eliminated. (908)

Unclassified balance sheet Balance sheet that broadly groups assets, liabilities, and equity accounts. (104)

Uncontrollable costs Costs that a manager does not have the power to determine or strongly influence. (866)

Underapplied overhead Amount by which actual overhead cost incurred in a period exceeds the overhead applied to that period's production using the predetermined overhead rate. (588)

Unearned revenue Liability created when customers pay in advance for products or services; earned when the products or services are later delivered. (47, 91)

Unfavorable variance Difference in revenues or costs, when the actual amount is compared to the budgeted amount, that contributes to a lower income. (822)

Unit contribution margin Amount by which a product's unit selling price exceeds its total unit variable cost.

Unit-level activities Activities that arise as a result of the total volume of goods and services that are produced, and that are performed each time a unit is produced. (676)

Units-of-production depreciation Method that charges a varying amount to depreciation expense for each period of an asset's useful life depending on its usage. (317)

Unlimited liability Legal relationship among general partners that makes each of them responsible for partnership debts if the other partners are unable to pay their shares.

Unrealized gain (loss) Gain (loss) not yet realized by an actual transaction or event such as a sale. (C-4, C-9)

Unsecured bonds Bonds backed only by the issuer's credit-standing; almost always riskier than secured bonds; also called *debentures*. (398)

Unusual gain or loss Gain or loss that is abnormal or unrelated to the company's ordinary activities and environment.

Useful life Length of time an asset will be productively used in the operations of a business; also called *service life* or *limited life*. (315)

Value-added activities Activities that add value to products or-services. (677)

Value-added time The portion of cycle time that is directed at producing a product or service; equals process time. (D-3)

Value-based pricing System where sellers find the maximum price buyers will pay for the goods and services they value. (912)

Value chain Sequential activities that add value to an entity's products or services; includes design, production, marketing, distribution, and service. (554)

Value stream The activities necessary to create customer value. (D-2)

Variable cost Cost that changes in total in proportion to changes in the activity output volume. (706)

Variable cost of goods sold Direct materials, direct labor, and variable overhead costs for units sold. (743)

Variable costing Costing method that includes only variable manufacturing costs (direct materials, direct labor, and variable manufacturing overhead) in unit product costs; also called *direct* or *marginal costing*. (721, 741)

Variable costing income statement An income statement in which costs are classified as variable or fixed; also called *contrib ution margin income statement*. (721)

Variance A difference between an actual amount and a budgeted amount. (822)

Variance analysis Process of examining differences between actual and budgeted revenues or costs and describing them in terms of price and quantity differences. (826)

Vendee Buyer of goods or services. (263)

Vendor Seller of goods or services. (262)

Vertical analysis Evaluation of each financial statement item or group of items in terms of a specific base amount. (504)

Volume variance Difference between two dollar amounts of fixed overhead cost; one amount is the total budgeted overhead cost, and the other is the overhead cost allocated to products using the predetermined fixed overhead rate. (834)

Voucher Internal file used to store documents and information to control cash disbursements and to ensure that a transaction is properly authorized and recorded. (251)

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Voucher register Journal (referred to as *book of original entry*) in which all vouchers are recorded after they have been approved. (263)

Voucher system Procedures and approvals designed to control cash disbursements and acceptance of obligations. (251)

Wage bracket withholding table Table of the amounts of income tax withheld from employees' wages. (366)

Warranty Agreement that obligates the seller to correct or replace a product or service when it fails to perform properly within a specified period. (356)

Weighted average (WA) Method for assigning inventory cost to sales; the cost of available-for-sale units is divided by the number of units available to determine per unit cost prior to each sale, which is then multiplied by the units sold to yield the cost of that sale; also called *average cost.* (206)

Weighted-average contribution margin The contribution margin per composite unit for a company that provides multiple goods or services; also called *contribution margin per composite unit*. (716)

Weighted-average method Method for assigning inventory cost to sales; the cost of available-for-sale units is divided by the number of units available to determine per unit cost prior to each sale, which is

then multiplied by the units sold to yield the cost of that sale; also called *weighted average*. (621)

Whole units Number of physical units in production in a period. (622)

Wholesaler Intermediary that buys products from manufacturers or other wholesalers and sells them to retailers or other wholesalers. (153)

Withdrawals Payment of cash or other assets from a proprietorship or partnership to its owner or owners.

Work in Process Inventory Account in which costs are accumulated for products that are in the process of being produced but are not yet complete; also called *Goods in Process Inventory.* (548, 576)

Work sheet Spreadsheet used to draft an unadjusted trial balance, adjusting entries, adjusted trial balance, and financial statements. (111)

Working capital Current assets minus current liabilities at a point in time. (512)

Working papers Analyses and other informal reports prepared by accountants and managers when organizing information for formal reports and financial statements.

Yield Measures the efficiency of process operations; computed as nondefective units produced divided by units that could have been produced. (634)

Zero-based budgeting A budgeting approach where each budget item must be justified against a zero base, without reference to amounts from prior periods. (775)

4D

Work Sheet—Perpetual System

Exhibit 4D.1 shows the work sheet for preparing financial statements of a merchandiser. It differs slightly from the work sheet layout in the prior chapter—the differences are in **orange boldface**. The adjustments in the work sheet reflect the following: (*1*) expiration of $600 of prepaid insurance, (*2*) use of $3,000 of supplies, (*3*) depreciation of $3,700 for equipment, (*4*) accrual of $800 of unpaid salaries, and (*5*) inventory shrinkage of $250. Once the adjusted amounts are extended into the financial statement columns, the information is used to develop financial statements.

	A	B	C	D	E	F	G	H	I	J	K	L
1			Unadjusted Trial Balance		Adjustments		Adjusted Trial Balance		Income Statement		Balance Sheet	
2	No.	Account	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.
3	101	Cash	8,200				8,200				8,200	
4	106	Accounts receivable	11,250				11,250				11,250	
5	108	Allowance for sales discounts		0		(g) 50		50				50
6	119	Merchandise inventory	21,250			(5) 250	21,000				21,000	
7	121	Inventory returns estimated	200		(h2) 300		500				500	
8	126	Supplies	3,800			(2) 3,000	800				800	
9	128	Prepaid insurance	900			(1) 600	300				300	
10	167	Equipment	34,200				34,200				34,200	
11	168	Accumulated depr.—Equip.		3,700		(3) 3,700		7,400				7,400
12	201	Accounts payable		16,000				16,000				16,000
13	209	Salaries payable				(4) 800		800				800
14	227	Sales refund payable		300		(h1) 900		1,200				1,200
15	307	Common stock		10,000				10,000				10,000
16	318	Retained earnings		31,900				31,900				31,900
17	319	Dividends	4,000				4,000				4,000	
18	413	Sales		321,000				321,000		321,000		
19	414	Sales returns and allowances	1,100		(h1) 900		2,000		2,000			
20	415	Sales discounts	4,250		(g) 50		4,300		4,300			
21	502	Cost of goods sold	230,450		(5) 250	(h2) 300	230,400		230,400			
22	612	Depreciation expense—Equip.			(3) 3,700		3,700		3,700			
23	622	Salaries expense	43,000		(4) 800		43,800		43,800			
24	637	Insurance expense			(1) 600		600		600			
25	640	Rent expense	9,000				9,000		9,000			
26	652	Supplies expense			(2) 3,000		3,000		3,000			
27	655	Advertising expense	11,300				11,300		11,300			
28		Totals	382,900	382,900	9,600	9,600	388,350	388,350	308,100	321,000	80,250	67,350
29		Net income							12,900			12,900
30		Totals							321,000	321,000	80,250	80,250

EXHIBIT 4D.1

Work Sheet for Merchandiser (using a perpetual system)

PROBLEM SET A

Problem 4-6A[D]

ONLINE APPENDIX: Preparing a work sheet for a merchandiser **P3**

Refer to the data and information in Problem 4-5A.

Required

Prepare and complete the entire 10-column work sheet for Nelson Company. Follow the structure of Exhibit 4D.1.

PROBLEM SET B

Problem 4-6B[D]

ONLINE APPENDIX: Preparing a work sheet for a merchandiser **P3**

Refer to the data and information in Problem 4-5B.

Required

Prepare and complete the entire 10-column work sheet for Foster Products Company. Follow the structure of Exhibit 4D.1.

Appendix A Financial Statement Information

This appendix includes financial information for (1) **Apple**, (2) **Google**, and (3) **Samsung**. Apple states that it designs, manufactures and markets smartphones, personal computers, tablets, wearables, and accessories, and sells a variety of related services. It competes with both Google and Samsung in the United States and globally. The information in this appendix is taken from annual 10-K reports (or annual report for Samsung) filed with the SEC or other regulatory agency. An **annual report** is a summary of a company's financial results for the year along with its current financial condition and future plans. This report is directed to external users of financial information, but it also affects the actions and decisions of internal users.

A company often uses an annual report to showcase itself and its products. Many annual reports include photos, diagrams, and illustrations related to the company. The primary objective of annual reports, however, is the financial section, which communicates much information about a company, with most data drawn from the accounting information system. The content of a typical annual report's financial section follows.

- Letter to Shareholders
- Financial History and Highlights
- Quantitative and Qualitative Disclosures about Risk Factors
- Management Discussion and Analysis
- Management's Report on Financial Statements and on Internal Controls
- Report of Independent Accountants (Auditor's Report) and on Internal Controls
- Financial Statements

- Notes to Financial Statements
- Directors, Officers, and Corporate Governance
- Executive Compensation
- Accounting Fees and Services

This appendix provides the financial statements for Apple (plus selected notes), Google, and Samsung. (*Note:* Google is part of **Alphabet**; we refer to Alphabet as "Google" because of its global familiarity and because Google makes up 99% of Alphabet's revenues.) The appendix is organized as follows:

APPLE

GOOGLE

SAMSUNG

- **Apple A-1** through **A-8**
- **Google A-9** through **A-12**
- **Samsung A-13** through **A-16**

Many assignments at the end of each chapter refer to information in this appendix. We encourage readers to spend time with these assignments; they are especially useful in showing the relevance and diversity of accounting and reporting.

Special note: The SEC maintains the EDGAR (**E**lectronic **D**ata **G**athering, **A**nalysis, and **R**etrieval) database at SEC.gov for U.S. filers. The **Form 10-K** is the annual report form for most companies. It provides electronically accessible information. The **Form 10-KSB** is the annual report form filed by small businesses. It requires slightly less information than the Form 10-K. One of these forms must be filed within 90 days after the company's fiscal year-end. (Forms 10-K405, 10-KT, 10-KT405, and 10-KSB405 are slight variations of the usual form due to certain regulations or rules.)

Apple Inc.
CONSOLIDATED BALANCE SHEETS
(In millions, except number of shares which are reflected in thousands and par value)

	September 28, 2019	September 29, 2018
ASSETS		
Current assets		
Cash and cash equivalents	$ 48,844	$ 25,913
Marketable securities	51,713	40,388
Accounts receivable, net	22,926	23,186
Inventories	4,106	3,956
Vendor non-trade receivables	22,878	25,809
Other current assets	12,352	12,087
Total current assets	162,819	131,339
Non-current assets		
Marketable securities	105,341	170,799
Property, plant and equipment, net	37,378	41,304
Other non-current assets	32,978	22,283
Total non-current assets	175,697	234,386
Total assets	$ 338,516	$ 365,725
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current liabilities		
Accounts payable	$ 46,236	$ 55,888
Other current liabilities	37,720	33,327
Deferred revenue	5,522	5,966
Commercial paper	5,980	11,964
Term debt	10,260	8,784
Total current liabilities	105,718	115,929
Non-current liabilities		
Term debt	91,807	93,735
Other non-current liabilities	50,503	48,914
Total non-current liabilities	142,310	142,649
Total liabilities	248,028	258,578
Commitments and contingencies		
Shareholders' equity		
Common stock and additional paid-in capital, $0.00001 par value: 12,600,000 shares authorized; 4,443,236 and 4,754,986 shares issued and outstanding, respectively	45,174	40,201
Retained earnings	45,898	70,400
Accumulated other comprehensive income (loss)	(584)	(3,454)
Total shareholders' equity	90,488	107,147
Total liabilities and shareholders' equity	$ 338,516	$ 365,725

See accompanying Notes to Consolidated Financial Statements.

Apple Inc.

CONSOLIDATED STATEMENTS OF OPERATIONS

(In millions, except number of shares which are reflected in thousands and per share amounts)

Years ended	September 28, 2019	September 29, 2018	September 30, 2017
Net sales:			
Products	$ 213,883	$ 225,847	$ 196,534
Services	46,291	39,748	32,700
Total net sales	260,174	265,595	229,234
Cost of sales:			
Products	144,996	148,164	126,337
Services	16,786	15,592	14,711
Total cost of sales	161,782	163,756	141,048
Gross margin	98,392	101,839	88,186
Operating expenses:			
Research and development	16,217	14,236	11,581
Selling, general and administrative	18,245	16,705	15,261
Total operating expenses	34,462	30,941	26,842
Operating income	63,930	70,898	61,344
Other income (expense), net	1,807	2,005	2,745
Income before provision for income taxes	65,737	72,903	64,089
Provision for income taxes	10,481	13,372	15,738
Net income	$ 55,256	$ 59,531	$ 48,351
Earnings per share:			
Basic	$ 11.97	$ 12.01	$ 9.27
Diluted	$ 11.89	$ 11.91	$ 9.21
Shares used in computing earnings per share:			
Basic	4,617,834	4,955,377	5,217,242
Diluted	4,648,913	5,000,109	5,251,692

See accompanying Notes to Consolidated Financial Statements.

Apple Inc.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

(In millions)

Years ended	September 28, 2019	September 29, 2018	September 30, 2017
Net income	$ 55,256	$ 59,531	$ 48,351
Other comprehensive income (loss):			
Change in foreign currency translation, net of tax	(408)	(525)	224
Change in unrealized gains/losses on derivative instruments, net of tax:			
Change in fair value of derivatives	(661)	523	1,315
Adjustment for net (gains) losses realized and included in net income	23	382	(1,477)
Total change in unrealized gains/losses on derivative instruments	(638)	905	(162)
Change in unrealized gains/losses on marketable securities, net of tax:			
Change in fair value of marketable securities	3,802	(3,407)	(782)
Adjustment for net (gains) losses realized and included in net income	25	1	(64)
Total change in unrealized gains/losses on marketable securities	3,827	(3,406)	(846)
Total other comprehensive income (loss)	2,781	(3,026)	(784)
Total comprehensive income	$ 58,037	$ 56,505	$ 47,567

See accompanying Notes to Consolidated Financial Statements.

Apple Inc.

CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY

(In millions)

Years ended	September 28, 2019	September 29, 2018	September 30, 2017
Total shareholders' equity, beginning balances	$ 107,147	$ 134,047	$ 128,249
Common stock and additional paid-in capital			
Beginning balances	40,201	35,867	31,251
Common stock issued	781	669	555
Common stock withheld related to net share settlement of equity awards	(2,002)	(1,778)	(1,468)
Share-based compensation	6,194	5,443	4,909
Tax benefit from equity awards, including transfer pricing adjustments	—	—	620
Ending balances	45,174	40,201	35,867
Retained earnings			
Beginning balances	70,400	98,330	96,364
Net income	55,256	59,531	48,351
Dividends and dividend equivalents declared	(14,129)	(13,735)	(12,803)
Common stock withheld related to net share settlement of equity awards	(1,029)	(948)	(581)
Common stock repurchased	(67,101)	(73,056)	(33,001)
Cumulative effects of changes in accounting principles	2,501	278	—
Ending balances	45,898	70,400	98,330
Accumulated other comprehensive income (loss)			
Beginning balances	(3,454)	(150)	634
Other comprehensive income (loss)	2,781	(3,026)	(784)
Cumulative effects of changes in accounting principles	89	(278)	—
Ending balances	(584)	(3,454)	(150)
Total shareholders' equity, ending balances	$ 90,488	$ 107,147	$ 134,047

See accompanying Notes to Consolidated Financial Statements.

Apple Inc.

CONSOLIDATED STATEMENTS OF CASH FLOWS

(In millions)

Years ended	September 28, 2019	September 29, 2018	September 30, 2017
Cash, cash equivalents and restricted cash, beginning balances	$ 25,913	$ 20,289	$ 20,484
Operating activities			
Net income	55,256	59,531	48,351
Adjustments to reconcile net income to cash generated by operating activities:			
Depreciation and amortization	12,547	10,903	10,157
Share-based compensation expense	6,068	5,340	4,840
Deferred income tax expense (benefit)	(340)	(32,590)	5,966
Other	(652)	(444)	(166)
Changes in operating assets and liabilities:			
Accounts receivable, net	245	(5,322)	(2,093)
Inventories	(289)	828	(2,723)
Vendor non-trade receivables	2,931	(8,010)	(4,254)
Other current and non-current assets	873	(423)	(5,318)
Accounts payable	(1,923)	9,175	8,966
Deferred revenue	(625)	(3)	(593)
Other current and non-current liabilities	(4,700)	38,449	1,092
Cash generated by operating activities	69,391	77,434	64,225
Investing activities			
Purchases of marketable securities	(39,630)	(71,356)	(159,486)
Proceeds from maturities of marketable securities	40,102	55,881	31,775
Proceeds from sales of marketable securities	56,988	47,838	94,564
Payments for acquisition of property, plant and equipment	(10,495)	(13,313)	(12,451)
Payments made in connection with business acquisitions, net	(624)	(721)	(329)
Purchases of non-marketable securities	(1,001)	(1,871)	(521)
Proceeds from non-marketable securities	1,634	353	126
Other	(1,078)	(745)	(124)
Cash generated by (used in) investing activities	45,896	16,066	(46,446)
Financing activities			
Proceeds from issuance of common stock	781	669	555
Payments for taxes related to net share settlement of equity awards	(2,817)	(2,527)	(1,874)
Payments for dividends and dividend equivalents	(14,119)	(13,712)	(12,769)
Repurchases of common stock	(66,897)	(72,738)	(32,900)
Proceeds from issuance of term debt, net	6,963	6,969	28,662
Repayments of term debt	(8,805)	(6,500)	(3,500)
Proceeds from (Repayments of) commercial paper, net	(5,977)	(37)	3,852
Other	(105)	—	—
Cash used in financing activities	(90,976)	(87,876)	(17,974)
Increase (decrease) in cash, cash equivalents and restricted cash	24,311	5,624	(195)
Cash, cash equivalents and restricted cash, ending balances	$ 50,224	$ 25,913	$ 20,289
Supplemental cash flow disclosure:			
Cash paid for income taxes, net	$ 15,263	$ 10,417	$ 11,591
Cash paid for interest	$ 3,423	$ 3,022	$ 2,092

See accompanying Notes to Consolidated Financial Statements.

SELECTED NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Basis of Presentation and Preparation

In the opinion of the Company's management, the consolidated financial statements reflect all adjustments, which are normal and recurring in nature, necessary for fair financial statement presentation. The preparation of these consolidated financial statements and accompanying notes in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the amounts reported.

The Company's fiscal year is the 52- or 53-week period that ends on the last Saturday of September. The Company's fiscal years 2019 and 2018 spanned 52 weeks each, whereas fiscal year 2017 included 53 weeks. A 14th week was included in the first fiscal quarter of 2017, as is done every five or six years, to realign the Company's fiscal quarters with calendar quarters. Unless otherwise stated, references to particular years, quarters, months and periods refer to the Company's fiscal years ended in September and the associated quarters, months and periods of those fiscal years.

Revenue Recognition

Net sales consist of revenue from the sale of iPhone, Mac, iPad, Services and other products. The Company recognizes revenue at the amount to which it expects to be entitled when control of the products or services is transferred to its customers. Control is generally transferred when the Company has a present right to payment and title and the significant risks and rewards of ownership of products or services are transferred to its customers. For most of the Company's Products net sales, control transfers when products are shipped. For the Company's Services net sales, control transfers over time as services are delivered. Payment for Products and Services net sales is collected within a short period following transfer of control or commencement of delivery of services, as applicable.

The Company records reductions to Products net sales related to future product returns, price protection and other customer incentive programs based on the Company's expectations and historical experience.

For arrangements with multiple performance obligations, which represent promises within an arrangement that are capable of being distinct, the Company allocates revenue to all distinct performance obligations based on their relative stand-alone selling prices ("SSPs"). When available, the Company uses observable prices to determine SSPs. When observable prices are not available, SSPs are established that reflect the Company's best estimates of what the selling prices of the performance obligations would be if they were sold regularly on a stand-alone basis.

The Company has identified up to three performance obligations regularly included in arrangements involving the sale of iPhone, Mac, iPad and certain other products. The first performance obligation, which represents the substantial portion of the allocated sales price, is the hardware and bundled software delivered at the time of sale. The second performance obligation is the right to receive certain product-related bundled services, which include iCloud, Siri and Maps. The third performance obligation is the right to receive, on a when-and-if-available basis, future unspecified software upgrades relating to the software bundled with each device. The Company allocates revenue and any related discounts to these performance obligations based on their relative SSPs. Because the Company lacks observable prices for the undelivered performance obligations, the allocation of revenue is based on the Company's estimated SSPs. Revenue allocated to the delivered hardware and bundled software is recognized when control has transferred to the customer, which generally occurs when the product is shipped. Revenue allocated to the product-related bundled services and unspecified software upgrade rights is deferred and recognized on a straight-line basis over the estimated period they are expected to be provided. Cost of sales related to delivered hardware and bundled software, including estimated warranty costs, are recognized at the time of sale. Costs incurred to provide product-related bundled services and unspecified software upgrade rights are recognized as cost of sales as incurred.

For the sale of third-party products where the Company obtains control of the product before transferring it to the customer, the Company recognizes revenue based on the gross amount billed to

customers. The Company considers multiple factors when determining whether it obtains control of third-party products including, but not limited to, evaluating if it can establish the price of the product, retains inventory risk for tangible products or has the responsibility for ensuring acceptability of the product. For thirdparty applications sold through the App Store, Mac App Store, TV App Store and Watch App Store and certain digital content sold through the Company's other digital content stores, the Company does not obtain control of the product before transferring it to the customer. Therefore, the Company accounts for such sales on a net basis by recognizing in Services net sales only the commission it retains.

The Company has elected to record revenue net of taxes collected from customers that are remitted to governmental authorities, with the collected taxes recorded within other current liabilities until remitted to the relevant government authority.

Deferred Revenue As of September 28, 2019 and September 29, 2018, the Company had total deferred revenue of $8.1 billion and $8.8 billion, respectively. As of September 28, 2019, the Company expects 68% of total deferred revenue to be realized in less than a year, 25% within one-to-two years, 6% within two-to-three years and 1% in greater than three years.

Advertising Costs

Advertising costs are expensed as incurred and included in selling, general and administrative expenses.

Other Income and Expense

$ millions	2019	2018	2017
Interest and dividend income	$ 4,961	$ 5,686	$ 5,201
Interest expense	(3,576)	(3,240)	(2,323)
Other income (expense), net	422	(441)	(133)
Total other income (expense), net	$ 1,807	$ 2,005	$ 2,745

Cash Equivalents and Marketable Securities

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All highly liquid investments with maturities of three months or less at the date of purchase are classified as cash equivalents. The Company's investments in marketable debt securities have been

classified and accounted for as available-for-sale. The Company classifies its marketable debt securities as either short-term or long-term based on each instrument's underlying contractual maturity date. Unrealized gains and losses on marketable debt securities classified as available-for-sale are recognized in other comprehensive income/(loss) ("OCI").

The Company's investments in marketable equity securities are classified based on the nature of the securities and their availability for use in current operations. The Company's marketable equity securities are measured at fair value with gains and losses recognized in other income/(expense), net ("OI&E"). The cost of securities sold is determined using the specific identification method.

Restricted Cash and Restricted Marketable Securities

The Company considers cash and marketable securities to be restricted when withdrawal or general use is legally restricted. The Company records restricted cash as other assets in the Consolidated Balance Sheets, and determines current or non-current classification based on the expected duration of the restriction. The Company records restricted marketable securities as current or non-current marketable securities in the Consolidated Balance Sheets based on the classification of the underlying securities.

The Company's restricted cash primarily consisted of cash required to be on deposit under a contractual agreement with a bank to support the Company's iPhone Upgrade Program.

Accounts Receivable (Trade Receivables)

The Company has considerable trade receivables outstanding with its third-party cellular network carriers, wholesalers, retailers, resellers, small and mid-sized businesses and education, enterprise and government customers.

As of September 28, 2019, the Company had no customers that individually represented 10% or more of total trade receivables. As of September 29, 2018, the Company had one customer that represented 10% or more of total trade receivables, which accounted for 10%. The Company's cellular network carriers accounted for 51% and 59% of total trade receivables as of September 28, 2019 and September 29, 2018, respectively.

Inventories

Inventories are measured using the first-in, first-out method.

Property, Plant and Equipment

Depreciation on property, plant and equipment is recognized on a straight-line basis over the estimated useful lives of the assets, which for buildings is the lesser of 30 years or the remaining life of the underlying building; between one and five years for machinery and equipment, including product tooling and manufacturing process equipment; and the shorter of lease term or useful life for leasehold improvements. Capitalized costs related to internal-use software are amortized on a straight-line basis over the estimated useful lives of the assets, which range from three to five years. Depreciation and amortization expense on property and equipment was $11.3 billion, $9.3 billion and $8.2 billion during 2019, 2018 and 2017, respectively.

$ millions	2019	2018
Land and buildings	$17,085	$16,216
Machinery, equipment and internal-use software	69,797	65,982
Leasehold improvements	9,075	8,205
Gross property, plant and equipment	95,957	90,403
Accumulated depreciation and amortization	(58,579)	(49,099)
Total property, plant and equipment, net	$37,378	$41,304

Fair Value Measurements

The fair values of the Company's money market funds and certain marketable equity securities are based on quoted prices in active markets for identical assets. The valuation techniques used to measure the fair value of the Company's debt instruments and all other financial instruments, which generally have counterparties with high credit ratings, are based on quoted market prices or model-driven valuations using significant inputs derived from or corroborated by observable market data.

Financial Instruments

The Company typically invests in highly rated securities, with the primary objective of minimizing the potential risk of principal loss. The Company's investment policy generally requires securities to be

investment grade and limits the amount of credit exposure to any one issuer. Fair values were determined for each individual security in the investment portfolio.

Accrued Warranty and Guarantees

The following table shows changes in the Company's accrued warranties and related costs for 2019 and 2018:

$ millions	2019	2018
Beginning accrued warranty and related costs	$ 3,692	$ 3,834
Cost of warranty claims	(3,857)	(4,115)
Accruals for product warranty	3,735	3,973
Ending accrued warranty and related costs	$ 3,570	$ 3,692

Other Non-Current Liabilities

$ millions	2019	2018
Long-term taxes payable	$29,545	$33,589
Other non-current liabilities	20,958	15,325
Total other non-current liabilities	$50,503	$48,914

Term Debt

As of September 28, 2019, the Company had outstanding floating- and fixed-rate notes with varying maturities for an aggregate principal amount of $101.7 billion (collectively the "Notes"). The Notes are senior unsecured obligations and interest is payable in arrears.

The Company recognized $3.2 billion, $3.0 billion and $2.2 billion of interest cost on its term debt for 2019, 2018 and 2017, respectively.

The future principal payments for the Company's Notes as of September 28, 2019 are as follows (in millions):

2020	$ 10,270
2021	8,750
2022	9,528
2023	9,290
2024	10,039
Thereafter	53,802
Total term debt	$101,679

As of September 28, 2019 and September 29, 2018, the fair value of the Company's Notes, based on Level 2 inputs, was $107.5 billion and $103.2 billion, respectively.

Share Repurchase Program

On April 30, 2019, the Company announced the Board of Directors increased the current share repurchase program authorization from $100 billion to $175 billion of the Company's common stock, of which $96.1 billion had been utilized as of September 28, 2019. During 2019, the Company repurchased 345.2 million shares of its common stock for $67.1 billion, including 62.0 million shares delivered under a $12.0 billion accelerated share repurchase arrangement dated February 2019, which settled in August 2019. The Company's share repurchase program does not obligate it to acquire any specific number of shares.

Contingencies

The Company is subject to various legal proceedings and claims that have arisen in the ordinary course of business and that have not been fully resolved. The outcome of litigation is inherently uncertain. If one or more legal matters were resolved against the Company in a reporting period for amounts above management's expectations, the Company's financial condition and operating results for that reporting period could be materially adversely affected. In the opinion of management, there was not at least a reasonable possibility the Company may have incurred a material loss, or a material loss greater than a recorded accrual, concerning loss contingencies for asserted legal and other claims, except for the following matters:

- VirnetX
- Qualcomm
- iOS Performance Management Cases
- French Competition Authority

Disaggregated Revenue by Significant Products and Services

Net sales (mil.)	2019	2018	2017
iPhone	$142,381	$164,888	$139,337
Mac	25,740	25,198	25,569
iPad	21,280	18,380	18,802
Wearables, Home and Accessories	24,482	17,381	12,826
Services	46,291	39,748	32,700
Total net sales	$260,174	$265,595	$229,234

Reportable segment (mil.)	2019	2018	2017
Americas:			
Net sales	$116,914	$112,093	$96,600
Operating income	$ 35,099	$ 34,864	$30,684
Europe:			
Net sales	$ 60,288	$ 62,420	$54,938
Operating income	$ 19,195	$ 19,955	$16,514
Greater China:			
Net sales	$ 43,678	$ 51,942	$44,764
Operating income	$ 16,232	$ 19,742	$17,032
Japan:			
Net sales	$ 21,506	$ 21,733	$17,733
Operating income	$ 9,369	$ 9,500	$ 8,097
Rest of Asia Pacific:			
Net sales	$ 17,788	$ 17,407	$15,199
Operating income	$ 6,055	$ 6,181	$ 5,304

A reconciliation of the Company's segment operating income to the Consolidated Statements of Operations for 2019, 2018 and 2017 is as follows:

$ millions	2019	2018	2017
Segment operating income	$ 85,950	$ 90,242	$77,631
Research and development expense	(16,217)	(14,236)	(11,581)
Other corporate expenses, net	(5,803)	(5,108)	(4,706)
Total operating income	$ 63,930	$ 70,898	$61,344

Selected Financial Data

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(in millions, except number of shares, which are reflected in thousands, and per share amounts).

	2019	2018	2017	2016	2015
Total net sales	$ 260,174	$ 265,595	$ 229,234	$ 215,639	$ 233,715
Net income	$ 55,256	$ 59,531	$ 48,351	$ 45,687	$ 53,394
Earnings per share:					
Basic	$ 11.97	$ 12.01	$ 9.27	$ 8.35	$ 9.28
Diluted	$ 11.89	$ 11.91	$ 9.21	$ 8.31	$ 9.22
Cash dividends declared per share	$ 3.00	$ 2.72	$ 2.40	$ 2.18	$ 1.98
Shares used in computing earnings per share:					
Basic	4,617,834	4,955,377	5,217,242	5,470,820	5,753,421
Diluted	4,648,913	5,000,109	5,251,692	5,500,281	5,793,069
Total cash, cash equivalents and marketable securities	$ 205,898	$ 237,100	$ 268,895	$ 237,585	$ 205,666
Total assets	$ 338,516	$ 365,725	$ 375,319	$ 321,686	$ 290,345
Non-current portion of term debt	$ 91,807	$ 93,735	$ 97,207	$ 75,427	$ 53,329
Other non-current liabilities	$ 50,503	$ 48,914	$ 44,212	$ 39,986	$ 38,104

Company Background

The Company designs, manufactures and markets smartphones, personal computers, tablets, wearables and accessories, and sells a variety of related services. The Company's fiscal year is the 52- or 53-week period that ends on the last Saturday of September. The Company is a California corporation established in 1977.

Products

iPhone iPhone® is the Company's line of smartphones based on its iOS operating system. In September 2019, the Company introduced three new iPhones: iPhone 11, iPhone 11 Pro and iPhone 11 Pro Max.

Mac Mac® is the Company's line of personal computers based on its macOS® operating system. During 2019, the Company released a new version of MacBook Air® and a new Mac mini®, and introduced an updated Mac Pro®, which is expected to be available in the fall of 2019.

iPad iPad® is the Company's line of multi-purpose tablets. iPad is based on the Company's iPadOS™ operating system, which was introduced during 2019. Also during 2019, the Company released two new versions of iPad Pro®, an iPad Air®, an updated iPad mini® and a new 10.2-inch iPad.

Wearables, Home and Accessories Wearables, Home and Accessories includes AirPods®, Apple TV®, Apple Watch®, Beats® products, HomePod™, iPod touch® and other Apple-branded and third-party accessories. AirPods are the Company's wireless headphones that interact with Siri. In October 2019, the Company introduced AirPods Pro™. Apple Watch is a personal electronic device that combines the watchOS® user interface and other technologies created specifically for a smaller device. In September 2019, the Company introduced Apple Watch Series 5.

Services

Digital Content Stores and Streaming Services The Company operates various platforms that allow customers to discover and download applications and digital content, such as books, music, video, games and podcasts. These platforms include the App Store®, available for iPhone and iPad, the Mac App Store, the TV App Store and the Watch App Store.

The Company also offers subscription-based digital content streaming services, including Apple Music®, which offers users a curated listening experience with on-demand radio stations, and Apple TV+, which offers exclusive original content, and is expected to be available in November 2019.

AppleCare AppleCare® includes AppleCare+ ("AC+") and the AppleCare Protection Plan, which are fee-based services that extend the coverage of phone support eligibility and hardware repairs. AC+ offers additional coverage for instances of accidental damage and is available in certain countries for certain products. Additionally, AC+ with theft and loss protection is available for iPhone in the U.S.

iCloud iCloud® is the Company's cloud service, which stores music, photos, contacts, calendars, mail, documents and more, keeping them up-to-date and available across multiple Apple devices and Windows personal computers.

Licensing The Company licenses the use of certain of its intellectual property, and provides other related services.

Other Services The Company delivers a variety of other services available in certain countries, including Apple Arcade™, a game

subscription service; Apple Card™, a co-branded credit card; Apple News+, a subscription news and magazine service; and Apple Pay, a cashless payment service.

Markets and Distribution

The Company's customers are primarily in the consumer, small and mid-sized business, education, enterprise and government markets. The Company sells its products and resells third-party products in most of its major markets directly to consumers, small and mid-sized businesses, and education, enterprise and government customers through its retail and online stores and its direct sales force. The Company also employs a variety of indirect distribution channels, such as third-party cellular network carriers, wholesalers, retailers and resellers. During 2019, the Company's net sales through its direct and indirect distribution channels accounted for 31% and 69%, respectively, of total net sales.

Employees

As of September 28, 2019, the Company had approximately 137,000 full-time equivalent employees.

Google Inc. (Alphabet Inc.)[a]
CONSOLIDATED BALANCE SHEETS
(In millions, except share amounts which are reflected in thousands, and par value per share amounts)

	December 31, 2018	December 31, 2019
Assets		
Current assets		
Cash and cash equivalents	$ 16,701	$ 18,498
Marketable securities	92,439	101,177
Total cash, cash equivalents, and marketable securities	109,140	119,675
Accounts receivable, net of allowance of $729 and $753	20,838	25,326
Income taxes receivable, net	355	2,166
Inventory	1,107	999
Other current assets	4,236	4,412
Total current assets	135,676	152,578
Non-marketable investments	13,859	13,078
Deferred income taxes	737	721
Property and equipment, net	59,719	73,646
Operating lease assets	0	10,941
Intangible assets, net	2,220	1,979
Goodwill	17,888	20,624
Other non-current assets	2,693	2,342
Total assets	$ 232,792	$ 275,909
Liabilities and Stockholders' Equity		
Current liabilities		
Accounts payable	$ 4,378	$ 5,561
Accrued compensation and benefits	6,839	8,495
Accrued expenses and other current liabilities	16,958	23,067
Accrued revenue share	4,592	5,916
Deferred revenue	1,784	1,908
Income taxes payable, net	69	274
Total current liabilities	34,620	45,221
Long-term debt	4,012	4,554
Deferred revenue, non-current	396	358
Income taxes payable, non-current	11,327	9,885
Deferred income taxes	1,264	1,701
Operating lease liabilities	0	10,214
Other long-term liabilities	3,545	2,534
Total liabilities	55,164	74,467
Commitments and Contingencies		
Stockholders' equity		
Convertible preferred stock, $0.001 par value per share, 100,000 shares authorized; no shares issued and outstanding	0	0
Class A and Class B common stock, and Class C capital stock and additional paid-in capital, $0.001 par value per share: 15,000,000 shares authorized (Class A 9,000,000, Class B 3,000,000, Class C 3,000,000); 695,556 (Class A 299,242, Class B 46,636, Class C 349,678) and 688,335 (Class A 299,828, Class B 46,441, Class C 342,066) shares issued and outstanding	45,049	50,552
Accumulated other comprehensive loss	(2,306)	(1,232)
Retained earnings	134,885	152,122
Total stockholders' equity	177,628	201,442
Total liabilities and stockholders' equity	$ 232,792	$ 275,909

[a]Google is part of Alphabet, but we loosely refer to Alphabet as "Google" because of its global familiarity and because Google provides 99% of Alphabet's $161,857 billion in revenues.

See accompanying notes.

Google Inc. (Alphabet Inc.)[a]
CONSOLIDATED STATEMENTS OF INCOME
(In millions)

Year Ended December 31	2017	2018	2019
Revenues	$ 110,855	$ 136,819	$ 161,857
Costs and expenses			
Cost of revenues	45,583	59,549	71,896
Research and development	16,625	21,419	26,018
Sales and marketing	12,893	16,333	18,464
General and administrative	6,840	6,923	9,551
European Commission fines	2,736	5,071	1,697
Total costs and expenses	84,677	109,295	127,626
Income from operations	26,178	27,524	34,231
Other income (expense), net	1,015	7,389	5,394
Income before income taxes	27,193	34,913	39,625
Provision for income taxes	14,531	4,177	5,282
Net income	$ 12,662	$ 30,736	$ 34,343

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See accompanying notes.

Google Inc. (Alphabet Inc.)[a]
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(In millions)

Year Ended December 31	2017	2018	2019
Net income	$ 12,662	$ 30,736	$ 34,343
Other comprehensive income (loss):			
Change in foreign currency translation adjustment	1,543	(781)	(119)
Available-for-sale investments:			
Change in net unrealized gains (losses)	307	88	1,611
Less: reclassification adjustment for net (gains) losses included in net income	105	(911)	(111)
Net change (net of tax effect of $0, $156, and $221)	412	(823)	1,500
Cash flow hedges:			
Change in net unrealized gains (losses)	(638)	290	22
Less: reclassification adjustment for net (gains) losses included in net income	93	98	(299)
Net change (net of tax effect of $247, $103, and $42)	(545)	388	(277)
Other comprehensive income (loss)	1,410	(1,216)	1,104
Comprehensive income	$ 14,072	$ 29,520	$ 35,447

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See accompanying notes.

Google Inc. (Alphabet Inc.)[a]
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(In millions, except share amounts which are reflected in thousands)

	Class A and Class B Common Stock, Class C Capital Stock and Additional Paid-In Capital		Accumulated Other Comprehensive Income (Loss)	Retained Earnings	Total Stockholders' Equity
	Shares	Amount			
Balance as of December 31, 2016	691,293	$ 36,307	$ (2,402)	$ 105,131	$ 139,036
Cumulative effect of accounting change	0	0	0	(15)	(15)
Common and capital stock issued	8,652	212	0	0	212
Stock-based compensation expense	0	7,694	0	0	7,694
Tax withholding related to vesting of restricted stock units	0	(4,373)	0	0	(4,373)
Repurchases of capital stock	(5,162)	(315)	0	(4,531)	(4,846)
Sale of interest in consolidated entities	0	722	0	0	722
Net income	0	0	0	12,662	12,662
Other comprehensive income	0	0	1,410	0	1,410
Balance as of December 31, 2017	694,783	40,247	(992)	113,247	152,502
Cumulative effect of accounting change	0	0	(98)	(599)	(697)
Common and capital stock issued	8,975	148	0	0	148
Stock-based compensation expense	0	9,353	0	0	9,353
Tax withholding related to vesting of restricted stock units and other	0	(4,782)	0	0	(4,782)
Repurchases of capital stock	(8,202)	(576)	0	(8,499)	(9,075)
Sale of interest in consolidated entities	0	659	0	0	659
Net income	0	0	0	30,736	30,736
Other comprehensive loss	0	0	(1,216)	0	(1,216)
Balance as of December 31, 2018	695,556	45,049	(2,306)	134,885	177,628
Cumulative effect of accounting change	0	0	(30)	(4)	(34)
Common and capital stock issued	8,120	202	0	0	202
Stock-based compensation expense	0	10,890	0	0	10,890
Tax withholding related to vesting of restricted stock units and other	0	(4,455)	0	0	(4,455)
Repurchases of capital stock	(15,341)	(1,294)	0	(17,102)	(18,396)
Sale of interest in consolidated entities	0	160	0	0	160
Net income	0	0	0	34,343	34,343
Other comprehensive income (loss)	0	0	1,104	0	1,104
Balance as of December 31, 2019	688,335	$ 50,552	$ (1,232)	$ 152,122	$ 201,442

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See accompanying notes.

Google Inc. (Alphabet Inc.)[a]
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In millions)

Year Ended December 31	2017	2018	2019
Operating activities			
Net income	$ 12,662	$ 30,736	$ 34,343
Adjustments:			
Depreciation and impairment of property and equipment	6,103	8,164	10,856
Amortization and impairment of intangible assets	812	871	925
Stock-based compensation expense	7,679	9,353	10,794
Deferred income taxes	258	778	173
(Gain) loss on debt and equity securities, net	37	(6,650)	(2,798)
Other	294	(189)	(592)
Changes in assets and liabilities, net of effects of acquisitions:			
Accounts receivable	(3,768)	(2,169)	(4,340)
Income taxes, net	8,211	(2,251)	(3,128)
Other assets	(2,164)	(1,207)	(621)
Accounts payable	731	1,067	428
Accrued expenses and other liabilities	4,891	8,614	7,170
Accrued revenue share	955	483	1,273
Deferred revenue	390	371	37
Net cash provided by operating activities	37,091	47,971	54,520
Investing activities			
Purchases of property and equipment	(13,184)	(25,139)	(23,548)
Purchases of marketable securities	(92,195)	(50,158)	(100,315)
Maturities and sales of marketable securities	73,959	48,507	97,825
Purchases of non-marketable investments	(1,745)	(2,073)	(1,932)
Maturities and sales of non-marketable investments	533	1,752	405
Acquisitions, net of cash acquired, and purchases of intangible assets	(287)	(1,491)	(2,515)
Proceeds from collection of notes receivable	1,419	0	0
Other investing activities	99	98	589
Net cash used in investing activities	(31,401)	(28,504)	(29,491)
Financing activities			
Net payments related to stock-based award activities	(4,166)	(4,993)	(4,765)
Repurchases of capital stock	(4,846)	(9,075)	(18,396)
Proceeds from issuance of debt, net of costs	4,291	6,766	317
Repayments of debt	(4,377)	(6,827)	(585)
Proceeds from sale of interest in consolidated entities	800	950	220
Net cash used in financing activities	(8,298)	(13,179)	(23,209)
Effect of exchange rate changes on cash and cash equivalents	405	(302)	(23)
Net increase (decrease) in cash and cash equivalents	(2,203)	5,986	1,797
Cash and cash equivalents at beginning of period	12,918	10,715	16,701
Cash and cash equivalents at end of period	$ 10,715	$ 16,701	$ 18,498
Supplemental disclosures of cash flow information			
Cash paid for taxes, net of refunds	$ 6,191	$ 5,671	$ 8,203

[a]Google is part of Alphabet, but we loosely refer to Alphabet as "Google" because of its global familiarity and because Google provides 99% of Alphabet's $161,857 billion in revenues.

See accompanying notes.

Samsung Electronics Co., Ltd. and Subsidiaries
CONSOLIDATED STATEMENTS OF FINANCIAL POSITION

In thousands of US dollars	December 31, 2019	December 31, 2018
Assets		
Current assets		
Cash and cash equivalents	$ 23,069,002	$ 26,033,073
Short-term financial instruments	65,426,571	56,538,875
Short-term financial assets at amortized cost	3,358,516	2,319,851
Short-term financial assets at fair value through profit or loss	1,482,192	1,717,732
Trade receivables	30,143,757	29,059,541
Non-trade receivables	3,585,812	2,643,362
Advance payments	1,224,266	1,168,472
Prepaid expenses	2,064,610	3,548,957
Inventories	22,966,437	24,869,754
Other current assets	2,312,887	1,996,067
Total current assets	**155,634,050**	**149,895,684**
Non-current assets		
Financial assets at amortized cost	—	204,476
Financial assets at fair value through other comprehensive income	7,654,241	6,264,780
Financial assets at fair value through profit or loss	900,077	665,340
Investment in associates and joint ventures	6,513,833	6,274,952
Property, plant and equipment	102,813,888	99,031,047
Intangible assets	17,764,234	12,777,442
Net defined benefit assets	506,094	482,518
Deferred income tax assets	3,865,469	4,691,711
Other non-current assets	6,859,137	10,890,850
Total assets	**$302,511,023**	**$291,178,800**
Liabilities and Equity		
Current liabilities		
Trade payables	$ 7,480,499	$ 7,276,025
Short-term borrowings	12,350,032	11,657,766
Other payables	10,298,520	9,190,823
Advances received	919,862	703,812
Withholdings	769,958	816,205
Accrued expenses	16,611,144	17,452,068
Current income tax liabilities	1,190,751	7,482,067
Current portion of long-term liabilities	725,971	28,646
Provisions	3,491,005	3,761,637
Other current liabilities	889,802	904,980
Total current liabilities	**54,727,544**	**59,274,029**
Non-current liabilities		
Debentures	836,835	825,401
Long-term borrowings	1,885,248	73,006
Long-term other payables	1,874,152	2,740,586
Net defined benefit liabilities	403,944	432,502
Deferred income tax liabilities	14,632,684	13,009,904
Long-term provisions	524,342	569,405
Other non-current liabilities	2,066,906	1,674,233
Total liabilities	**76,951,655**	**78,599,066**
Equity attributable to owners of the parent company		
Preference shares	102,506	102,506
Ordinary shares	667,588	667,588
Share premium	3,778,674	3,778,674
Retained earnings	218,439,838	208,243,059
Other components of equity	(4,263,406)	(6,805,356)
	218,725,200	**205,986,471**
Non-controlling interests	6,834,168	6,593,263
Total equity	**225,559,368**	**212,579,734**
Total liabilities and equity	**$302,511,023**	**$291,178,800**

The above consolidated statement of financial position should be read in conjunction with the accompanying notes.

Samsung Electronics Co., Ltd. and Subsidiaries
CONSOLIDATED STATEMENTS OF PROFIT OR LOSS

For the year ended December 31	2019	2018
In thousands of US dollars		
Revenue	$197,690,938	$209,163,262
Cost of sales	126,335,995	113,598,417
Gross profit	**71,354,943**	**95,564,845**
Selling and administrative expenses	47,528,721	45,038,298
Operating profit	**23,826,222**	**50,526,547**
Other non-operating income	1,526,149	1,274,207
Other non-operating expense	1,213,861	979,886
Share of net profit of associates and joint ventures	354,332	463,203
Financial income	8,718,988	8,579,720
Financial expense	7,100,090	7,386,694
Profit before income tax	**26,111,740**	**52,477,097**
Income tax expense	7,459,135	14,427,866
Profit for the year	**$ 18,652,605**	**$ 38,049,231**
Profit attributable to owners of the parent company	$ 18,451,988	$ 37,659,703
Profit attributable to non-controlling interests	$ 200,617	$ 389,528
Earnings per share (in US dollars)		
—Basic	$ 2.72	$ 5.54
—Diluted	2.72	5.54

The above consolidated statement of financial position should be read in conjunction with the accompanying notes.

Samsung Electronics Co., Ltd. and Subsidiaries
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

For the year ended December 31	2019	2018
In thousands of US dollars		
Profit for the year	**$18,652,605**	**$38,049,231**
Other comprehensive income (loss)		
Items that will not be reclassified to profit or loss subsequently:		
Gain (loss) on valuation of financial assets at fair value through other comprehensive income, net of tax	983,817	(202,380)
Share of other comprehensive loss of associates and joint ventures, net of tax	(14,497)	(9,122)
Remeasurement of net defined benefit liabilities (assets), net of tax	(1,012,877)	(351,922)
Items that may be reclassified to profit or loss subsequently:		
Share of other comprehensive income of associates and joint ventures, net of tax	41,742	5,739
Foreign currency translation, net of tax	2,588,248	506,786
Gain on valuation of cash flow hedge derivatives	1,553	40,395
Other comprehensive income (loss) for the year, net of tax	**2,587,986**	**(10,504)**
Total comprehensive income for the year	**$21,240,591**	**$38,038,727**
Comprehensive income attributable to:		
Owners of the parent company	$20,993,415	$37,652,492
Non-controlling interests	$ 247,176	$ 386,235

The above consolidated statement of financial position should be read in conjunction with the accompanying notes.

Samsung Electronics Co., Ltd. and Subsidiaries

CONSOLIDATED STATEMENTS OF CHANGES IN EQUITY

(In thousands of US dollars)

	Preference shares	Ordinary shares	Share premium	Retained earnings	Other components of equity	Equity attributable to owners of the parent company	Non-controlling interests	Total
Balance as of January 1, 2018	**102,506**	**667,588**	**$3,778,674**	**$185,172,550**	**$(11,925,927)**	**$177,795,391**	**$6,244,755**	**$184,040,146**
Cumulative effect of changes in accounting policies	—	—	—	211,529	(224,576)	(13,047)	—	(13,047)
Restated total equity at the beginning of the financial year	**102,506**	**667,588**	**3,778,674**	**185,384,079**	**(12,150,503)**	**177,782,344**	**6,244,755**	**184,027,099**
Profit for the year	—	—	—	37,659,703	—	37,659,703	389,528	38,049,231
Gain (loss) on valuation of financial assets at fair value through other comprehensive income, net of tax	—	—	—	(2,581)	(202,789)	(205,370)	2,990	(202,380)
Share of other comprehensive income (loss) of associates and joint ventures, net of tax	—	—	—	—	(3,463)	(3,463)	80	(3,383)
Foreign currency translation, net of tax	—	—	—	—	497,023	497,023	9,763	506,786
Remeasurement of net defined benefit liabilities (assets), net of tax	—	—	—	—	(335,796)	(335,796)	(16,126)	(351,922)
Gain on valuation of cash flow hedge derivatives	—	—	—	—	40,395	40,395	—	40,395
Total comprehensive income (loss)	**—**	**—**	**—**	**37,657,122**	**(4,630)**	**37,652,492**	**386,235**	**38,038,727**
Dividends	—	—	—	(8,703,297)	—	(8,703,297)	(43,465)	(8,746,762)
Capital transaction under common control	—	—	—	—	1,474	1,474	6,856	8,330
Changes in consolidated entities	—	—	—	—	—	—	35	35
Acquisition of treasury shares	—	—	—	—	(750,872)	(750,872)	—	(750,872)
Retirement of treasury shares	—	—	—	(6,094,845)	6,094,845	—	—	—
Other	—	—	—	—	4,330	4,330	(1,153)	3,177
Total transactions with owners	**—**	**—**	**—**	**(14,798,142)**	**5,349,777**	**(9,448,365)**	**(37,727)**	**(9,486,092)**
Balance as of December 31, 2018	**102,506**	**667,588**	**3,778,674**	**208,243,059**	**(6,805,356)**	**205,986,471**	**6,593,263**	**212,579,734**
Balance as of January 1, 2019	**102,506**	**667,588**	**3,778,674**	**208,243,059**	**(6,805,356)**	**205,986,471**	**6,593,263**	**212,579,734**
Profit for the year	—	—	—	18,451,988	—	18,451,988	200,617	18,652,605
Gain (loss) on valuation of financial assets at fair value through other comprehensive income, net of tax	—	—	—	(1,085)	953,498	952,413	31,404	983,817
Share of other comprehensive income (loss) of associates and joint ventures, net of tax	—	—	—	(522)	27,009	26,487	758	27,245
Foreign currency translation, net of tax	—	—	—	—	2,545,753	2,545,753	42,495	2,588,248
Remeasurement of net defined benefit liabilities (assets), net of tax	—	—	—	—	(984,779)	(984,779)	(28,098)	(1,012,877)
Gain on valuation of cash flow hedge derivatives	—	—	—	—	1,553	1,553	—	1,553
Total comprehensive income	**—**	**—**	**—**	**18,450,381**	**2,543,034**	**20,993,415**	**247,176**	**21,240,591**
Dividends	—	—	—	(8,253,602)	—	(8,253,602)	(18,327)	(8,271,929)
Capital transaction under common control	—	—	—	—	(73)	(73)	6,312	6,239
Changes in consolidated entities	—	—	—	—	—	—	4,917	4,917
Other	—	—	—	—	(1,011)	(1,011)	827	(184)
Total transactions with owners	**—**	**—**	**—**	**(8,253,602)**	**(1,084)**	**(8,254,686)**	**(6,271)**	**(8,260,957)**
Balance as of December 31, 2019	**102,506**	**667,588**	**$3,778,674**	**$218,439,838**	**$(4,263,406)**	**$218,725,200**	**$6,834,168**	**$225,559,368**

The above consolidated statement of financial position should be read in conjunction with the accompanying notes.

Samsung Electronics Co., Ltd. and Subsidiaries
CONSOLIDATED STATEMENTS OF CASH FLOWS

For the year ended December 31	2019	2018
In thousands of US dollars		
Cash flows from operating activities		
Profit for the year	$18,652,605	$38,049,231
Adjustments	32,126,956	37,414,045
Changes in assets and liabilities arising from operating activities	(2,184,336)	(8,515,406)
Cash generated from operations	**48,595,225**	**66,947,870**
Interest received	1,978,962	1,534,604
Interest paid	(497,640)	(470,434)
Dividends received	207,473	185,328
Income tax paid	(11,344,104)	(10,681,998)
Net cash inflow from operating activities	**38,939,916**	**57,515,370**
Cash flows from investing activities		
Net increase in short-term financial instruments	(1,742,585)	(10,612,375)
Net increase in short-term financial assets at amortized cost	(701,945)	(1,232,856)
Net decrease (increase) in short-term financial assets at fair value through profit or loss	321,746	(119,839)
Disposal of long-term financial instruments	3,935,450	219,527
Acquisition of long-term financial instruments	(10,918,835)	(6,588,518)
Disposal of financial assets at amortized cost	595,974	—
Acquisition of financial assets at amortized cost	(707,898)	(136,183)
Disposal of financial assets at fair value through other comprehensive income	1,351	13,910
Acquisition of financial assets at fair value through other comprehensive income	(54,719)	(391,377)
Disposal of financial assets at fair value through profit or loss	55,189	68,761
Acquisition of financial assets at fair value through profit or loss	(116,543)	(166,327)
Disposal of investment in associates and joint ventures	10,424	127
Acquisition of investment in associates and joint ventures	(10,964)	(43,953)
Disposal of property, plant and equipment	440,397	477,900
Acquisition of property, plant and equipment	(21,766,303)	(25,360,292)
Disposal of intangible assets	6,213	10,241
Acquisition of intangible assets	(2,788,525)	(875,635)
Cash outflow from business combinations	(874,680)	(85,038)
Cash inflow (outflow) from other investing activities	39,512	(1,965)
Net cash outflow from investing activities	**(34,276,741)**	**(44,823,892)**
Cash flows from financing activities		
Net increase (decrease) in short-term borrowings	742,876	(1,755,933)
Acquisition of treasury shares	—	(750,872)
Proceeds from long-term borrowings	—	3,072
Repayment of debentures and long-term borrowings	(608,687)	(1,704,560)
Dividends paid	(8,270,727)	(8,746,499)
Net increase (decrease) in non-controlling interests	(1,459)	6,924
Net cash outflow from financing activities	**(8,137,997)**	**(12,947,868)**
Effect of exchange rate changes on cash and cash equivalents	510,751	80,816
Net decrease in cash and cash equivalents	**(2,964,071)**	**(175,574)**
Cash and cash equivalents		
Beginning of the year	**26,033,073**	**26,208,647**
End of the year	**$23,069,002**	**$26,033,073**

The above consolidated statements of cash flows should be read in conjunction with the accompanying notes.

B Time Value of Money

Appendix Preview

PRESENT AND FUTURE VALUE CONCEPTS

C1 Time is money

Concept of interest

VALUE OF A SINGLE AMOUNT

P1 Present value of a single amount

P2 Future value of a single amount

NTK B-1, B-2

VALUE OF AN ANNUITY

P3 Present value of an annuity

P4 Future value of an annuity

NTK B-3, B-4

Learning Objectives

CONCEPTUAL

C1 Describe the earning of interest and the concepts of present and future values.

ANALYTICAL

P1 Apply present value concepts to a single amount by using interest tables.

P2 Apply future value concepts to a single amount by using interest tables.

P3 Apply present value concepts to an annuity by using interest tables.

P4 Apply future value concepts to an annuity by using interest tables.

PRESENT AND FUTURE VALUE CONCEPTS

C1

Describe the earning of interest and the concepts of present and future values.

The old saying “Time is money” means that as time passes, the values of assets and liabilities change. This change is due to *interest,* which is a borrower’s payment to the owner of an asset for its use. The most common example of interest is a savings account. Cash in the account earns interest paid by the financial institution. An example of a liability is a car loan. As we carry the balance of the loan, we accumulate interest costs on it. We must ultimately repay this loan with interest.

Present and future value computations enable us to measure or estimate the interest component of holding assets or liabilities over

time. The present value computation is used to compute the value of future-day assets *today.* The future value computation is used to compute the value of present-day assets *at a future date.* The first section focuses on the present value of a single amount. The second section focuses on the future value of a single amount. Then both the present and future values of a series of amounts (called an *annuity*) are defined and explained.

Decision Insight

What's Five Million Worth? Robert Miles, a maintenance worker, purchased a scratch-off ticket that won him a $5 million jackpot. The $5 million payout was offered to Miles as a $250,000 annuity for 20 years **or** as a lump-sum payment of $3,210,000, which is about $2,124,378 after taxes. ■

PRESENT VALUE OF A SINGLE AMOUNT

Graph of PV of a Single Amount We graphically express the present value, called *p*, of a single future amount, called *f*, that is received or paid at a future date in Exhibit B.1.

EXHIBIT B.1

Present Value of a Single Amount Diagram

P1

Apply present value concepts to a single amount by using interest tables.

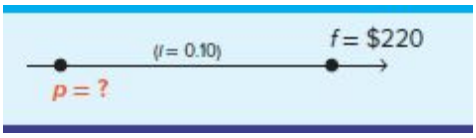
Formula of PV of a Single Amount The formula to compute the present value of a single amount is shown in Exhibit B.2, where *p* = present value (PV); *f* = future value (FV); *i* = rate of interest per period; and *n* = number of periods. (Interest is also called the *discount,* and interest rate is also called the *discount rate.*)

$$p = \frac{f}{(1+i)^n}$$

EXHIBIT B.2

Present Value of a Single Amount Formula

Illustration of PV of a Single Amount for One Period To illustrate present value concepts, assume that we need $220 one period from today. We want to know how much we must invest now, for one period, at an interest rate of 10% to provide for this $220. For this illustration, the *p*, or present value, is the unknown amount—the specifics are shown graphically as follows.



Conceptually, we know *p* must be less than $220. This is clear from the answer to: Would we rather have $220 today or $220 at some future date? If we had $220 today, we could invest it and see it grow to something more than $220 in the future. Therefore, we would prefer the $220 today. This means that if we were promised $220 in the future, we would take less than $220 today. But how much less?

To answer that question, we compute an estimate of the present value of the $220 to be received one period from now using the formula in Exhibit B.2 as follows.

$$p = \frac{f}{(1+i)^n} = \frac{\$220}{(1+0.10)^1} = \$200$$

We interpret this result to say that given an interest rate of 10%, we are indifferent between $200 today or $220 at the end of one period.

page B-3

Illustration of PV of a Single Amount for Multiple Periods

We can use this formula to compute the present value for *any number of periods.* To illustrate, consider a payment of $242 at the end of two periods at 10% interest. The present value of this $242 to be received two periods from now is computed as follows.

Point: Excel for PV.

	A	B
1	Future value	$242
2	Periods	2
3	Period int. rate	10%
4	Present value	

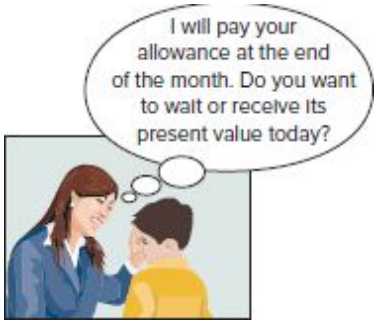
=–PV(B3,B2,0,B1) = $200

$$p = \frac{f}{(1+i)^n} = \frac{\$242}{(1+0.10)^2} = \$200$$

Together, these results tell us we are indifferent between $200 today, or $220 one period from today, or $242 two periods from today given a 10% interest rate per period.

The number of periods (*n*) in the present value formula does not have to be expressed in years. Any period of time such as a day, a month, a quarter, or a year can be used. Whatever period is used, the interest rate (*i*) must be compounded for the same period. This means that if a situation expresses *n* in months and *i* equals 12% per year, then *i* is transformed into interest earned per month (or 1%). In this case, interest is said to be *compounded monthly.* For example,

the present value of $1 when *n* is 12 months and *i* is 12% compounded monthly follows.



$$p = \frac{1}{(1+0.01)^{12}} = \$0.8874$$

Using Present Value Table to Compute PV of a Single Amount A present value table helps us with present value computations. It gives us present values (factors) for a variety of both interest rates (*i*) and periods (*n*). Each present value in a present value table assumes that the future value (*f*) equals 1. When the future value (*f*) is different from 1, we simply multiply the present value (*p*) from the table by that future value to give us the estimate. The formula used to construct a table of present values for a single future amount of 1 is shown in Exhibit B.3.

$$p = \frac{1}{(1+i)^n}$$

EXHIBIT B.3

Present Value of 1 Formula

This formula is identical to that in Exhibit B.2 except that *f* equals 1. **Table B.1** at the end of this appendix is such a present value table. It is often called a **present value of 1 table**. A present value table has three factors: *p*, *i*, and *n*. Knowing two of these three factors allows us to compute the third. (A fourth is *f*, but, as already

explained, we need only multiply the 1 used in the formula by *f.*) To illustrate the use of a present value table, consider three cases.

Case 1 Solve for *p* when knowing *i* and *n*. To show how we use a present value table, let's look again at how we estimate the present value of $220 (the *f* value) at the end of one period (*n* = 1) where the interest rate (*i*) is 10%. To solve this case, we go to the present value table (Table B.1) and look in the row for one period and in the column for 10% interest. Here we find a present value (*p*) of 0.9091 based on a future value of 1. This means, for instance, that $1 to be received one period from today at 10% interest is worth $0.9091 today. Because the future value in this case is not $1 but $220, we multiply the 0.9091 by $220 to get an answer of $200.

Case 2 Solve for *n* when knowing *p* and *i*. To illustrate, assume a $100,000 future value (*f*) that is worth $13,000 today (*p*) using an interest rate of 12% (*i*) but where *n* is unknown. In particular, we want to know how many periods (*n*) there are between the present value and the future value. To put this in context, it would fit a situation in which we want to retire with $100,000 but currently have only $13,000 that is earning a 12% return and we are unable to save additional money. How long will it be before we can retire? To answer this, we go to Table B.1 and look in the 12% interest column. Here we find a column of present values (*p*) based on a future value of 1. To use the present value table for this solution, we must divide $13,000 (*p*) by $100,000 (*f*), which equals 0.1300. This is necessary because *a present value table defines* f *equal to 1, and* p *as a fraction of 1.* We look for a value nearest to 0.1300 (*p*), which we find in the row for 18 periods (*n*). This means that the present value of $100,000 at the end of 18 periods at 12% interest is $13,000; alternatively stated, we must work 18 more years.

Case 3 Solve for *i* when knowing *p* and *n*. In this case, we have, say, a $120,000 future value (*f*) worth $60,000 today (*p*) when there are nine periods (*n*) between the present and future values, but the interest rate is unknown. As an example, suppose we want to retire with $120,000 in nine years, but we have only $60,000 and we are unable to save additional money. What interest rate must we earn to retire with $120,000 in nine years? To answer this, we go to

the present value table (Table B.1) and look in the row for nine periods. To use the present value table, we must divide $60,000 (*p*) by $120,000 (*f*), which equals 0.5000. Recall that this step is necessary because a present value table defines *f* equal to 1 and *p* as a fraction of 1. We look for a value in the row for nine periods that is nearest to 0.5000 (*p*), which we find in the column for 8% interest (*i*). This means that the present value of $120,000 at the end of nine periods at 8% interest is $60,000 or, in our example, we must earn 8% annual interest to retire in nine years.

NEED-TO-KNOW B-1

Present Value of a Single Amount

P1

A company is considering an investment expected to yield $70,000 after six years. If this company demands an 8% return, how much is it willing to pay for this investment today?

Solution

Today's value = $70,000 × 0.6302 = $44,114 (using PV factor from Table B.1, *i* = 8%, *n* = 6)

FUTURE VALUE OF A SINGLE AMOUNT

P2

Apply future value concepts to a single amount by using interest tables.

$$f = p \times (1 \times i)^n$$

EXHIBIT B.4

Future Value of a Single Amount Formula

Formula of FV of a Single Amount We must modify the formula for the present value of a single amount to obtain the formula for the future value of a single amount. In particular, we multiply both sides of the equation in Exhibit B.2 by (1 + *i*)*n* to get the result shown in Exhibit B.4.

Illustration of FV of a Single Amount for One Period The future value (*f*) is defined in terms of *p*, *i*, and *n.* We can use this formula to determine that $200 (*p*) invested for one period (*n*) at an interest rate of 10% (*i*) yields a future value of $220 as follows.

$$\begin{aligned} f &= p \times (1 + i)^n \\ &= \$200 \times (1 + 0.10)^1 \\ &= \$220 \end{aligned}$$

Point: The FV factor in Table B.2 when *n* = 3 and *i* = 10% is 1.3310.

Illustration of FV of a Single Amount for Multiple Periods This formula can be used to compute the future value of an amount for *any number of periods* into the future. To illustrate, assume that $200 is invested for three periods at 10%. The future value of this $200 is $266.20, computed as follows.

$$\begin{aligned} f &= p \times (1 + i)^n \\ &= \$200 \times (1 + 0.10)^3 \\ &= \$200 \times 1.3310 \\ &= \$266.20 \end{aligned}$$

Point: Excel for FV.

	A	B
1	Present value	$200
2	Periods	3
3	Period int. rate	10%
4	Future value	

=–FV(B3,B2,0,B1) = $266.20

Using Future Value Table to Compute FV of a Single Amount A future value table makes it easier for us to compute future values (*f*) for many different combinations of interest rates (*i*) and time periods (*n*). Each future value in a future value table assumes the present value (*p*) is 1. If the future amount is something other than 1, we multiply our answer by that amount. The formula used to construct a table of future values (factors) for a single amount of 1 is in Exhibit B.5.

$$f = (1 + i)^n$$

EXHIBIT B.5

Future Value of 1 Formula

Table B.2 at the end of this appendix shows a table of future values for a current amount of 1. This type of table is called a **future value of 1 table**.

page B-5

There are some important relations between Tables B.1 and B.2. In Table B.2, for the row where *n* = 0, the future value is 1 for each interest rate. This is because no interest is earned when time does not pass. We also see that Tables B.1 and B.2 report the same information but in a different manner. In particular, one table is simply the *reciprocal* of the other. To illustrate this inverse relation, let's say we invest $100 for a period of five years at 12% per year. How much do we expect to have after five years? We can answer this question using Table B.2 by finding the future value (*f*) of 1, for five periods from now, compounded at 12%. From that table we find *f* = 1.7623. If we start with $100, the amount it accumulates to after five years is $176.23 ($100 × 1.7623). We can alternatively use Table B.1. Here we find that the present value (*p*) of 1, discounted five periods at 12%, is 0.5674. Recall the inverse relation between present value and future value. This means that $p = 1/f$ (or equivalently, $f = 1/p$). We can compute the future value of $100 invested for five periods at 12% as follows: f = $100 × (1/0.5674) = $176.24 (which equals the $176.23 just computed, except for a 1 cent rounding difference).

Point: 1/PV factor = FV factor. 1/FV factor = PV factor.

Point: The FV factor when n = 2 and *i* = 10% is 1.2100. Its reciprocal, 0.8264, is the PV factor when *n* = 2 and *i* = 10%.

A future value table has three factors: *f, i,* and *n.* Knowing two of these three factors allows us to compute the third. To illustrate, consider three possible cases.

Case 1 **Solve for *f* when knowing *i* and *n*.** Our preceding example fits this case. We found that $100 invested for five periods at 12% interest accumulates to $176.24.

Case 2 **Solve for *n* when knowing** f **and** i**.** In this case, we have, say, $2,000 (*p*) and we want to know how many periods (*n*) it will take to accumulate to $3,000 (*f*) at 7% interest (*i*). To answer this, we go to the future value table (Table B.2) and look in the 7% interest column. Here we find a column of future values (*f*) based on a present value of 1. To use a future value table, we must divide $3,000 (*f*) by $2,000 (*p*), which equals 1.500. This is necessary because *a future value table defines* p *equal to 1, and* f *as a multiple of 1.* We look for a value nearest to 1.50 (*f*), which we find in the row for six periods (*n*). This means that $2,000 invested for six periods at 7% interest accumulates to $3,000.

Case 3 **Solve for *i* when knowing *f* and *n*.** In this case, we have, say, $2,001 (*p*) today, and in nine years (*n*) we want to have $4,000 (*f*). What rate of interest must we earn to accomplish this? To answer that, we go to Table B.2 and search in the row for nine periods. To use a future value table, we must divide $4,000 (*f*) by $2,001 (*p*), which equals 1.9990. Recall that this is necessary because a future value table defines *p* equal to 1 and *f* as a multiple of 1. We look for a value nearest to 1.9990 (*f*), which we find in the column for 8% interest (*i*). This means that $2,001 invested for nine periods at 8% interest accumulates to $4,000.

Decision Maker

Entrepreneur You are a retailer planning a sale on a security system that requires no payments for two years. At the end of two years, buyers must pay the full amount. The system's suggested retail price is $4,100, but you are willing to sell it today for $3,000 cash. What is your sale price if payment will not occur for two years and the market

interest rate is 10%? ■ *Answer:* This is a present value question. The interest rate (10%) and present value ($3,000) are known, but the payment required two years later is unknown. The two-year-later price of $3,630 is computed as $3,000 × 1.10 × 1.10. The $3,630 two years from today is equivalent to $3,000 today.

NEED-TO-KNOW B-2

Future Value of a Single Amount

P2

Assume that you win a $150,000 cash sweepstakes today. You decide to deposit this cash in an account earning 8% annual interest, and you plan to quit your job when the account equals $555,000. How many years will it be before you can quit working?

Solution

Future value factor = $555,000⁄$150,000 = 3.7000

Searching for 3.7 in the 8% column of Table B.2 shows you cannot quit working for 17 years if your deposit earns 8% interest.

PRESENT VALUE OF AN ANNUITY

P3

Apply present value concepts to an annuity by using interest tables.

Graph of PV of an Annuity An *annuity* is a series of equal payments occurring at equal intervals. One example is a series of three annual payments of $100 each. An *ordinary annuity* is defined as equal end-of-period payments at equal intervals. An ordinary annuity of $100 for three periods and its present value (*p*) are illustrated in Exhibit B.6.

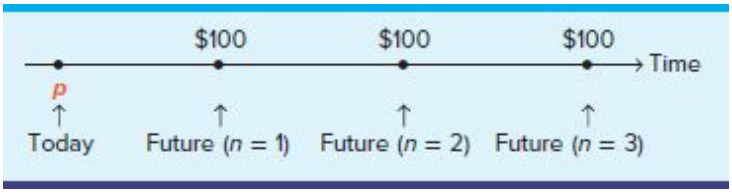


EXHIBIT B.6

Present Value of an Ordinary Annuity Diagram

Formula and Illustration of PV of an Annuity One way to compute the present value of an ordinary annuity is to find the present value of each payment using our present value formula from Exhibit B.3. We then add each of the three present values. To illustrate, let's look at three $100 payments at the end of each of the next three periods with an interest rate of 15%. Our present value computations are

$$p = \frac{\$100}{(1+0.15)^1} + \frac{\$100}{(1+0.15)^2} + \frac{\$100}{(1+0.15)^3} = \$228.32$$

Using Present Value Table to Compute PV of an Annuity This computation is identical to computing the present value of each payment (from Table B.1) and taking their sum or, alternatively, adding the values from Table B.1 for each of the three payments and multiplying their sum by the $100 annuity payment.

A more direct way is to use a present value of annuity table. **Table B.3** at the end of this appendix is one such table. This table is called a **present value of an annuity of 1 table**. If we look at Table B.3 where n = 3 and i = 15%, we see the present value is 2.2832. This means that the present value of an annuity of 1 for three periods, with a 15% interest rate, equals 2.2832.

A present value of an annuity formula is used to construct Table B.3. It also can be constructed by adding the amounts in a present value of 1 table. To illustrate, we use Tables B.1 and B.3 to confirm this relation for the prior example.

Point: Excel for PV annuity.

	A	B
1	Payment	$100
2	Periods	3
3	Period int. rate	15%
4	Present value	

=–PV(B3,B2,B1) = $228.32

From Table B.1		From Table B.3	
$i = 15\%, n = 1$	0.8696		
$i = 15\%, n = 2$	0.7561		
$i = 15\%, n = 3$	0.6575		
Total.....	2.2832	$i = 15\%, n = 3$.....	2.2832

We also can use business calculators or spreadsheet programs to find the present value of an annuity.

Decision Insight

Count Your Blessings "I don't have good luck—I'm blessed," proclaimed Andrew "Jack" Whittaker, a sewage treatment contractor, after winning the largest ever undivided jackpot in a U.S. lottery. Whittaker had to choose between $315 million in 30 annual installments or $170 million in one lump sum ($112 million after taxes). ■

NEED-TO-KNOW B-3

Present Value of an Annuity

P3

A company is considering an investment that would produce payments of $10,000 every six months for three years. The first payment would be received in six months. If this company requires an 8% annual return, what is the maximum amount it is willing to pay for this investment today?

Solution

Maximum paid = $10,000 × 5.2421 = $52,421 (using PV of annuity factor from Table B.3, i = 4%, n = 6)

FUTURE VALUE OF AN ANNUITY

P4

Apply future value concepts to an annuity by using interest tables.

Graph of FV of an Annuity The future value of an *ordinary annuity* is the accumulated value of each annuity payment with interest as of the date of the final payment. To illustrate, let's consider the earlier annuity of three annual payments of $100. Exhibit B.7 shows the point in time for the future value (*f*). The first payment is made two periods prior to the point when future value is determined, and the final payment occurs on the future value date.

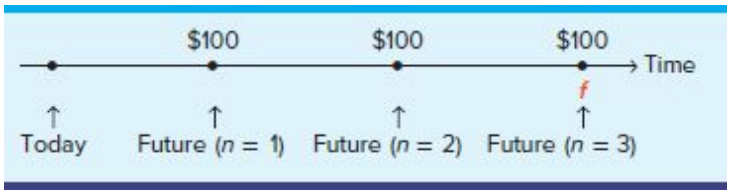


EXHIBIT B.7

Future Value of an Ordinary Annuity Diagram

Formula and Illustration of FV of an Annuity One way to compute the future value of an annuity is to use the formula to find the future value of *each* payment and add them. If we assume an interest rate of 15%, our calculation is

$$f = \$100 \times (1 + 0.15)^2 + \$100 \times (1 + 0.15)^1 + \$100 \times (1 + 0.15)^0 = \$347.25$$

Point: An ordinary annuity is a series of equal cash flows, with the payment at the *end* of each period.

This is identical to using Table B.2 and summing the future values of each payment, or adding the future values of the three payments of 1 and multiplying the sum by $100.

Using Future Value Table to Compute FV of an Annuity A more direct way is to use a table showing future values of annuities. Such a table is called a **future value of an annuity of 1 table**. **Table B.4** at the end of this appendix is one such table. Note that in Table B.4 when n = 1, the future values equal 1 (f = 1) for all rates of interest. This is because such an annuity consists of only one payment, and the future value is determined on the date of that payment—no time passes between the payment and its future value. The future value of an annuity formula is used to construct Table B.4. We also can construct it by adding the amounts from a future value of 1 table. To illustrate, we use Tables B.2 and B.4 to confirm this relation for the prior example.

From Table B.2		From Table B.4	
$i = 15\%, n = 0$	1.0000		
$i = 15\%, n = 1$	1.1500		
$i = 15\%, n = 2$	1.3225		
Total.	3.4725	$i = 15\%, n = 3$.	3.4725

Point: Excel for FV annuity.

	A	B
1	Payment	$100
2	Periods	3
3	Period int. rate	15%
4	Future value	

=–FV(B3,B2,B1) = $347.25

Note that the future value in Table B.2 is 1.0000 when n = 0, but the future value in Table B.4 is 1.0000 when n = 1. Is this a contradiction? No. When n = 0 in Table B.2, the future value is determined on the date when a single payment occurs. This means that no interest is earned because no time has passed, and the future value equals the payment. Table B.4 describes annuities with equal payments occurring at the end of each period. When n = 1, the annuity has one payment, and its future value equals 1 on the date of its final and only payment. Again, no time passes between the payment and its future value date.

NEED-TO-KNOW B-4

Future Value of an Annuity

P4

A company invests $45,000 per year for five years at 12% annual interest. Compute the value of this annuity investment at the end of five years.

Solution%

Future value = $45,000 × 6.3528 = $285,876 (using FV of annuity factor from Table B.4, i = 12%, n = 5)

Summary: Cheat Sheet

PV OF A SINGLE AMOUNT

$p = \frac{f}{(1+i)^n}$ where p = present value (PV); f = future value (FV); i = rate of interest per period; and n = number of periods. Excel follows:

Point: Excel for PV.

	A	B
1	Future value	$242
2	Periods	2
3	Period int. rate	10%
4	Present value	

=−PV(B3,B2,0,B1) = $200

PV OF AN ANNUITY

$p = f \times \left[1 - \frac{1}{(1+i)^n}\right] / i$ where p = present value (PV); f = future value (FV); i = rate of interest per period; and n = number of periods. Excel follows:

Point: Excel for PV annuity

	A	B
1	Payment	$100
2	Periods	3
3	Period int. rate	15%
4	Present value	

=–PV(B3,B2,B1) = $228.32

FV OF A SINGLE AMOUNT

$f = p \times (1 + i)^n$ where p = present value (PV); f = future value (FV); i = rate of interest per period; and n = number of periods. Excel follows:

Point: Excel for FV.

	A	B
1	Present value	$200
2	Periods	3
3	Period int. rate	10%
4	Future value	

=–FV(B3,B2,0,B1) = $266.20

FV OF AN ANNUITY

$f = p \times [(1 + i)^n - 1]/i$ where p = present value (PV); f = future value (FV); i = rate of interest per period; and n = number of periods. Excel follows:

Point: Excel for FV annuity

	A	B
1	Payment	$100
2	Periods	3
3	Period int. rate	15%
4	Future value	

=–FV(B3,B2,B1) = $347.25

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off.

connect

QUICK STUDY

QS B-1

Identifying interest rates in tables

C1

Assume that you must estimate what the future value will be two years from today using the *future value of 1 table* (Table B.2). Which interest rate column *and* number-of-periods row do you use when working with the following rates?

1. 12% annual rate, compounded annually

2. 6% annual rate, compounded semiannually

3. 8% annual rate, compounded quarterly

4. 12% annual rate, compounded monthly (the answer for number-of-periods in part 4 is not shown in Table B.2)

QS B-2

Interest rate on an investment **P1**

Ken Francis is offered the possibility of investing $2,745 today; in return, he would receive $10,000 after 15 years. What is the annual rate of interest for this investment? (Use Table B.1.)

QS B-3

Number of periods of an investment **P1**

Megan Brink is offered the possibility of investing $6,651 today at 6% interest per year in a desire to accumulate $10,000. How many years must Brink wait to accumulate $10,000? (Use Table B.1.)

QS B-4

Present value of an amount **P1**

Flaherty is considering an investment that, if paid for immediately, is expected to return $140,000 five years from now. If Flaherty

demands a 9% return, how much is she willing to pay for this investment?

QS B-5

Future value of an amount **P2**

CII, Inc., invests $630,000 in a project expected to earn a 12% annual rate of return. The earnings will be reinvested in the project each year until the entire investment is liquidated 10 years later. What will the cash proceeds be when the project is liquidated?

QS B-6

Present value of an annuity **P3**

Beene Distributing is considering a project that will return $150,000 annually at the end of each year for the next six years. If Beene demands an annual return of 7% and pays for the project immediately, how much is it willing to pay for the project?

QS B-7

Future value of an annuity **P4**

Claire Fitch is planning to begin an individual retirement program in which she will invest $1,500 at the end of each year. Fitch plans to retire after making 30 annual investments in the program earning a return of 10%. What is the value of the program on the date of the last payment (30 years from the present)?

EXERCISES

Exercise B-1

Present value of an amount **P1**

Mike Derr Company expects to earn 10% per year on an investment that will pay $606,773 six years from now. Use Table B.1 to compute

the present value of this investment. (Round the amount to the nearest dollar.)

Exercise B-2

Present value of an amount **P1**

On January 1, a company agrees to pay $20,000 in three years. If the annual interest rate is 10%, determine how much cash the company can borrow with this agreement.

Exercise B-3

Number of periods of an investment **P2**

Tom Thompson expects to invest $10,000 at 12% and, at the end of a certain period, receive $96,463. How many years will it be before Thompson receives the payment? (Use Table B.2.)

Exercise B-4

Interest rate on an investment **P2**

Bill Padley expects to invest $10,000 for 25 years, after which he wants to receive $108,347. What rate of interest must Padley earn? (Use Table B.2.)

Exercise B-5

Future value of an amount **P2**

Mark Welsch deposits $7,200 in an account that earns interest at an annual rate of 8%, compounded quarterly. The $7,200 plus earned interest must remain in the account 10 years before it can be withdrawn. How much money will be in the account at the end of 10 years?

Exercise B-6

Future value of an amount **P2**

Catten, Inc., invests $163,170 today earning 7% per year for nine years. Use Table B.2 to compute the future value of the investment nine years from now. (Round the amount to the nearest dollar.)

Exercise B-7

Interest rate on an investment **P3**

Jones expects an immediate investment of $57,466 to return $10,000 annually for eight years, with the first payment to be received one year from now. What rate of interest must Jones earn? (Use Table B.3.)

Exercise B-8

Number of periods of an investment **P3**

Keith Riggins expects an investment of $82,014 to return $10,000 annually for several years. If Riggins earns a return of 10%, how many annual payments will he receive? (Use Table B.3.)

Exercise B-9

Present value of an annuity **P3**

Dave Krug finances a new automobile by paying $6,500 cash and agreeing to make 40 monthly payments of $500 each, the first payment to be made one month after the purchase. The loan bears interest at an annual rate of 12%. What is the cost of the automobile?

Exercise B-10

Present values of annuities

P3

C&H Ski Club recently borrowed money and agreed to pay it back with a series of six annual payments of $5,000 each. C&H subsequently borrows more money and agrees to pay it back with a

series of four annual payments of $7,500 each. The annual interest rate for both loans is 6%.

1. Use Table B.1 to find the present value of these two separate annuities. (Round amounts to the nearest dollar.)
2. Use Table B.3 to find the present value of these two separate annuities. (Round amounts to the nearest dollar.)

Exercise B-11

Present value with semiannual compounding

C1 P3

Otto Co. borrows money on January 1 and promises to pay it back in four semiannual payments of $13,000 each on June 30 and December 31 of both this year and next year.

1. How much money is Otto able to borrow if the interest rate is 8%, compounded semiannually?
2. How much money is Otto able to borrow if the interest rate is 12%, compounded semiannually?
3. How much money is Otto able to borrow if the interest rate is 16%, compounded semiannually?

Exercise B-12

Present value of bonds

P1 P3

Spiller Corp. plans to issue 10%, 15-year, $500,000 par value bonds payable that pay interest semiannually on June 30 and December 31. The bonds are dated January 1 of the current year and are issued on that date. If the market rate of interest for the bonds is 8% on the date of issue, what will be the total cash proceeds from the bond issue?

Exercise B-13

Present value of an amount and of an annuity

P1 P3

Compute the amount that can be borrowed under each of the following circumstances: page B-10

1. A promise to repay $90,000 seven years from now at an interest rate of 6%.
2. An agreement to make three separate annual payments of $20,000, with the first payment occurring 1 year from now. The annual interest rate is 10%.

Exercise B-14

Interest rate on an investment **P4**

Algoe expects to invest $1,000 annually for 40 years to yield an accumulated value of $154,762 on the date of the last investment. For this to occur, what rate of interest must Algoe earn? (Use Table B.4.)

Exercise B-15

Number of periods of an investment **P4**

Steffi Derr expects to invest $10,000 annually that will earn 8%. How many annual investments must Derr make to accumulate $303,243 on the date of the last investment? (Use Table B.4.)

Exercise B-16

Future value of an annuity **P4**

Kelly Malone plans to have $50 withheld from her monthly paycheck and deposited in a savings account that earns 12% annually, compounded monthly. If Malone continues with her plan for two and

one-half years, how much will be accumulated in the account on the date of the last deposit?

Exercise B-17

Future value of an amount plus an annuity

P2 P4

Starr Company decides to establish a fund that it will use 10 years from now to replace an aging production facility. The company will make a $100,000 initial contribution to the fund and plans to make quarterly contributions of $50,000 beginning in three months. The fund earns 12%, compounded quarterly. What will be the value of the fund 10 years from now?

Exercise B-18

Practical applications of the time value of money

P1 P2 P3 P4

a. How much would you have to deposit today if you wanted to have $60,000 in four years? Annual interest rate is 9%.

b. Assume that you are saving up for a trip around the world when you graduate in two years. If you can earn 8% on your investments, how much would you have to deposit today to have $15,000 when you graduate?

c. Would you rather have $463 now or $1,000 ten years from now? Assume that you can earn 9% on your investments.

d. Assume that a college parking sticker today costs $90. If the cost of parking is increasing at the rate of 5% per year, how much will the college parking sticker cost in eight years?

e. Assume that the average price of a new home is $158,500. If the cost of a new home is increasing at a rate of 10% per year, how much will a new home cost in eight years?

f. An investment will pay you $10,000 in 10 years *and* it also will pay you $400 at the end of *each* of the next 10 years (Years 1 through 10). If the annual interest rate is 6%, how much would you be willing to pay today for this type of investment?

g. A college student is reported in the newspaper as having won $10,000,000 in the Kansas State Lottery. However, as is often the custom with lotteries, she does *not* actually receive the entire $10 million now. Instead she will receive $500,000 at the end of the year for *each* of the next 20 years. If the annual interest rate is 6%, what is the present value (today's amount) that she won? (Ignore taxes.)

Exercise B-19

Using present and future value tables

C1 P1 P2 P3 P4

For each of the following situations, identify (1) the case as either (*a*) a present or a future value and (*b*) a single amount or an annuity, (2) the table you would use in your computations (but do not solve the problem), and (3) the interest rate and time periods you would use.

a. You need to accumulate $10,000 for a trip you wish to take in four years. You are able to earn 8% compounded semiannually on your savings. You plan to make only one deposit and let the money accumulate for four years. How would you determine the amount of the one-time deposit?

b. Assume the same facts as in part (*a*) except that you will make semiannual deposits to your savings account.

c. You want to retire after working 40 years with savings in excess of $1,000,000. You expect to save $4,000 a year for 40 years and earn an annual rate of interest of 8%. Will you be able to retire with more than $1,000,000 in 40 years? Explain.

d. A sweepstakes agency names you a grand prize winner. You can take $225,000 immediately or elect to receive annual installments

of $30,000 for 20 years. You can earn 10% annually on any investments you make. Which prize do you choose to receive?

TABLE B.1*

page B-11

$$p = 1/(1+i)^n$$

Present Value of 1

Periods	Rate 1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	15%	Periods
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.8929	0.8696	1
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264	0.7972	0.7561	2
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513	0.7118	0.6575	3
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830	0.6355	0.5718	4
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209	0.5674	0.4972	5
6	0.9420	0.8880	0.8375	0.7903	0.7462	0.7050	0.6663	0.6302	0.5963	0.5645	0.5066	0.4323	6
7	0.9327	0.8706	0.8131	0.7599	0.7107	0.6651	0.6227	0.5835	0.5470	0.5132	0.4523	0.3759	7
8	0.9235	0.8535	0.7894	0.7307	0.6768	0.6274	0.5820	0.5403	0.5019	0.4665	0.4039	0.3269	8
9	0.9143	0.8368	0.7664	0.7026	0.6446	0.5919	0.5439	0.5002	0.4604	0.4241	0.3606	0.2843	9
10	0.9053	0.8203	0.7441	0.6756	0.6139	0.5584	0.5083	0.4632	0.4224	0.3855	0.3220	0.2472	10
11	0.8963	0.8043	0.7224	0.6496	0.5847	0.5268	0.4751	0.4289	0.3875	0.3505	0.2875	0.2149	11
12	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.4440	0.3971	0.3555	0.3186	0.2567	0.1869	12
13	0.8787	0.7730	0.6810	0.6006	0.5303	0.4688	0.4150	0.3677	0.3262	0.2897	0.2292	0.1625	13
14	0.8700	0.7579	0.6611	0.5775	0.5051	0.4423	0.3878	0.3405	0.2992	0.2633	0.2046	0.1413	14
15	0.8613	0.7430	0.6419	0.5553	0.4810	0.4173	0.3624	0.3152	0.2745	0.2394	0.1827	0.1229	15
16	0.8528	0.7284	0.6232	0.5339	0.4581	0.3936	0.3387	0.2919	0.2519	0.2176	0.1631	0.1069	16
17	0.8444	0.7142	0.6050	0.5134	0.4363	0.3714	0.3166	0.2703	0.2311	0.1978	0.1456	0.0929	17
18	0.8360	0.7002	0.5874	0.4936	0.4155	0.3503	0.2959	0.2502	0.2120	0.1799	0.1300	0.0808	18
19	0.8277	0.6864	0.5703	0.4746	0.3957	0.3305	0.2765	0.2317	0.1945	0.1635	0.1161	0.0703	19
20	0.8195	0.6730	0.5537	0.4564	0.3769	0.3118	0.2584	0.2145	0.1784	0.1486	0.1037	0.0611	20
25	0.7798	0.6095	0.4776	0.3751	0.2953	0.2330	0.1842	0.1460	0.1160	0.0923	0.0588	0.0304	25
30	0.7419	0.5521	0.4120	0.3083	0.2314	0.1741	0.1314	0.0994	0.0754	0.0573	0.0334	0.0151	30
35	0.7059	0.5000	0.3554	0.2534	0.1813	0.1301	0.0937	0.0676	0.0490	0.0356	0.0189	0.0075	35
40	0.6717	0.4529	0.3066	0.2083	0.1420	0.0972	0.0668	0.0460	0.0318	0.0221	0.0107	0.0037	40

*Used to compute the present value of a known future amount. For example: How much would you need to invest today at 10% compounded semiannually to accumulate $5,000 in 6 years from today? Using the factors of n = 12 and i = 5% (12 semiannual periods and a semiannual rate of 5%), the factor is 0.5568. You would need to invest $2,784 today ($5,000 × 0.5568).

TABLE B.2†

$$f = (1+i)^n$$

Future Value of 1

Periods	Rate												Periods
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	15%	
0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0
1	1.0100	1.0200	1.0300	1.0400	1.0500	1.0600	1.0700	1.0800	1.0900	1.1000	1.1200	1.1500	1
2	1.0201	1.0404	1.0609	1.0816	1.1025	1.1236	1.1449	1.1664	1.1881	1.2100	1.2544	1.3225	2
3	1.0303	1.0612	1.0927	1.1249	1.1576	1.1910	1.2250	1.2597	1.2950	1.3310	1.4049	1.5209	3
4	1.0406	1.0824	1.1255	1.1699	1.2155	1.2625	1.3108	1.3605	1.4116	1.4641	1.5735	1.7490	4
5	1.0510	1.1041	1.1593	1.2167	1.2763	1.3382	1.4026	1.4693	1.5386	1.6105	1.7623	2.0114	5
6	1.0615	1.1262	1.1941	1.2653	1.3401	1.4185	1.5007	1.5869	1.6771	1.7716	1.9738	2.3131	6
7	1.0721	1.1487	1.2299	1.3159	1.4071	1.5036	1.6058	1.7138	1.8280	1.9487	2.2107	2.6600	7
8	1.0829	1.1717	1.2668	1.3686	1.4775	1.5938	1.7182	1.8509	1.9926	2.1436	2.4760	3.0590	8
9	1.0937	1.1951	1.3048	1.4233	1.5513	1.6895	1.8385	1.9990	2.1719	2.3579	2.7731	3.5179	9
10	1.1046	1.2190	1.3439	1.4802	1.6289	1.7908	1.9672	2.1589	2.3674	2.5937	3.1058	4.0456	10
11	1.1157	1.2434	1.3842	1.5395	1.7103	1.8983	2.1049	2.3316	2.5804	2.8531	3.4785	4.6524	11
12	1.1268	1.2682	1.4258	1.6010	1.7959	2.0122	2.2522	2.5182	2.8127	3.1384	3.8960	5.3503	12
13	1.1381	1.2936	1.4685	1.6651	1.8856	2.1329	2.4098	2.7196	3.0658	3.4523	4.3635	6.1528	13
14	1.1495	1.3195	1.5126	1.7317	1.9799	2.2609	2.5785	2.9372	3.3417	3.7975	4.8871	7.0757	14
15	1.1610	1.3459	1.5580	1.8009	2.0789	2.3966	2.7590	3.1722	3.6425	4.1772	5.4736	8.1371	15
16	1.1726	1.3728	1.6047	1.8730	2.1829	2.5404	2.9522	3.4259	3.9703	4.5950	6.1304	9.3576	16
17	1.1843	1.4002	1.6528	1.9479	2.2920	2.6928	3.1588	3.7000	4.3276	5.0545	6.8660	10.7613	17
18	1.1961	1.4282	1.7024	2.0258	2.4066	2.8543	3.3799	3.9960	4.7171	5.5599	7.6900	12.3755	18
19	1.2081	1.4568	1.7535	2.1068	2.5270	3.0256	3.6165	4.3157	5.1417	6.1159	8.6128	14.2318	19
20	1.2202	1.4859	1.8061	2.1911	2.6533	3.2071	3.8697	4.6610	5.6044	6.7275	9.6463	16.3665	20
25	1.2824	1.6406	2.0938	2.6658	3.3864	4.2919	5.4274	6.8485	8.6231	10.8347	17.0001	32.9190	25
30	1.3478	1.8114	2.4273	3.2434	4.3219	5.7435	7.6123	10.0627	13.2677	17.4494	29.9599	66.2118	30
35	1.4166	1.9999	2.8139	3.9461	5.5160	7.6861	10.6766	14.7853	20.4140	28.1024	52.7996	133.1755	35
40	1.4889	2.2080	3.2620	4.8010	7.0400	10.2857	14.9745	21.7245	31.4094	45.2593	93.0510	267.8635	40

†Used to compute the future value of a known present amount. For example: What is the accumulated value of $3,000 invested today at 8% compounded quarterly for 5 years? Using the factors of $n = 20$ and $i = 2\%$ (20 quarterly periods and a quarterly interest rate of 2%), the factor is 1.4859. The accumulated value is $4,457.70 ($3,000 × 1.4859).

TABLE B.3

page B-12

$$p = \left[1 - \frac{1}{(1+i)^n}\right] / i$$

Present Value of an Annuity of 1

Periods	Rate												Periods
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	15%	
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.8929	0.8696	1
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.6901	1.6257	2
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4018	2.2832	3
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.0373	2.8550	4
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6048	3.3522	5
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.1114	3.7845	6
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.5638	4.1604	7
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	4.9676	4.4873	8
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.3282	4.7716	9
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.6502	5.0188	10
11	10.3676	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	5.9377	5.2337	11
12	11.2551	10.5753	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.1944	5.4206	12
13	12.1337	11.3484	10.6350	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.4235	5.5831	13
14	13.0037	12.1062	11.2961	10.5631	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.6282	5.7245	14
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.7122	9.1079	8.5595	8.0607	7.6061	6.8109	5.8474	15
16	14.7179	13.5777	12.5611	11.6523	10.8378	10.1059	9.4466	8.8514	8.3126	7.8237	6.9740	5.9542	16
17	15.5623	14.2919	13.1661	12.1657	11.2741	10.4773	9.7632	9.1216	8.5436	8.0216	7.1196	6.0472	17
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591	9.3719	8.7556	8.2014	7.2497	6.1280	18
19	17.2260	15.6785	14.3238	13.1339	12.0853	11.1581	10.3356	9.6036	8.9501	8.3649	7.3658	6.1982	19
20	18.0456	16.3514	14.8775	13.5903	12.4622	11.4699	10.5940	9.8181	9.1285	8.5136	7.4694	6.2593	20
25	22.0232	19.5235	17.4131	15.6221	14.0939	12.7834	11.6536	10.6748	9.8226	9.0770	7.8431	6.4641	25
30	25.8077	22.3965	19.6004	17.2920	15.3725	13.7648	12.4090	11.2578	10.2737	9.4269	8.0552	6.5660	30
35	29.4086	24.9986	21.4872	18.6646	16.3742	14.4982	12.9477	11.6546	10.5668	9.6442	8.1755	6.6166	35
40	32.8347	27.3555	23.1148	19.7928	17.1591	15.0463	13.3317	11.9246	10.7574	9.7791	8.2438	6.6418	40

‡Used to calculate the present value of a series of equal payments made at the end of each period. For example: What is the present value of $2,000 per year for 10 years assuming an annual interest rate of 9%? For (n = 10, i = 9%), the PV factor is 6.4177. $2,000 per year for 10 years is the equivalent of $12,835 today ($2,000 × 6.4177).

TABLE B.4§

$$f = [(1 + i)^n - 1]/i$$

Future Value of an Annuity of 1

Periods	Rate												Periods
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	15%	
1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1
2	2.0100	2.0200	2.0300	2.0400	2.0500	2.0600	2.0700	2.0800	2.0900	2.1000	2.1200	2.1500	2
3	3.0301	3.0604	3.0909	3.1216	3.1525	3.1836	3.2149	3.2464	3.2781	3.3100	3.3744	3.4725	3
4	4.0604	4.1216	4.1836	4.2465	4.3101	4.3746	4.4399	4.5061	4.5731	4.6410	4.7793	4.9934	4
5	5.1010	5.2040	5.3091	5.4163	5.5256	5.6371	5.7507	5.8666	5.9847	6.1051	6.3528	6.7424	5
6	6.1520	6.3081	6.4684	6.6330	6.8019	6.9753	7.1533	7.3359	7.5233	7.7156	8.1152	8.7537	6
7	7.2135	7.4343	7.6625	7.8983	8.1420	8.3938	8.6540	8.9228	9.2004	9.4872	10.0890	11.0668	7
8	8.2857	8.5830	8.8923	9.2142	9.5491	9.8975	10.2598	10.6366	11.0285	11.4359	12.2997	13.7268	8
9	9.3685	9.7546	10.1591	10.5828	11.0266	11.4913	11.9780	12.4876	13.0210	13.5795	14.7757	16.7858	9
10	10.4622	10.9497	11.4639	12.0061	12.5779	13.1808	13.8164	14.4866	15.1929	15.9374	17.5487	20.3037	10
11	11.5668	12.1687	12.8078	13.4864	14.2068	14.9716	15.7836	16.6455	17.5603	18.5312	20.6546	24.3493	11
12	12.6825	13.4121	14.1920	15.0258	15.9171	16.8699	17.8885	18.9771	20.1407	21.3843	24.1331	29.0017	12
13	13.8093	14.6803	15.6178	16.6268	17.7130	18.8821	20.1406	21.4953	22.9534	24.5227	28.0291	34.3519	13
14	14.9474	15.9739	17.0863	18.2919	19.5986	21.0151	22.5505	24.2149	26.0192	27.9750	32.3926	40.5047	14
15	16.0969	17.2934	18.5989	20.0236	21.5786	23.2760	25.1290	27.1521	29.3609	31.7725	37.2797	47.5804	15
16	17.2579	18.6393	20.1569	21.8245	23.6575	25.6725	27.8881	30.3243	33.0034	35.9497	42.7533	55.7175	16
17	18.4304	20.0121	21.7616	23.6975	25.8404	28.2129	30.8402	33.7502	36.9737	40.5447	48.8837	65.0751	17
18	19.6147	21.4123	23.4144	25.6454	28.1324	30.9057	33.9990	37.4502	41.3013	45.5992	55.7497	75.8364	18
19	20.8109	22.8406	25.1169	27.6712	30.5390	33.7600	37.3790	41.4463	46.0185	51.1591	63.4397	88.2118	19
20	22.0190	24.2974	26.8704	29.7781	33.0660	36.7856	40.9955	45.7620	51.1601	57.2750	72.0524	102.4436	20
25	28.2432	32.0303	36.4593	41.6459	47.7271	54.8645	63.2490	73.1059	84.7009	98.3471	133.3339	212.7930	25
30	34.7849	40.5681	47.5754	56.0849	66.4388	79.0582	94.4608	113.2832	136.3075	164.4940	241.3327	434.7451	30
35	41.6603	49.9945	60.4621	73.6522	90.3203	111.4348	138.2369	172.3168	215.7108	271.0244	431.6635	881.1702	35
40	48.8864	60.4020	75.4013	95.0255	120.7998	154.7620	199.6351	259.0565	337.8824	442.5926	767.0914	1,779.0903	40

§Used to calculate the future value of a series of equal payments made at the end of each period. For example: What is the future value of $4,000 per year for 6 years assuming an annual interest rate of 8%? For (n = 6, i = 8%), the FV factor is 7.3359. $4,000 per year for 6 years accumulates to $29,343.60 ($4,000 × 7.3359).

C Investments

Appendix Preview

BASICS OF INVESTMENTS

C1 Short- vs. long-term

Debt vs. equity

Classification and reporting summary

DEBT INVESTMENTS

P1 Trading securities

P2 Held-to-maturity securities

P3 Available-for-sale securities

NTK C-1, 2, 3

EQUITY INVESTMENTS

P4 Insignificant influence

P5 Significant influence

C2 Controlling influence

NTK C-4, 5

REPORTING AND ANALYSIS

Summary of debt and equity investments

Comprehensive income

A1 Return on assets components

NTK C-6

All content is updated for new investment rules.

Learning Objectives

CONCEPTUAL

C1 Distinguish between debt and equity securities and between short-term and long-term investments.

C2 Describe how to report equity securities with controlling influence.

ANALYTICAL

A1 Compute and analyze the components of return on total assets.

PROCEDURAL

P1 Account for debt securities as trading.

P2 Account for debt securities as held-to-maturity.

P3 Account for debt securities as available-for-sale.

P4 Account for equity securities with insignificant influence.

P5 Account for equity securities with significant influence.

BASICS OF INVESTMENTS

C1

Distinguish between debt and equity securities and between short-term and long-term investments.

In prior chapters we covered the reporting of both equity (common and preferred stock) and debt (bonds and notes) from the seller's (also called *issuer* or *investee*) standpoint. **This appendix covers the reporting of both equity and debt from the buyer's (or investor) standpoint.** All content is updated for new GAAP requirements.

Purposes and Types of Investments

Companies make investments for at least three reasons. (1) Companies invest their *extra cash* to earn more income. (2) Some entities, such as mutual funds and pension funds, are set up to earn income from investments. (3) Companies make investments for strategic reasons such as investments in competitors, suppliers, and customers. Exhibit C.1 shows short-term (ST) and long-term (LT) investments as a percent of total assets for several companies.

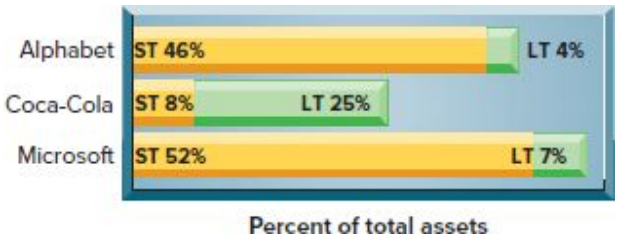


EXHIBIT C.1

Investment Assets

Short-Term Investments **Short-term investments,** or *marketable securities,* are investments that (1) management intends to convert to

cash within one year or the operating cycle, whichever is longer, and (2) are readily convertible to cash. These investments usually mature between 3 and 12 months. Cash equivalents are not short-term investments because they usually mature within 3 months. Short-term investments are current assets.

Long-Term Investments **Long-term investments** are investments that are not readily convertible to cash or are not intended to be converted into cash in the short term. Long-term investments also include funds designated for a special purpose, such as investments in land or other assets not used in operations. Long-term investments are noncurrent assets.

Debt Securities versus Equity Securities Investments in securities include both debt and equity securities. *Debt securities* reflect a creditor relation such as investments in notes, bonds, and certificates of deposit; they are issued by governments, companies, and individuals. *Equity securities* reflect an owner relation such as investments in shares of stock issued by companies.

Classification and Reporting

Accounting for investments in securities depends on three factors: (1) security type, either debt or equity; (2) the company's intent to hold the security either short term or long term; and (3) the investor's percentage of ownership in the other company's (investee's) equity securities. Exhibit C.2 identifies six classes of securities using these three factors. This exhibit reflects new GAAP requirements.

Debt Investments			Equity Investments		
Held-to-Maturity	**Trading**	**Available-for-Sale**	**Insignificant Influence**	**Significant Influence**	**Controlling Influence**
Debt securities intended to be held until maturity	Debt securities that are actively traded	Debt securities that are not HTM or Trading	Equity securities with insignificant influence	Equity securities with significant influence	Equity securities with controlling influence

EXHIBIT C.2

Investments in Securities

Debt Investments

Debt Investments—Basics

This section covers the purchase, sale, and any interest received for **debt investments** (also called *debt securities*).

Recording Acquisition Debt investments are recorded at cost when purchased. Assume that Ling Co. paid $30,000 on July 1, 2021, to buy Dell's 7%, two-year bonds payable with a $30,000 par value. The bonds pay interest semiannually on December 31 and June 30. The entry to record this purchase follows.

July 1, 2021	Debt Investments	30,000	
	Cash		30,000
	Purchased bonds as debt investments.		

Assets = Liabilities + Equity
+30,000
−30,000

Recording Interest Interest revenue for debt investments is recorded when earned. On December 31, 2021, Ling records cash receipt of interest as follows. The $1,050 interest earned from July 1 to December 31 is computed as Principal × Annual rate × Fraction of year.

Dec. 31, 2021	Cash	1,050	
	Interest Revenue		1,050
	Record interest earned ($30,000 × 7% × 6/12).		

Assets = Liabilities + Equity
+1,050 +1,050

Reporting Debt Investments Ling's financial statements at December 31, 2021, report the interest revenue and the investment as shown in Exhibit C.3.

On the income statement for year 2021:	
Interest revenue	**$1,050**

On the December 31, 2021, balance sheet:	
Debt investments	**$30,000**

EXHIBIT C.3

Financial Statement Presentation of Debt Investments

Maturity When bonds mature, we record the proceeds (assuming interest was already recorded).

July 1, 2023	Cash	30,000	
	Debt Investments		30,000
	Received cash from matured bonds.		

Assets = Liabilities + Equity
+30,000
−30,000

The cost of a debt security can be either higher or lower than its maturity value. When the investment is long term, the difference between cost and maturity value is amortized as an adjustment to interest revenue over the remaining life of the security. We assume for simplicity that the cost of a long-term debt security equals its maturity value for all assignments.

Point: It is common to add the security name to the account title to track as a subsidiary ledger. For example, the Debt Investments account can be titled Debt Investments (Dell).

DEBT INVESTMENTS: TRADING

P1

Account for debt securities as trading.

Trading securities are *debt* investments that the company actively buys and sells for profit. **Trading securities are always current assets.**

The portfolio of trading securities is reported at fair value; this requires a "fair value adjustment" from the cost of the portfolio. A *portfolio* is a group of securities. **Any unrealized gain (or loss) from a change in the fair value of the portfolio of trading securities is reported on the income statement.**

Recording Fair Value TechCom's portfolio of trading securities had a total cost of $11,500 and a fair value of $13,000 on December 31, 2021, the first year it held trading securities. The difference between the $11,500 cost and the $13,000 fair value is a $1,500 gain. It is an **unrealized gain** because it is not yet confirmed by actual sales of securities. The fair value adjustment for trading securities is recorded with an adjusting entry at the end of each period to equal the difference between the portfolio's cost and its fair value. TechCom records this gain as follows.

Point: Fair Value Adj. is a balance sheet account with either a debit balance (Fair value > Cost) or credit balance (Fair value < Cost).

Dec. 31, 2021	Fair Value Adjustment—Trading	1,500	
	Unrealized Gain—Income		1,500
	Record unrealized gain in trading securities.		

Assets = Liabilities + Equity
+1,500 +1,500

This adjustment is computed using our three-step adjusting process.

page C-4

Unadj. bal. is rarely $0; it is $0 here because it's the first year.

Step 1: Determine what unadjusted balance equals: Fair Value Adjustment–Trading = $0.
Step 2: Determine what adjusted balance should equal: Fair Value Adjustment–Trading = $1,500 Dr.
Explanation: $13,000 fair value > $11,500 cost; thus, Fair Value Adjustment–Trading requires a $1,500 debit to be at fair value.
Step 3: Record the $1,500 adjusting entry to get from step 1 to step 2.
Explanation: This means a $1,500 debit to Fair Value Adjustment–Trading and a $1,500 credit to Unrealized Gain–Income.

Example: If TechCom's trading securities have a cost of $14,800 and a fair value of $16,100 at Dec. 31, 2022, its adjusting entry is

Unreal. Loss—Income 200

Fair Value Adj.—Trading 200

This is computed as:

$1,500 Beg. Dr. bal. + $200 Cr. = $1,300 End. Dr. bal.

Reporting Fair Value The **unrealized gain (or loss)** is reported in the Other Revenues and Gains (or Expenses and Losses) section on the income statement. Unrealized Gain—Income (or Unrealized Loss—Income) is a *temporary* account that is closed to Income Summary at the end of each period. Fair Value Adjustment—Trading is a *permanent* asset account that adjusts the reported value of the trading securities portfolio from its prior period fair value to the current period fair value. The total cost of the trading securities portfolio is maintained in one account, and the fair value adjustment is recorded in a separate account. For example, TechCom's investment in trading securities is reported in current assets as follows.

Debt Investments–Trading		
1/1/2021	0	
Purchase	11,500	
12/31/2021	11,500	

Fair Value Adjustment–Trading		
1/1/2021	0	
Adjustment	1,500	
12/31/2021	1,500	

Current Assets

Debt investments—Trading (at cost)	$11,500	
Fair value adjustment—Trading	1,500	
Debt investments—Trading (at fair value)		$13,000

or simply

Debt investments—Trading (at fair value; cost is $11,500)	$13,000

Selling Trading Securities When individual trading securities are sold, the difference between the net proceeds (sale price minus fees) and the cost of the individual trading securities sold is recorded as a gain or a loss. **Any prior-period fair value adjustment to the portfolio is not used to compute the gain or loss from the sale of individual trading securities.** This is because the balance in the Fair Value Adjustment account is for the entire portfolio, not individual securities. If TechCom sold some of its trading securities that had cost $100 for $120 cash on January 9, 2022, it records the following.

Assets	=	Liabilities	+	Equity
+120				+20
−100				

Jan. 9, 2022	Cash	120	
	Debt Investments—Trading		100
	Gain on Sale of Debt Investments		20
	Sold trading securities costing $100 for $120 cash.		

This is a *realized* $20 gain—realized by an actual sale. A gain is reported in the Other Revenues and Gains section on the income statement, and a loss is reported in Other Expenses and Losses. When the period-end fair value adjustment for the portfolio of trading

securities is computed, it excludes the cost and fair value of any securities sold.

Leungchopan/Shutterstock

NEED-TO-KNOW C-1

Trading Securities

P1

Berkshire Co. purchases debt investments in trading securities at a cost of $130 on July 1. (This is its first and only purchase of trading securities.) On December 30, Berkshire received $1 of interest from its trading securities. At year-end December 31, the trading securities had a fair value of $140.

a. Prepare the July 1 purchase entry of trading securities.

b. Prepare the December 30 entry for receipt of cash interest.

c. Prepare the December 31 year-end adjusting entry for the trading securities' portfolio.

d. Explain how each account in entry *c* is reported in financial statements.

e. Prepare the January 3 entry when a portion of its trading securities (that had cost $33) is sold for $36.

Solution

a.

July 1	Debt Investments—Trading	130	
	Cash		130
	Record purchase of trading securities.		

b.

Dec. 30	Cash	1	
	Interest Revenue		1
	Record interest received on trading securities.		

c.

Dec. 31	Fair Value Adjustment—Trading	10	
	Unrealized Gain—Income		10
	Record unrealized gain in fair value of trading securities.		

Fair Value Adjustment–Trading

Unadj. bal.	0
Adjustment	10
Dec. 31	10

d. **(i)** The $10 debit in the Fair Value Adjustment—Trading account is an adjunct asset account in the balance sheet. It increases the $130 balance of the Debt Investments—Trading account to its $140 fair value.

(ii) The $10 credit for Unrealized Gain is reported in the Other Revenues and Gains section of the income statement.

Jan. 3	Cash	36	
	Gain on Sale of Debt Investments		3
	Debt Investments—Trading		33
	Record sale of trading securities.		

Do More: QS C-3, QS C-4, QS C-5, E C-2, E C-3

DEBT INVESTMENTS: HELD-TO-MATURITY

P2

Account for debt securities as held-to-maturity.

Held-to-maturity (HTM) securities are *debt* securities a company intends and is able to hold until maturity. They are reported in current assets if their maturity dates are within one year or the operating cycle, whichever is longer. Otherwise, they are classified as long-term investments.

The cost of a debt security can be either higher or lower than its maturity value. When the investment is long term, the difference between cost and maturity value is amortized over the remaining life

of the security. We assume for simplicity that the cost of a long-term HTM debt security equals its maturity value for all assignments.

Recording Acquisition and Interest All HTM securities are recorded at cost when purchased, and interest revenue is recorded when earned—see earlier "basic" entries.

Reporting HTM Securities at Cost The portfolio of HTM securities is usually reported at (amortized) cost, which is explained in advanced courses. **There is no fair value adjustment to the portfolio of HTM securities—neither to short-term nor long-term portfolios.**

NEED-TO-KNOW C-2

Held-to-Maturity Securities

P2

Prepare journal entries to record the following transactions involving short-term debt investments.

a. On May 15, paid $100 cash to purchase Muni's 120-day short-term debt securities ($100 principal), dated May 15, that pay 6% interest (categorized as held-to-maturity securities).

b. On September 13, received a check from Muni in payment of the principal and 120 days' interest on the debt securities purchased in transaction *a*.

Solution

a.

May 15	Debt Investments—HTM	100	
	Cash		100
	Purchased 120-day, 6% debt securities.		

b.

Sep. 13	Cash	102	
	Debt Investments—HTM		100
	Interest Revenue		2
	Collect $100 principal plus interest of $100 × 6% × 120/360.		

Do More: QS C-6, E C-4

DEBT INVESTMENTS: AVAILABLE-FOR-SALE

P3

Account for debt securities as available-for-sale.

Available-for-sale (AFS) securities are *debt* investments not classified as trading or held-to-maturity securities. If the intent is to sell AFS securities within the longer of one year or the operating cycle, they are classified as short-term investments. Otherwise, they are classified as long-term investments.

Companies adjust the cost of the portfolio of AFS securities for changes in fair value. This is done with a fair value adjustment to its portfolio cost. **Any unrealized gain or loss for the portfolio of AFS securities is not reported on the income statement. It is reported in the equity section of the balance sheet** (as part of *comprehensive income,* covered later).

Recording Fair Value Assume that Mitsu Co. had no prior investments in available-for-sale securities other than those purchased in the current period. Exhibit C.4 shows the cost and fair value of the portfolio of investments on December 31, 2021, the end of its reporting period.

	Cost	Fair Value	Unrealized Gain (Loss)
Apple bonds	$30,000	$29,050	$ (950)
Intex notes	43,000	45,500	2,500
Total	$73,000	$74,550	**$1,550**

EXHIBIT C.4

Cost and Fair Value of Available-for-Sale Securities

Example: If fair value in Exhibit C.4 is $70,000 (instead of $74,550), what entry is made? *Answer:*

Unreal. Loss—Equity 3,000

The year-end adjusting entry to record the fair value of the portfolio of investments follows.

Assets = Liabilities + Equity
+1,550 +1,550

Dec. 31, 2021	Fair Value Adjustment—Available-for-Sale	1,550	
	Unrealized Gain—Equity		1,550
	Record adjustment to fair value of AFS securities.		

Reporting Fair Value Exhibit C.5 shows the December 31, 2021, balance sheet—it assumes these investments are long term, but they also can be short term. Fair Value Adjustment—AFS is a permanent account, shown as a deduction or addition to the investment account. It is also common to combine the cost of investments with the balance in the Fair Value Adjustment account and report the net as a single amount. Unrealized Gain (Loss)—Equity is also a permanent equity account on the balance sheet.

	Assets		
	Debt investments—Available-for-sale (at cost)	$73,000	
Reconciled	Fair value adjustment—Available-for-sale	1,550	
	Debt investments—Available-for-sale (at fair value)		$74,550
	or simply		
	Debt investments—Available-for-sale (at fair value; cost is $73,000) ...		$74,550
	Equity		
	Add unrealized gain on available-for-sale securities*		$ 1,550

*Included under Accumulated Other Comprehensive Income.

EXHIBIT C.5

Balance Sheet Presentation of Available-for-Sale Securities

Debt Investments–AFS

1/1/2021	0
Purchase	73,000
12/31/2021	73,000

Fair Value Adjustment–AFS

1/1/2021	0
Adjustment	1,550
12/31/2021	1,550

Reporting for Next Year Let's extend this example and assume that at the end of its next year, December 31, 2022, Mitsu's portfolio of long-term AFS securities has an $81,000 cost and an $82,000 fair value. The year-end adjustment is computed using our three-step adjusting process.

page C-7

Step 1: Determine what unadjusted balance equals: Fair Value Adjustment–AFS = $1,550 Dr. (from Exhibit C.5).
Step 2: Determine what adjusted balance should equal: Fair Value Adjustment–AFS = $1,000 Dr.
Explanation: $82,000 fair value > $81,000 cost; thus, Fair Value Adjustment–AFS must have a $1,000 Dr. bal. so securities are at fair value.
Step 3: Record the $550 adjusting entry to get from step 1 to step 2.
Explanation: This implies a $550 credit to Fair Value Adjustment–AFS (and a $550 debit to Unrealized Gain).

It records the year-end adjustment to fair value as follows.

Dec. 31, 2022	Unrealized Gain—Equity	550	
	Fair Value Adjustment—Available-for-Sale		550
	Record adjustment to fair value of AFS securities.		

Assets = Liabilities + Equity
−550 −550

The effects of the 2021 and 2022 securities transactions are shown in the following T-accounts.

Unrealized Gain—Equity

Adj. 12/31/22	550	Bal. 12/31/21	1,550
		Bal. 12/31/22	**1,000**

Fair Value Adjustment—Available-for-Sale

Bal. 12/31/21	1,550	Adj. 12/31/22	550
Bal. 12/31/22	**1,000**		

Example: If cost is $83,000 and fair value is $82,000 at Dec. 31, 2022, it records the following adjustment:

Unreal. Gain—Equity 1,550

Unreal. Loss—Equity 1,000

Fair Value Adj.—AFS 2,550

Selling AFS Securities

Accounting for the sale of individual AFS securities is identical to accounting for the sale of trading securities. When individual AFS securities are sold, the difference between the cost of the individual securities sold and the net proceeds (sale price less fees) is recorded as a gain or loss on sale of debt investments.

NEED-TO-KNOW C-3

Available-for-Sale Securities

P3

Gard Company completes the following transactions related to its short-term debt investments.

May 8 Purchased FedEx notes as a short-term investment in available-for-sale securities for $12,975.

Sep. 2 Sold part of its investment in FedEx notes for $4,475, which had cost $4,325.

Oct. 2 Purchased Ajay bonds for $25,600 as a short-term investment in available-for-sale securities.

Required

1. Prepare journal entries for the transactions.
2. Prepare a year-end adjusting journal entry as of December 31 if the fair values of the debt securities held by Gard are $9,600 for FedEx and $22,000 for Ajay. (This year is the first year Gard Company acquired short-term debt investments.)

Solution

1.

May 8	Debt Investments—AFS	12,975	
	Cash		12,975
	*Purchased **FedEx** notes.*		
Sep. 2	Cash	4,475	
	Gain on Sale of Debt Investment		150
	Debt Investments—AFS		4,325
	*Sold a portion of its **FedEx** notes.*		
Oct. 2	Debt Investments—AFS	25,600	
	Cash		25,600
	*Purchased **Ajay** bonds.*		

2. Computation of unrealized gain or loss, along with the adjusting entry, follows.

Debt Investments–AFS			
Jan. 1	0		
May 8	12,975		
		Sep. 2	4,325
Oct. 2	25,600		
Dec. 31 bal.	34,250		

Fair Value Adjustment–AFS			
Jan. 1	0		
		Dec. 31 adj.	2,650
		Dec. 31 bal.	2,650

Debt Investments–AFS			
Jan. 1	0		
May 8	12,975		
		Sep. 2	4,325
Oct. 2	25,600		
Dec. 31 bal.	34,250		

Fair Value Adjustment–AFS			
Jan. 1	0		
		Dec. 31 adj.	2,650
		Dec. 31 bal.	2,650

Debt Investments in Available-for-Sale Securities	Total Cost	Total Fair Value	Unrealized Gain (Loss)
FedEx	$ 8,650*	$ 9,600	
Ajay	25,600	22,000	
Totals	$34,250	$31,600	$(2,650)

*$12,975 – $4,325

Dec. 31	Unrealized Loss—Equity	2,650	
	Fair Value Adjustment—Available-for-Sale		2,650
	Record unrealized loss in fair value of AFS portfolio.		

Do More: QS C-7, QS C-8, QS C-9, QS C-10, E C-5, E C-6, E C-7

Equity Investments

This section covers **equity investments** (also called *equity securities*). Exhibit C.6 summarizes the accounting for equity investments based on an investor's ownership in the stock. We cover each of these three cases.

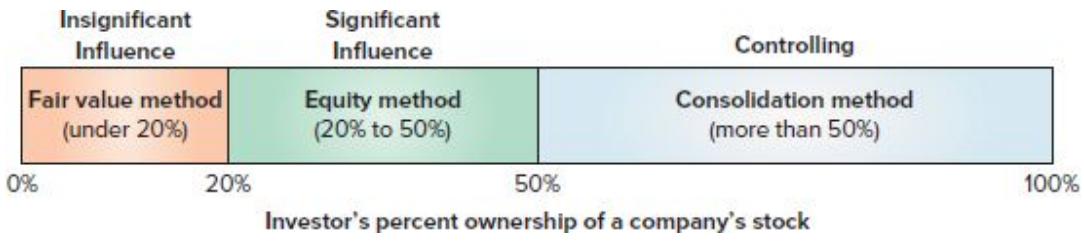


EXHIBIT C.6

Equity Investments by Percent of Ownership

EQUITY INVESTMENTS: INSIGNIFICANT INFLUENCE, UNDER 20%

P4

Account for equity securities with insignificant influence.

When an investor has insignificant influence over another company, presumably when it owns less than 20% of voting stock, the stock investment is reported at fair value. Stock investments are classified as short or long term based on managers' intent and the stock's marketability. Any cash dividends are recorded as dividend revenue.

Recording Acquisition Equity investments are recorded at cost when acquired, including any commissions and brokerage fees paid. Assume ITI purchases 100 shares of Lynx common stock for $7,000 on October 10, 2021. After the purchase, ITI has insignificant influence over Lynx. It records this purchase as follows.

Oct. 10	Stock Investments	7,000	
	Cash		7,000
	Purchased 100 shares of Lynx.		

Assets = Liabilities + Equity
+7,000
−7,000

Recording Dividends If ITI receives $10 in dividends on November 1 from its stock investment, it records the following.

Nov. 1	Cash	10	
	Dividend Revenue		10
	Record dividend received on stock investments.		

Assets = Liabilities + Equity
+10 +10

Recording Fair Value The stock investments portfolio is reported at fair value; this requires a "fair value adjustment" from cost of the portfolio. **Any unrealized gain (or loss) from a change in the fair**

value of this portfolio of stock investments is reported on the income statement.

Assume ITI's portfolio of stock investments with page C-9 insignificant influence has a total cost of $7,000 and a fair value of $9,000 on December 31, 2021, the first year it held these securities. The difference between the $7,000 cost and the $9,000 fair value is a $2,000 **unrealized gain.** The fair value adjustment is recorded at the end of each period to equal the difference between the portfolio's cost and its fair value. ITI records this gain as follows.

Dec. 31	Fair Value Adjustment—Stock	2,000	
	Unrealized Gain—Income		2,000
	Record unrealized gain in stock investments.		

Assets = Liabilities + Equity
+2,000 +2,000

This adjustment is computed using our three-step adjusting process.

Step 1: Determine what unadjusted balance equals: Fair Value Adjustment–Stock = $0. ← Unadj. bal. is rarely $0; it is $0 here because it's the first year.

Step 2: Determine what adjusted balance should equal: Fair Value Adjustment–Stock = $2,000 Dr.

Explanation: $9,000 fair value > $7,000 cost; thus, Fair Value Adjustment–Stock requires a $2,000 debit to be at fair value.

Step 3: Record the $2,000 adjusting entry to get from step 1 to step 2.

Explanation: This means a $2,000 debit to Fair Value Adjustment–Stock and a $2,000 credit to Unrealized Gain–Income.

Example: If cost is $10,000 and fair value is $8,500 at Dec. 31, 2022, it records the following adjustment:

Unreal. Loss—Income 3,500

Fair Value Adj.—Stock 3,500

The FVA—Stock Cr. is computed as:

$2,000 Beg. Dr. bal. + $3,500 Cr. = $1,500 End. Cr. bal.

Reporting Fair Value The **unrealized gain (or loss)** is reported in the Other Revenues and Gains (or Expenses and Losses) section on the income statement. Unrealized Gain (or Loss)—Income is a *temporary* account that is closed to Income Summary at the end of each period. Fair Value Adjustment—Stock is a *permanent* asset account that adjusts the reported value of the stock investments portfolio from its prior-period fair value to the current-period fair value. The total cost of the portfolio is kept in one account, and the fair value

adjustment is kept in a separate account. ITI's stock investment is reported in its assets.

Assets		
Stock investments (at cost)	$7,000	
Fair value adjustment—Stock	2,000	
Stock investments (at fair value)		$9,000
or simply		
Stock investments (at fair value; cost is $7,000)		$9,000

Stock Investments

1/1/2021	0
Purchase	7,000
12/31/2021	7,000

Fair Value Adjustment–Stock

1/1/2021	0
Adjustment	2,000
12/31/2021	2,000

Selling Stock Investments When individual stock investments are sold, the difference between the net proceeds (sale price minus fees) and the cost of the individual stocks that are sold is recorded as a gain or a loss. **Any prior-period fair value adjustment to the portfolio is not used to compute the gain or loss from the sale of individual stocks.** This is because the balance in the Fair Value Adjustment account is for the entire portfolio, not individual stocks. If ITI sold some of its stock investments that had cost $500 for $800 cash on March 9, 2022, it records the following. A gain is reported in the Other Revenues and Gains section on the income statement, and a loss is reported in Other Expenses and Losses.

Assets = Liabilities + Equity
+800 +300
−500

Mar. 9	Cash	800	
	Stock Investments		500
	Gain on Sale of Stock Investments		300
	Sold stock investments costing $500 for $800 cash.		

page C-10

NEED-TO-KNOW C-4

Stock Investments with Insignificant Influence (<20%)

P4

Derr Co. purchases stock investments (with insignificant influence) at a cost of $250 on December 15. This is its first and only purchase of such securities. On December 28, Derr received a $15 cash dividend from the stock investments. At year-end December 31, the stock investments had a fair value of $200.

a. Prepare the December 15 purchase entry for stock investments.

b. Prepare the December 28 receipt of cash dividends entry.

c. Prepare the December 31 year-end adjusting entry for the stock investments' portfolio.

d. Explain how each account in entry *c* is reported in financial statements.

e. Prepare the January 3 entry when a portion of its stock investments (that had cost $37) is sold for $40.

Solution

a.

Dec. 15	Stock Investments	250	
	Cash		250
	Record purchase of stock investments.		

b.

Dec. 28	Cash	15	
	Dividend Revenue		15
	Record dividend received on stock investments.		

c.

Dec. 31	Unrealized Loss—Income	50	
	Fair Value Adjustment—Stock		50
	Record unrealized loss in stock investments.		

Fair Value Adjustment–Stock

Unadj. bal.	0		
		Adj.	50
		Dec. 31	50

d. **(i)** The $50 credit in the Fair Value Adjustment—Stock account is a contra asset account in the balance sheet. It decreases the $250 balance of the Stock Investments account to its $200 fair value.

(ii) The $50 debit for Unrealized Loss is reported in the Other Expenses and Losses section of the income statement.

e.

Jan. 3	Cash	40	
	Gain on Sale of Stock Investments		3
	Stock Investments		37
	Record sale of stock investments.		

Do More: QS C-11, QS C-12, QS C-13, E C-8, E C-9, E C-10, E C-11

EQUITY INVESTMENTS: SIGNIFICANT INFLUENCE, 20% TO 50%

P5

Account for equity securities with insignificant influence.

A long-term investment classified as **equity securities with significant influence** means that the investor has significant influence over the investee. An investor that owns between 20% and 50% of a company's voting stock usually has significant influence. The **equity method** is used for long-term investments in equity securities with significant influence, which is explained in this section.

page C-11

Recording Acquisition Long-term investments in equity securities with significant influence are recorded at cost when acquired. Micron Co. records the purchase of 3,000 shares (30%) of Star Co. common stock at a total cost of $70,000 on January 1, 2021, as follows.

Jan. 1	Equity Method Investments	70,000	
	Cash		70,000
	Record purchase of 3,000 Star shares.		

Assets = Liabilities + Equity
+70,000
−70,000

Recording Share of Earnings When the investee reports its earnings, the investor records its share of those earnings in its investment account. Assume that Star reports net income of $20,000 for 2021. Micron records its 30% share of those earnings—see entry below. The debit increases Micron's equity in Star. The credit is 30% of Star's net income. Earnings from Equity Method Investments is a *temporary* account (closed to Income Summary at each period-end) and is reported on the investor's (Micron's) income statement. If the investee incurs a net loss instead of net income, the investor records its share of the loss and reduces (credits) its investments account.

Dec. 31	Equity Method Investments	6,000	
	Earnings from Equity Method Investments		6,000
	Record 30% equity in investee's $20,000 earnings.		

Assets = Liabilities + Equity
+6,000 +6,000

Recording Share of Dividends Cash dividends received by an investor from an investee under the equity method are accounted for as a conversion of one asset to another. Dividends reduce the Equity Method Investments account. Assume Star pays a total of $10,000 in cash dividends on its common stock. Micron records its 30% share of these dividends received on January 9, 2022, as follows.

Jan. 9	Cash	3,000	
	Equity Method Investments		3,000
	Record 30% share of $10,000 dividend paid by Star.		

Assets = Liabilities + Equity
+3,000
−3,000

Reporting Investments with Significant Influence The book value of investments under the equity method equals the cost of investments plus the investor's share of net income or loss and minus its share of dividends. **The Equity Method Investments account is not adjusted to fair value.** After Micron records these transactions, its Equity Method Investments account appears as in Exhibit C.7. Micron's account balance on January 9, 2022, for its investment in Star is $73,000. This is the investment's cost *plus* Micron's share of Star's earnings *minus* Micron's share of Star's cash dividends.

Equity Method Investments

1/1/2021 Investment acquisition	70,000		
12/31/2021 Share of earnings	6,000		
12/31/2021 Balance	76,000		
		1/9/2022 Share of dividend	3,000
1/9/2022 Balance	73,000		

EXHIBIT C.7

Equity Method Investments (T-account)

Selling Investments with Significant Influence When equity method investments are sold, the gain or loss is computed by comparing proceeds from the sale with the book value of the investments on the sale date. If Micron sells all of its Star stock for $80,000 on January 10, 2022, it records the sale as follows.

Jan. 10	Cash	80,000	
	Equity Method Investments		73,000
	Gain on Sale of Stock Investments		7,000
	Sold 3,000 shares of stock for $80,000.		

Assets = Liabilities + Equity
+80,000 +7,000
−73,000

NEED-TO-KNOW C-5

Equity Method Investments

P5

Prepare entries to record the following transactions of Garcia Company.

Year 1

Jan. 1 Purchased 400 shares of Lopez Co. common stock for $3,000 cash. Lopez has 1,000 shares of common stock outstanding, and its policies will be significantly influenced by Garcia.

Aug. 1 Lopez declared and paid a cash dividend of $2 per share.

Dec. 31 Lopez reported net income for the year of $2,500.

Year 2

Aug. 1 Lopez declared and paid a cash dividend of $2.25 per share.

Dec. 31 Lopez reported net income for the year of $2,750.

Year 3

Jan. 1 Garcia sold 100 shares of Lopez for $1,300 cash.

Solution

Jan. 1, Year 1	Equity Method Investments	3,000	
	Cash		3,000
	*Record purchase of investment.**		

*Garcia's investment is 40% of Lopez's stock (400/1,000). Garcia uses the equity method.

Aug. 1, Year 1	Cash	800	
	Equity Method Investments		800
	Record receipt of cash dividend (400 × $2).		
Dec. 31, Year 1	Equity Method Investments	1,000	
	Earnings from Equity Method Investments		1,000
	Record equity in investee earnings ($2,500 × 40%).		

Aug. 1, Year 2	Cash	900	
	Equity Method Investments		900
	Record receipt of cash dividend (400 × $2.25).		
Dec. 31, Year 2	Equity Method Investments	1,100	
	Earnings from Equity Method Investments		1,100
	Record equity in investee earnings ($2,750 × 40%).		

Jan. 1, Year 3	Cash	1,300	
	Gain on Sale of Stock Investments		450
	Equity Method Investments*		850
	Record sale of investment.		

*Book value (Lopez stock) at Jan. 1, Year 3.

Original cost	$3,000
Less Year 1 dividends	(800)
Plus share of Year 1 earnings	1,000
Less Year 2 dividends	(900)
Plus share of Year 2 earnings	1,100
Book value at date of sale	$3,400
Book value of shares sold ($3,400 × [100/400])	$ 850

Do More: QS C-16, E C-14, E C-15, E C-16

EQUITY INVESTMENTS: CONTROLLING INFLUENCE, MORE THAN 50%

C2

Describe how to report equity securities with controlling influence.

A long-term investment classified as **equity securities with controlling influence** means that the investor has a controlling

influence over the investee. An investor who owns more than 50% of a company's voting stock has control over the investee. This investor can dominate all other shareholders in electing the corporation's board of directors and has control over the investee's management.

The *consolidation method* is used for long-term investments in equity securities with controlling influence. page C-13
The investor reports *consolidated financial statements* when owning such securities. The controlling investor is called the **parent** and the investee is called the **subsidiary.** Many companies are parents with subsidiaries. **Microsoft** is the parent of Skype, LinkedIn, and other subsidiaries. When a company operates as a parent with subsidiaries, each entity maintains separate accounting records.

Tanuha2001/Shutterstock

Tanuha2001/Shutterstock

Consolidated financial statements show the financial statements of all entities under the parent's control, including all subsidiaries. These statements are prepared as if the business were organized as one entity. The individual assets and liabilities of the parent and its subsidiaries are combined on one balance sheet. Their revenues and expenses also are combined on one income statement, and their cash flows are combined on one statement of cash flows. Preparing consolidated financial statements is covered in advanced courses.

Accounting Summary for Debt and Equity Investments

Exhibit C.8 summarizes accounting for debt and equity investments.

Classification	Investments Account Reported at
Short-Term Investment in Securities	
Debt Investments—Held-to-Maturity	**Cost** (without any discount or premium amortization)
Debt Investments—Trading	**Fair value** (with fair value adjustment to income)
Debt Investments—Available-for-Sale	**Fair value** (with fair value adjustment to equity)
Stock Investments—insignificant influence	**Fair value** (with fair value adjustment to income)
Long-Term Investment in Securities	
Debt Investments—Held-to-Maturity	**Cost** (with any discount or premium amortized)
Debt Investments—Available-for-Sale	**Fair value** (with fair value adjustment to equity)
Stock Investments—insignificant influence	**Fair value** (with fair value adjustment to income)
Equity Method Investments—significant influence	Equity method (no fair value adjustment)
Consolidated Investments—controlling influence	Consolidation method (no fair value adjustment)

EXHIBIT C.8

Investments Summary

Computing and Reporting Comprehensive Income

Comprehensive income is all changes in equity during a period except those from owners' investments and dividends. Specifically, comprehensive income is computed by adding *other comprehensive income* to or subtracting it from net income.

Statement of Comprehensive Income	
Net income	$ #
Other comprehensive income	#
Comprehensive income	$ #

Frequently consists of:
Change in value of available-for-sale investment, net of tax
Change in foreign currency translation adjustment
Change in cash flow hedges, net of tax

Other comprehensive income includes **unrealized** gains and losses on available-for-sale securities, foreign currency translation adjustments, and other adjustments. (*Accumulated other comprehensive income* is the cumulative impact for all periods of *other comprehensive income*.) Comprehensive income is reported in financial statements in one of two ways.

1. On a separate *statement of comprehensive income* that follows the income statement.
2. On the lower section of the income statement (as a single continuous *statement of income and comprehensive income*).

Option 1 is most common. **Google**, for example, reports a statement of comprehensive income following its income statement (see Appendix A).

GOOGLE

Decision Analysis — Components of Return on Total Assets

A1

Compute and analyze the components of return on total assets.

A company's **return on total assets** (or *return on assets*) is used to assess financial performance. The return on total assets can be separated into two components, **profit margin** and **total asset turnover**, for additional analyses. Exhibit C.9 shows how these two components determine return on total assets.

page C-14

$$\text{Return on total assets} = \text{Profit margin} \times \text{Total asset turnover}$$

$$\frac{\text{Net income}}{\text{Average total assets}} = \frac{\text{Net income}}{\text{Net sales}} \times \frac{\text{Net sales}}{\text{Average total assets}}$$

EXHIBIT C.9

Components of Return on Total Assets

Profit margin reflects the percent of net income in each dollar of net sales. Total asset turnover reflects a company's ability to produce net sales from total assets. All companies want a high return on total assets. By considering these two components, we can often discover strengths and weaknesses not revealed by return on total assets alone. This improves our ability to assess future performance and company strategy.

Costco's return on total assets and its components are in Exhibit C.10.

	Costco					Walmart
Year	Return on Total Assets	=	Profit Margin	×	Total Asset Turnover	Return on Total Assets
Current Year	8.4%	=	2.4%	×	3.5	3.4%
1 Year Ago	8.1%	=	2.2%	×	3.7	5.2%
2 Years Ago	7.8%	=	2.1%	×	3.7	7.2%

EXHIBIT C.10

Components of Return on Total Assets for Two Competitors

Costco's return on total assets improved over the three-year period. This increase is driven by an increase in profit margin. Costco increased its return on total assets during a time when other retailers like **Walmart** have not done as well.

Decision Maker

Retailer You are an owner of a retail store. The store's recent annual performance reveals (industry norms in parentheses) return on total assets = 11% (11.2%); profit margin = 4.4% (3.5%); and total asset turnover = 2.5 (3.2). What does your analysis reveal? ■
Answer: The store's 11% return on assets is similar to the 11.2% industry norm. However, the store's 4.4% profit margin is much higher than the 3.5% norm, but the 2.5 asset turnover is much lower than the 3.2 norm. The poor turnover suggests that this store is less efficient in using assets. It must focus on increasing sales or reducing assets.

NEED-TO-KNOW C-6

COMPREHENSIVE

Accounting for Equity Securities with Insignificant Influence and for Equity Securities with Significant Influence

The following transactions relate to Brown Company's long-term investments. Brown did not own any long-term investments prior to these transactions. Show (1) the necessary journal entries and (2)

the relevant portions of each year's balance sheet and income statement that reflect these transactions for both years.

Year 1

Sep. 9 Purchased 1,000 shares of Packard common stock for $80,000 cash. These shares represent 30% of Packard's outstanding shares.

Oct. 2 Purchased 2,000 shares of AT&T common stock for $60,000 cash as a long-term investment. These shares represent less than a 1% ownership in AT&T.

17 Purchased as a long-term investment 1,000 shares of Apple common stock for $40,000 cash. These shares are less than 1% of Apple's outstanding shares.

Nov. 1 Received $5,000 cash dividend from Packard.

30 Received $3,000 cash dividend from AT&T.

Dec. 15 Received $1,400 cash dividend from Apple.

31 Packard's net income for this year is $70,000.

31 Fair values for the investments in equity securities are Packard, $84,000; AT&T, $48,000; and Apple, $45,000.

31 For preparing financial statements, note the following post-closing account balances: Common Stock, $500,000, and Retained Earnings, $350,000.

page C-15

Year 2

Jan. 1 Sold all of the Packard shares for $108,000 cash.

May 30 Received $3,100 cash dividend from AT&T.

June 15 Received $1,600 cash dividend from Apple.

Aug. 17 Sold all of the AT&T stock for $52,000 cash.

19 Purchased 2,000 shares of Coca-Cola common stock for $50,000 cash as a long-term investment. The stock represents less than a 5% ownership in Coca-Cola.

Dec. 15 Received $1,800 cash dividend from Apple.

31 Fair values of the investments in equity securities are Apple, $39,000, and Coca-Cola, $48,000.

31 For preparing financial statements, note the following post-closing account balances: Common Stock, $500,000, and Retained Earnings, $410,000.

SOLUTION

1. Journal entries for Year 1.

Sep.	9	Equity Method Investments	80,000	
		Cash		80,000
		Acquired 1,000 shares, a 30% equity in Packard.		
Oct.	2	Stock Investments	60,000	
		Cash		60,000
		Acquired 2,000 shares of AT&T.		
Oct.	17	Stock Investments	40,000	
		Cash		40,000
		Acquired 1,000 shares of Apple.		
Nov.	1	Cash	5,000	
		Equity Method Investments		5,000
		Received dividend from Packard.		
Nov.	30	Cash	3,000	
		Dividend Revenue		3,000
		Received dividend from AT&T.		
Dec.	15	Cash	1,400	
		Dividend Revenue		1,400
		Received dividend from Apple.		
Dec.	31	Equity Method Investments	21,000	
		Earnings from Equity Method Investments		21,000
		Record 30% share of Packard's earnings of $70,000.		
Dec.	31	Unrealized Loss—Income	7,000	
		Fair Value Adjustment—Stock*		7,000
		Record change in fair value of stock investments.		

*Fair value adjustment computations.

	Cost	Fair Value	Unrealized Gain (Loss)
AT&T	$ 60,000	$48,000	$(12,000)
Apple	40,000	45,000	5,000
Total	$100,000	$93,000	$ (7,000)

Required balance of the Fair Value Adjustment—Stock account (credit)	$(7,000)
Existing balance	0
Necessary adjustment (credit)	$(7,000)

Stock Investments

1/1/Year 1	0
10/2/Year 1	60,000
10/17/Year 1	40,000
12/31/Year 1	100,000

Fair Value Adjustment–Stock

1/1/Year 1	0		
		Adjustment	7,000
		12/31/Year 1	7,000

2. The December 31, Year 1, selected balance sheet items follow.

Assets—Long-term investments	
Stock investments (at fair value; cost is $100,000) . . .	$ 93,000
Equity method investments	96,000
Total long-term investments	$189,000

The relevant income statement items for the year ended December 31, Year 1, follow.

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Dividend revenue	$ 4,400
Unrealized loss—Income	(7,000)
Earnings from equity method investments	21,000

1. Journal entries for Year 2.

Packard cost at Jan. 1 is:
$80,000 − $5,000 + $21,000 = $96,000.

Stock Investments			
12/31/Year 1	100,000		
		8/17/Year 2	60,000
8/19/Year 2	50,000		
12/31/Year 2	90,000		

Fair Value Adjustment–Stock			
		12/31/Year 1	7,000
Adjustment	4,000		
		12/31/Year 2	3,000

Jan. 1	Cash	108,000	
	Equity Method Investments		96,000
	Gain on Sale of Stock Investments		12,000
	Sold 1,000 shares of Packard for cash.		
May 30	Cash	3,100	
	Dividend Revenue		3,100
	Received dividend from AT&T.		
June 15	Cash	1,600	
	Dividend Revenue		1,600
	Received dividend from Apple.		
Aug. 17	Cash	52,000	
	Loss on Sale of Stock Investments	8,000	
	Stock Investments		60,000
	Sold 2,000 shares of AT&T for cash.		
Aug. 19	Stock Investments	50,000	
	Cash		50,000
	Acquired 2,000 shares of Coca-Cola.		
Dec. 15	Cash	1,800	
	Dividend Revenue		1,800
	Received dividend from Apple.		
Dec. 31	Fair Value Adjustment—Stock*	4,000	
	Unrealized Gain—Income		4,000
	Record change in fair value of stock investments.		

	Cost	Fair Value	Unrealized Gain (Loss)
Apple	$40,000	$39,000	$(1,000)
Coca-Cola	50,000	48,000	(2,000)
Total	$90,000	$87,000	$(3,000)

Required balance of the Fair Value Adjustment—Stock account (credit)	$(3,000)
Existing balance (credit)	(7,000)
Necessary adjustment (debit)	$ 4,000

*Fair value adjustment computations.

2. The December 31, Year 2, balance sheet items follow.

Assets—Long-term investments	
Stock investments (at fair value; cost is $90,000)	$87,000

The relevant income statement items for the year ended December 31, Year 2, follow.

Dividend revenue	$ 6,500
Unrealized gain—Income	4,000
Gain on sale of stock investments	12,000
Loss on sale of stock investments	(8,000)

Summary: Cheat Sheet

BASICS OF INVESTMENTS

Short-term investments: Investments that (1) management intends to convert to cash within one year and (2) are readily convertible to cash. Short-term investments are current assets.

Long-term investments: Investments that are not going to be converted into cash in the short term. Long-term investments are noncurrent assets.

Debt securities: Reflect a creditor relation and include notes and bonds.

Equity securities: Reflect an owner relation and include stock.

DEBT INVESTMENTS

Acquiring debt investments:

Debt Investments	30,000	
Cash		30,000

Interest earned and received:

Cash	1,050	
Interest Revenue		1,050

Unrealized gain (or loss): A gain (or loss) not yet confirmed by actual sales of securities.

TRADING SECURITIES:

Debt investments that are actively bought and sold for profit. Trading securities are *always* current assets.

Fair value adjustment—Trading securities: Reflects gain (shown here) or loss.

Fair Value Adjustment—Trading	1,500	
Unrealized Gain—Income		1,500

Reporting fair value—Trading securities: An unrealized gain (or loss) from a change in the fair value of the portfolio of trading securities is reported on the income statement under Other Revenues and Gains (or Expenses and Losses). Fair Value Adjustment—Trading is an asset account that adjusts the trading securities portfolio to fair value.

Current Assets		
Debt investments—Trading (at cost)	$11,500	
Fair value adjustment—Trading	1,500	
Debt investments—Trading (at fair value)		$13,000

Selling trading securities: When sale price > cost, record a gain (shown here). When sale price < cost, record a loss. A gain (or loss) is

reported in Other Revenues and Gains (or Expenses and Losses) section on the income statement.

Cash	120	
Debt Investments—Trading		100
Gain on Sale of Debt Investments		20

HELD-TO-MATURITY (HTM) SECURITIES:

Debt investments that are held until maturity. They are current assets if their maturity is *within* one year and are long-term investments if their maturity is *over* one year. They are *not* reported at fair value.

Receipt of principal and interest—HTM:

Cash	102	
Debt Investments—HTM		100
Interest Revenue		2

AVAILABLE-FOR-SALE (AFS) SECURITIES:

Debt investments not classified as trading or held-to-maturity. They are current assets if they are to be sold *within* one year and long-term investments if they are to be sold *beyond* one year.

Fair value adjustment—AFS securities: Reflects gain (shown here) or loss.

Fair Value Adjustment—Available-for-Sale	1,550	
Unrealized Gain—Equity		1,550

Reporting fair value—AFS securities: An unrealized gain (or loss) from a change in the fair value of the portfolio of AFS securities is reported in the equity section of the balance sheet (as part of comprehensive income). Fair Value Adjustment—AFS is an asset account that adjusts the AFS securities portfolio to fair value.

Assets		
Debt investments—Available-for-sale (at cost)	$73,000	
Fair value adjustment—Available-for-sale	1,550	
Debt investments—Available-for-sale (at fair value)		$74,550

Selling AFS securities: Identical to selling trading securities.

EQUITY INVESTMENTS

Stock investments (insignificant influence): When a company owns less than 20% of voting stock of another company, it has insignificant influence. Can be classified as short or long term.

Acquiring stock investments (insignificant influence):

Stock Investments	7,000	
Cash		7,000

Dividends received from stock investment (insignificant influence):

Cash	10	
Dividend Revenue		10

Fair value adjustment—Stock (insignificant influence): Reflects gain (shown here) or loss.

Fair Value Adjustment—Stock	2,000	
Unrealized Gain—Income		2,000

Reporting fair value adjustment from stock (insignificant influence): An unrealized gain (or loss) from a change in the fair value of the portfolio of stock investments is reported on the income statement under Other Revenues and Gains (or Expenses and Losses). Fair Value Adjustment—Stock is an asset account that adjusts the stock investments portfolio to fair value.

Assets		
Stock investments (at cost)	$7,000	
Fair value adjustment—Stock	2,000	
Stock investments (at fair value)		$9,000

Selling stock investments: When sale price > cost, record a gain (shown here). When sale price < cost, record a loss. A gain (or loss) is

reported in Other Revenues and Gains (or Expenses and Losses) section on the income statement.

Cash	800	
Stock Investments		500
Gain on Sale of Stock Investments		300

EQUITY METHOD INVESTMENTS: When a company owns between 20% and 50% of voting stock of another company, it has significant influence. Classified as long term.

Acquiring equity method investments:

page C-18

Equity Method Investments	70,000	
Cash		70,000

Recording share of earnings (equity method): Calculated as percentage of ownership times net income of investee.

Equity Method Investments	6,000	
Earnings from Equity Method Investments		6,000

Recording share of dividends (equity method): Calculated as percentage of ownership times total dividends paid by investee.

Cash	3,000	
Equity Method Investments		3,000

Reporting equity method investments: Equity method investments are not adjusted to fair value. Instead, the account is increased by investee net income and decreased by investee dividends.

Equity Method Investments			
1/1/2021 Investment acquisition	70,000		
12/31/2021 Share of earnings	6,000		
12/31/2021 Balance	76,000		
		1/9/2022 Share of dividend	3,000
1/9/2022 Balance	73,000		

Selling equity method investments: When sale price > book value, record a gain (shown here). When sale price < book value, record a loss.

Cash	80,000	
Equity Method Investments		73,000
Gain on Sale of Stock Investments		7,000

EQUITY SECURITIES WITH CONTROLLING INFLUENCE: When an investor owns more than 50% of a company's voting stock, it has control over the investee and the consolidation method is used. The controlling investor is called the **parent,** and the investee is called the **subsidiary**.

REPORTING AND ANALYSIS

Classification	Investments Account Reported at
Short-Term Investment in Securities	
Debt Investments—Held-to-Maturity	Cost (without any discount or premium amortization)
Debt Investments—Trading	Fair value (with fair value adjustment to income)
Debt Investments—Available-for-Sale	Fair value (with fair value adjustment to equity)
Stock Investments—insignificant influence	Fair value (with fair value adjustment to income)
Long-Term Investment in Securities	
Debt Investments—Held-to-Maturity	Cost (with any discount or premium amortized)
Debt Investments—Available-for-Sale	Fair value (with fair value adjustment to equity)
Stock Investments—insignificant influence	Fair value (with fair value adjustment to income)
Equity Method Investments—significant influence	Equity method (no fair value adjustment)
Consolidated Investments—controlling influence	Consolidation method (no fair value adjustment)

Key Terms

Available-for-sale (AFS) securities (C-6)

Comprehensive income (C-13)

Consolidated financial statements (C-13)

Equity method (C-10)

Equity securities with controlling influence (C-12)

Equity securities with significant influence (C-10)

Fair Value Adjustment (C-3)

Held-to-maturity (HTM) securities (C-5)

Long-term investments (C-2)

Other comprehensive income (C-13)

Parent (C-13)

Profit margin (C-14)

Return on total assets (C-14)

Short-term investments (C-2)

Subsidiary (C-13)

Total asset turnover (C-14)

Trading securities (C-3)

Unrealized gain (loss) (C-4, C-9)

Multiple Choice Quiz

1. A company purchased $30,000 of 5% bonds for investment purposes on May 1. The bonds pay interest on February 1 and August 1. The amount of interest revenue accrued at December 31 (the company's year-end) is

   a. $1,500.

   b. $1,375.

   c. $1,000.

   e. $300.

   d. $625.

2. This period, Amadeus Co. purchased its only available-forsale investment in the notes of Bach Co. for $83,000. The period-end fair value of these notes is $84,500. Amadeus records a

   a. Credit to Unrealized Gain—Equity for $1,500.

   b. Debit to Unrealized Loss—Equity for $1,500.

   c. Debit to Investment Revenue for $1,500.

d. Credit to Fair Value Adjustment—Available-for-Sale for $3,500.

e. Credit to Cash for $1,500.

3. Mozart Co. owns 35% of Melody Inc. Melody pays $50,000 in cash dividends to its shareholders for the period. Mozart's entry to record the Melody dividend includes a

a. Credit to Investment Revenue for $50,000.

b. Credit to Equity Method Investments for $17,500.

c. Credit to Cash for $17,500.

d. Debit to Equity Method Investments for $17,500.

e. Debit to Cash for $50,000.

page C-19

4. A company has net income of $300,000, net sales of $2,500,000, and total assets of $2,000,000. Its return on total assets equals

a. 6.7%.

b. 12.0%.

c. 8.3%.

d. 80.0%.

e. 15.0%.

5. A company had net income of $80,000, net sales of $600,000, and total assets of $400,000. Its profit margin and total asset turnover are

	Profit Margin	Total Asset Turnover
a.	1.5%	13.3
b.	13.3%	1.5
c.	13.3%	0.7
d.	7.0%	13.3
e.	10.0%	26.7

ANSWERS TO MULTIPLE CHOICE QUIZ

1. d; $30,000 × 5% × 5/12 = $625

2. a; Unrealized gain = $84,500 − $83,000 = $1,500

3. b; $50,000 × 35% = $17,500

4. e; $300,000/$2,000,000 = 15%

5. b; Profit margin = $80,000/$600,000 = 13.3% Total asset turnover = $600,000/$400,000 = 1.5

Select Quick Study and Exercise assignments feature Guided Example videos, called "Hints" in Connect. Hints use different numbers, and instructors can turn this feature on or off. 

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QUICK STUDY

QS C-1

Distinguishing between short- and long-term investments

C1

Which of the following statements are true of long-term investments?

a. They can be considered cash equivalents.

b. They can include assets not used in operations, such as investments in land.

c. They generally include investments that will mature in 3 to 12 months.

d. They are reported with noncurrent assets on the balance sheet.

e. They are always easily sold and therefore qualify as being marketable.

f. They can include bonds and stocks not intended to be sold in the near future.

QS C-2

Distinguishing between debt and equity securities

C1

Identify investments as an investment in either debt securities or equity securities.

a. U.S. Treasury bonds

b. Google stock

c. Certificate of deposit

d. Apple bonds

e. IBM corporate notes

f. German government bonds

g. Amazon stock

h. Costco corporate notes

i. Chicago municipal bonds

j. Apple stock

k. David Bowie bonds

l. Facebook stock

QS C-3

Accounting for debt investments classified as trading **P1**

Prepare Hertog Company's journal entries to record the following transactions for the current year. page C-20

May 7 Purchases Kraft bonds as a short-term investment in trading securities at a cost of $10,300.

June 6 Sells its entire investment in Kraft bonds for $11,050 cash.

QS C-4

Fair value adjustment to a portfolio of trading securities

P1

Kitty Company began operations in the current year and acquired short-term debt investments in trading securities. The year-end cost and fair values for its portfolio of these debt investments follow. Prepare the journal entry to record the December 31 year-end fair value adjustment for these debt securities.

Trading Securities	Cost	Fair Value
Tesla bonds	$12,000	$ 9,000
Nike bonds	20,000	21,000
Ford bonds	5,000	4,000

QS C-5

Reporting trading securities on financial statements **P1**

Refer to the information in QS C-4. (1) After the fair value adjustment is made, prepare the assets section of Kitty Company's December 31 classified balance sheet. (2) In which income statement section is the unrealized gain (or loss) on the portfolio of trading securities reported?

QS C-6

Accounting for debt investments classified as held-to-maturity

P2

Prepare Garzon Company's journal entries to record the following transactions for the current year.

Jan. 1 Purchases 6% bonds (as a held-to-maturity investment) issued by PBS at a cost of $40,000, which is the par value.

June 30 Receives first semiannual payment of interest from PBS bonds.

Dec. 31 Receives a check from PBS in payment of principal ($40,000) and the second semiannual payment of interest.

QS C-7

Accounting for available-for-sale debt securities

P3

Journ Co. purchased short-term investments in available-for-sale debt securities at a cost of $50,000 cash on November 25. At December 31, these securities had a fair value of $47,000. This is the first and only time the company has purchased such securities.

1. Prepare the November 25 entry to record the purchase of debt securities.
2. Prepare the December 31 year-end adjusting entry for the securities' portfolio.
3. Prepare the April 6 entry when Journ sells 10% of these securities ($5,000 cost) for $6,000 cash.

QS C-8

Recording fair value adjustment for available-for-sale debt securities

P3

During the current year, Reed Consulting acquired long-term available-for-sale debt securities on July 1 at a $70,000 cost. At its December 31 year-end, these securities had a fair value of $58,000. This is the first and only time the company purchased such securities.

1. Prepare the July 1 entry to record the purchase of these debt securities.
2. Prepare the year-end adjusting entry related to these securities.

QS C-9

Adjusting available-for-sale debt securities to fair value

P3

On December 31, Reggit Company held the following short-term investments in its portfolio of available-for-sale debt securities. Reggit had no short-term investments in its prior accounting periods. Prepare the December 31 adjusting entry to report these investments at fair value.

Available-for-Sale Securities	Cost	Fair Value
Verrizano Corporation bonds	$89,600	$91,600
Preble Corporation notes	70,600	62,900
Lucerne Company bonds	86,500	83,100

Check Unrealized loss, $9,100

QS C-10

Reporting available-for-sale securities on financial statements **P3**

Refer to the information in QS C-9. (1) After the fair value adjustment is made, prepare the assets section of Reggit Company's December 31 classified balance sheet. (2) Is the unrealized gain (or loss) on the portfolio of available-for-sale securities reported on the income statement?

QS C-11

Accounting for stock investments **P4**

Prepare Riley Company's journal entries to record the following transactions for the current year.

Apr. 18 Purchases 300 common shares of XLT Co. as a short-term investment at a cost of $42 per share. With this stock investment, Riley has an insignificant influence over XLT.

May 30 Receives $1 per share from XLT in dividends.

QS C-12

Adjusting stock investments to fair value

P4

Prepare Tiker Company's journal entries to record the following transactions and the adjusting entry to record the fair value of the stock investments portfolio. This is the first and only time the company purchased such securities.

May 9 Purchases 200 shares of Higo stock as a short-term investment at a cost of $30 per share. Tiker has insignificant influence over Higo.

June 2 Sells 20 shares of its investment in Higo stock ($600 cost) at $33 per share.

Dec. 31 The closing market price (fair value) of the Higo stock is $23 per share.

QS C-13

Reporting stock investments with insignificant influence **P4**

On May 20, Montero Co. paid $150,000 to acquire 30 shares (4%) of ORD Corp. as a long-term investment. On August 5, Montero sold one-tenth of the ORD shares for $18,000.

1. Prepare entries to record both (*a*) the acquisition and (*b*) the sale of these shares.
2. Should this stock investment be reported at fair value or at cost on the balance sheet?

QS C-14

Financial statement presentation of investments

C1 P1 P2 P3 P4

Indicate where each of the following items is reported on page C-21 financial statements. Choose from the following categories: (*a*) current assets, (*b*) long-term investments, (*c*) current liabilities, (*d*) long-term liabilities, (*e*) other revenues and gains, (*f*) other expenses and losses, and (*g*) equity.

1. Trading securities
2. Unrealized gain on available-for-sale securities
3. Held-to-maturity securities (due in 15 years)
4. Unrealized gain on trading securities

5. Fair value adjustment—Trading

QS C-15

Reporting equity method investments **P5**

On January 1, Aivah Co. purchased 2,000 common shares (25%) of Maywood Corp. as a long-term investment for $200,000. Later in the year, Maywood paid $16,000 in total cash dividends on December 15 and reported net income of $60,000 for the year ended December 31. Determine the amount reported as an equity method investment on Aivah's December 31 balance sheet.

QS C-16

Recording equity method transactions **P5**

Rowan Co. purchases 100 common shares (40%) of JBI Corp. as a long-term investment for $500,000 cash on January 1. JBI paid $5,000 in total cash dividends on November 1 and reported net income of $100,000 for the year. Prepare Rowan's entries to record (1) the purchase of JBI shares, (2) the receipt of its share of JBI dividends, and (3) the December 31 year-end adjustment for its share of JBI net income.

QS C-17

Financial statement impact of equity method investments **P5**

Analyze Rowan's entries (1 through 3) from QS C-16 by showing each entry's effect on the accounting equation—specifically, identify the accounts and amounts (including + or −) for each.

QS C-18

Equity securities with controlling influence **C2**

Accenture purchases 55% of the voting common stock of JBL. After the purchase, Accenture has a controlling influence over JBL. (1) Which method does Accenture use to account for its investment in

JBL? (2) What type of financial statements does Accenture prepare after the acquisition?

QS C-19

Return on total assets

A1

	A	B	C	D
1		Current Year	1 Year Ago	2 Years Ago
2	Total assets, December 31	$770,000	$340,000	$210,000
3	Net income	55,500	38,400	30,200

Fivio Co. reports the following information. (1) Compute return on total assets for the current year and for 1 year ago. (2) Is Fivio more efficient or less efficient in using total assets to produce income in the current year versus 1 year ago?

EXERCISES

Exercise C-1

Debt and equity securities and short- and long-term investments

C1

Complete the following descriptions by filling in the blanks using the terms or phrases *a* through *g.*

a. not intended **b.** not readily **c.** cash **d.** operating cycle **e.** one year **f.** owner **g.** creditor

1. Debt securities reflect a(n) _____ relation such as with investments in notes and bonds.
2. Equity securities reflect a(n) _____ relation such as with investments in shares of stock.
3. Short-term investments are securities that (1) management intends to convert to cash within _____ or the _____, whichever is longer, and (2) are readily convertible to _____.

4. Long-term investments in securities are defined as those securities that are _____ _____ convertible to cash or are _____ to be converted into cash in the short term.

Exercise C-2

Accounting for debt investments classified as trading **P1**

Check (3) Gain, $1,000

Brooks Co. purchases debt investments as trading securities at a cost of $66,000 on December 27. This is its first and only purchase of such securities. At December 31, these securities had a fair value of $72,000.

1. Prepare the December 27 entry for the purchase of debt investments.
2. Prepare the December 31 year-end fair value adjusting entry for the trading securities' portfolio.
3. Prepare the January 3 entry when Brooks sells a portion of its trading securities (costing $3,000) for $4,000 cash.

Exercise C-3

Financial statement impact of trading securities **P1**

Analyze transactions (1 through 3) from Exercise C-2 by showing each transaction's effect on the accounting equation—specifically, identify the accounts and amounts (including + or −) for each.

Exercise C-4

Accounting for held-to-maturity debt securities

P2

Prepare Natura Co.'s journal entries to record the following transactions involving its short-term investments in held-to-maturity debt securities, all of which occurred during the current year.

a. On June 15, paid $1,000 cash to purchase Remed's 90-day short-term debt securities ($1,000 principal), dated June 15, that pay 10% interest.

b. On September 16, received a check from Remed in payment of the principal and 90 days' interest on the debt securities purchased in part *a*.

Exercise C-5

Accounting for available-for-sale debt securities

P3

Prepare Krum Co.'s journal entries to record the following transactions involving its short-term investments in available-for-sale debt securities, all of which occurred during the current year.

a. On August 1, paid $50,000 cash to purchase Houtte's 9%, six-month debt securities ($50,000 principal), dated August 1.

b. On October 30, received a check from Houtte for 90 days' interest on the debt securities in part *a*.

Exercise C-6

Fair value adjustment to available-for-sale debt securities

P3

On December 31, Lujack Co. held the following short-term available-for-sale securities. Lujack had no short-term investments prior to the current period. Prepare the December 31 year-end adjusting entry to record the fair value adjustment for these debt securities.

Available-for-Sale Securities	Cost	Fair Value
Nintendo Co. notes	$44,450	$48,900
Atlantic bonds	49,000	47,000
Kellogg Co. notes	25,000	23,200
McDonald's Corp. bonds	46,300	44,800

Exercise C-7

Multiyear fair value adjustments to available-for-sale debt securities

P3

Ticker Services began operations in Year 1 and holds long-term investments in available-for-sale debt securities. The year-end costs and fair values for its portfolio of these investments follow. Prepare journal entries to record each year-end fair value adjustment for these securities.

Portfolio of Available-for-Sale Securities	Cost	Fair Value
December 31, Year 1	$13,000	$15,000
December 31, Year 2	20,000	25,000
December 31, Year 3	23,000	29,000
December 31, Year 4	16,500	19,000

Exercise C-8

Accounting for stock investments with insignificant influence

P4

Prepare journal entries to record the following transactions involving the short-term stock investments of Duke Co., all of which occurred during the current year.

a. On March 22, purchased 1,000 shares of RPI Company stock at $10 per share. Duke's stock investment results in it having an insignificant influence over RPI.

b. On July 1, received a $1 per share cash dividend on the RPI stock purchased in part *a*.

c. On October 8, sold 50 shares of RPI stock for $15 per share.

Check (c) Dr. Cash $750

Exercise C-9

Financial statement impact of stock investments **P4**

Analyze transactions (*a* through *c*) from Exercise C-8 by showing each transaction's effect on the accounting equation—specifically, identify the accounts and amounts (including + or −) for each transaction.

Exercise C-10

Fair value adjustment to stock investments with insignificant influence **P4**

On December 31, Mars Co. had the following portfolio of stock investments with insignificant influence. Mars had no stock investments in prior periods. Prepare the December 31 adjusting entry to report these investments at fair value.

Stock Investments	Cost	Fair Value
Apple stock	$ 6,000	$ 8,000
Chipotle stock	4,000	1,500
Under Armour stock	12,000	14,000

Exercise C-11

Reporting stock investments on financial statements **P4**

Refer to the information in Exercise C-10. (1) After the fair page C-23 value adjustment is made, prepare the assets section of Mars Co.'s December 31 classified balance sheet. Assume Mars plans to sell its stock investments within the next six months. (2) In which income statement section is the unrealized gain (or loss) on the portfolio of stock investments reported?

Exercise C-12

Transactions and fair value adjustments for stock investments with insignificant influence

P4

Carlsville Company began operations in the current year and had no prior stock investments. The following transactions are from its short-term stock investments with insignificant influence. Prepare journal

entries to record these transactions. On December 31, prepare the adjusting entry to record the fair value adjustment for the portfolio of stock investments.

July 22 Purchased 1,600 shares of Hunt Corp. at $30 per share.

Sep. 5 Received a $2 cash dividend for each share of Hunt Corp.

Sep. 27 Purchased 3,400 shares of HCA at $34 per share.

Oct. 3 Sold 1,600 shares of Hunt at $25 per share.

Oct. 30 Purchased 1,200 shares of Black & Decker at $50 per share.

Dec. 17 Received a $3 cash dividend for each share of Black & Decker.

Dec. 31 Fair value of the short-term stock investments is $180,000.

Check Dec. 31: Dr. Fair Value Adjustment-Stock, $4,400

Exercise C-13

Transactions in held-to-maturity, trading, and stock investments

P1 P2 P4

Prepare journal entries to record the following transactions involving both the short-term and long-term investments of Cancun Corp., all of which occurred during the current year.

a. On February 15, paid $160,000 cash to purchase GMI's 90-day short-term notes at par, which are dated February 15 and pay 10% interest (classified as held-to-maturity).

b. On March 22, bought 700 shares of Fran Inc. common stock at $51 cash per share. Cancun's stock investment results in it having an insignificant influence over Fran.

c. On May 15, received a check from GMI in payment of the principal *and* 90 days' interest on the notes purchased in part *a*.

d. On July 30, paid $100,000 cash to purchase MP Inc.'s 8%, six-month notes at par, dated July 30 (classified as trading securities).

e. On September 1, received a $1 per share cash dividend on the Fran Inc. common stock purchased in part *b*.

f. On October 8, sold 30 shares of Fran Inc. common stock for $54 cash per share.

g. On October 30, received a check from MP Inc. for three months' interest on the notes purchased in part *d*.

Exercise C-14

Accounting for equity method investments

P5

Prepare journal entries to record the following transactions and events of Kodax Company.

Year 1

Jan. 2 Purchased 30,000 shares of Grecco Co. common stock for $411,000 cash. Grecco has 90,000 shares of common stock outstanding, and its activities will be significantly influenced by Kodax.

Sep. 1 Grecco declared and paid a cash dividend of $1.50 per share.

Dec. 31 Grecco announced that net income for the year is $486,900.

Year 2

June 1 Grecco declared and paid a cash dividend of $2.10 per share.

Dec. 31 Grecco announced that net income for the year is $702,750.

Dec. 31 Kodax sold 3,000 shares of Grecco for $71,000 cash.

Exercise C-15

Classifying investments in securities; recording fair values

C1 P2 P3 P4 P5

The following information shows Carperk Company's individual investments in securities during its current year, along with the December 31 fair values.

a. Investment in Brava Company bonds: $420,500 cost; $457,000 fair value. Carperk intends to hold these bonds until they mature in 5 years.

b. Investment in Baybridge common stock: 29,500 shares; $362,450 cost; $391,375 fair value. Carperk owns 32% of Baybridge's voting stock and has a significant influence over Baybridge.

c. Investment in Duffa bonds: $165,500 cost; $178,000 fair value. This investment is not readily marketable and is not classified as held-to-maturity or trading.

d. Investment in Newton notes: $90,300 cost; $88,625 fair value. Newton notes are not readily marketable and are not classified as held-to-maturity or trading.

e. Investment in Farmers common stock: 16,300 shares; $100,860 cost; $111,210 fair value. This stock is marketable, and Carperk intends to sell it within the year. This stock investment results in Carperk having an insignificant influence over Farmers.

page C-24

Required

1. Identify whether each investment *a* through *e* should be classified as a short-term or long-term investment. For each investment, indicate in which of the six investment classifications listed in Exhibit C.2 it should be placed.

2. Prepare a journal entry dated December 31 to record the fair value adjustment for the portfolio of available-for-sale debt securities. Carperk had no available-for-sale debt securities prior to this year.

Check (2) Unrealized gain, $10,825

Exercise C-16

Preparing assets section of balance sheet

C1 P1 P2 P3 P4 P5

Selected accounts from GermX Co.'s adjusted trial balance for the year ended December 31 follow. Prepare the assets section of a classified balance sheet. *Hint:* Fair Value Adjustment—Trading *increases* trading securities; Fair Value Adjustment—Stock *decreases* stock investments.

Trading securities (at cost)	$ 5,000	Cash	$10,000
Short-term stock investments (at cost)	23,000	Fair value adjustment—Stock	(1,000)
Equity method investments	70,000	Accounts receivable	2,000
Held-to-maturity securities (long-term)	13,000	Fair value adjustment—Trading	500

Exercise C-17

Equity securities with controlling influence

C2

Wixi Co. has the following equity investments in FSN, DELL, and ATI. (1) Which of these companies are subsidiaries of Wixi? (2) How are individual assets and liabilities of a parent and its subsidiary(ies) reported on a balance sheet?

FSN stock: Wixi owns 70% of the voting common stock and has controlling influence.

DELL stock: Wixi owns 5% of the voting common stock and has insignificant influence.

ATI stock: Wixi owns 30% of the voting common stock and has significant influence.

Exercise C-18

Preparing a statement of comprehensive income

C2

Total comprehensive income (final total)	$ 9,400	Other comprehensive income (subtotal)	$ (600)
Net income	10,000	Change in foreign currency translation	1,400
Change in value of available-for-sale securities	(2,000)		

Use the following information of Prescrip Co. to prepare a calendar year-end statement of comprehensive income.

Exercise C-19

Return on total assets

A1

Following are financial data for **Nike** and **Under Armour**. (1) Compute return on total assets for the current year for (*a*) Nike and (*b*) Under Armour. (2) Compute both profit margin and total asset turnover for the current year for (a) Nike and (b) Under Armour. (3) Which company more efficiently used its assets in the current year?

	Nike		Under Armour	
$ millions	Current Year	1 Year Prior	Current Year	1 Year Prior
Net income	$ 3,760	$ 3,273	$ 257	$ 233
Net sales	32,376	30,601	4,825	3,963
Total assets	21,396	21,597	3,644	2,866

connect

PROBLEM SET A

Problem C-1A

Recording and adjusting trading debt securities

P1

Kirkland Company had no trading debt securities prior to this year. It had the following transactions this year involving trading debt securities.

Aug. 2 Purchased Verizon bonds for $10,000.

Sep. 7 Purchased Apple bonds for $35,000.

12 Purchased Mastercard bonds for $20,000.

Oct. 21 Sold some of its Verizon bonds that had cost $2,000 for $2,100 cash.

23 Sold some of its Apple bonds that had cost $15,000 for $15,400 cash.

Nov. 1 Purchased Walmart bonds for $40,000.

Dec. 10 Sold all of its Mastercard bonds for $18,000 cash.

Required

page C-25

1. Prepare journal entries to record these transactions.
2. Prepare a table to compare the year-end cost and fair values of its trading debt securities. Year-end fair values: Verizon, $8,500; Apple, $22,000; and Walmart, $39,000.
3. Prepare the adjusting entry to record the year-end fair value adjustment for the portfolio of trading debt securities.

Problem C-2A

Recording, adjusting, and reporting available-for-sale debt securities

P3

Mead Inc. began operations in Year 1. Following is a series of transactions and events involving its long-term debt investments in available-for-sale securities.

Year 1

Jan. 20 Purchased Johnson & Johnson bonds for $20,500.

Feb. 9 Purchased Sony notes for $55,440.

June 12 Purchased Mattel bonds for $40,500.

Dec. 31 Fair values for debt in the portfolio are Johnson & Johnson, $21,500; Sony, $52,500; and Mattel, $46,350.

Year 2

Apr. 15 Sold all of the Johnson & Johnson bonds for $23,500.

July 5 Sold all of the Mattel bonds for $35,850.

July 22 Purchased Sara Lee notes for $13,500.

Aug. 19 Purchased Kodak bonds for $15,300.

Dec. 31 Fair values for debt in the portfolio are Kodak, $17,325; Sara Lee, $12,000; and Sony, $60,000.

Year 3

Feb. 27 Purchased Microsoft bonds for $160,800.

June 21 Sold all of the Sony notes for $57,600.

June 30 Purchased Black & Decker bonds for $50,400.

Aug. 3 Sold all of the Sara Lee notes for $9,750.

Nov. 1 Sold all of the Kodak bonds for $20,475.

Dec. 31 Fair values for debt in the portfolio are Black & Decker, $54,600, and Microsoft, $158,600.

Required

1. Prepare journal entries to record these transactions and page C-26 the year-end fair value adjustments to the portfolio of long-term available-for-sale debt securities.
2. Prepare a table that summarizes the (*a*) total cost, (*b*) total fair value adjustment, and (*c*) total fair value of the portfolio of long-term available-for-sale debt securities at each year-end.
3. Prepare a table that summarizes (*a*) the realized gains and losses and (*b*) the unrealized gains or losses for the portfolio of long-term available-for-sale debt securities at each year-end.

Check *(2b)* Fair Value Adj. bal.: 12/31/Year 1, $3,910 Dr.; 12/31/Year 2, $5,085 Dr. *(3b)* Unrealized Gain at 12/31/Year 3, $2,000

Problem C-3A

Debt investments in available-for-sale securities; unrealized and realized gains and losses

P3

Stoll Co.'s long-term available-for-sale portfolio at the *start* of this year consists of the following.

Available-for-Sale Securities	Cost	Fair Value
Company A bonds	$535,300	$490,000
Company B notes	159,380	154,000
Company C bonds	662,750	713,630

Stoll enters into the following transactions involving its available-for-sale debt securities this year.

Jan. 29	Sold one-half of the Company B notes for $79,200.
July 6	Purchased Company X bonds for $126,600.
Nov. 13	Purchased Company Z notes for $267,900.
Dec. 9	Sold all of the Company A bonds for $515,000.

Fair values at December 31 are B, $81,000; C, $665,000; X, $118,000; and Z, $278,000.

Required

1. Prepare journal entries to record these transactions, including the December 31 adjusting entry to record the fair value adjustment for the long-term investments in available-for-sale securities.
2. Determine the amount Stoll reports on its December 31 balance sheet for its long-term investments in available-for-sale securities.
3. What amount of gains or losses on transactions relating to long-term investments in available-for-sale debt securities does Stoll report on its income statement for this year?

Problem C-4A

Recording, adjusting, and reporting stock investments with insignificant influence

P4

Rose Company had no short-term investments prior to this year. It had the following transactions this year involving short-term stock investments with insignificant influence.

Apr. 16 Purchased 3,500 shares of Gem Co. stock at $24 per share.

July 7 Purchased 2,000 shares of PepsiCo stock at $49 per share.

20 Purchased 1,000 shares of Xerox stock at $16 per share.

Aug. 15 Received a $1.00 per share cash dividend on the Gem Co. stock.

28 Sold 2,000 shares of Gem Co. stock at $30 per share.

Oct. 1 Received a $2.50 per share cash dividend on the PepsiCo shares.

Dec. 15 Received a $1.00 per share cash dividend on the remaining Gem Co. shares.

31 Received a $1.50 per share cash dividend on the PepsiCo shares.

Required

1. Prepare journal entries to record the preceding transactions and events.

2. Prepare a table to compare the year-end cost and fair values of Rose's short-term stock investments. The year-end fair values per share are Gem Co., $26; PepsiCo, $46; and Xerox, $13.

Check (2) Cost = $150,000

(3) Dr. Unrealized Loss—Income, $6,000

3. Prepare an adjusting entry to record the year-end fair value adjustment for the portfolio of short-term stock investments.

Analysis Component

4. Prepare the current asset section of the balance sheet for the fair value adjustment for Rose's shortterm investments.

5. Identify the dollar increase or decrease from Rose's short-term stock investments on (*a*) its income statement for this year and (*b*) the equity section of its balance sheet at this year-end.

Problem C-5A

Accounting for long-term investments in stock with significant influence

P5

Selk Steel Co., which began operations in Year 1, had the following transactions and events in its long-term investments.

Year 1

Jan. 5 Selk purchased 60,000 shares (20% of total) of Kildaire's common stock for $1,560,000.

Oct. 23 Kildaire declared and paid a cash dividend of $3.20 per share.

Dec. 31 Kildaire's net income for the year is $1,164,000, and the fair value of its stock at December 31 is $30.00 per share.

Year 2

Oct. 15 Kildaire declared and paid a cash dividend of $2.60 per share.

Dec. 31 Kildaire's net income for the year is $1,476,000, and the fair value of its stock at December 31 is $32.00 per share.

Year 3

Jan. 2 Selk sold 3% (equal to 1,800 shares) of its investment in Kildaire for $54,200 cash.

Required

Prepare journal entries to record these transactions and events for Selk. Assume that Selk has a significant influence over Kildaire with its 20% share of stock.

Problem C-6A

Accounting for long-term investments in stock without significant influence

P4

Refer to the transactions in Problem C-5A. Assume that although Selk owns 20% of Kildaire's outstanding stock, circumstances indicate that it does *not* have a significant influence over the investee.

Required

Prepare journal entries to record the preceding transactions and events for Selk.

PROBLEM SET B

Problem C-1B

Recording and adjusting trading debt securities

P1

Ancore Company had no trading debt securities prior to this page C-27 year. It had the following transactions this year involving trading debt securities.

July 28 Purchased Target bonds for $30,000.

Aug. 17 Purchased Kroger bonds for $105,000.

26 Purchased Ford bonds for $60,000.

Sep. 5 Sold some of its Target bonds that had cost $6,000 for $6,300 cash.

8 Sold some of its Kroger bonds that had cost $45,000 for $46,200 cash.

Oct. 12 Purchased Marshall bonds for $120,000.

Nov. 28 Sold all of its Ford bonds for $54,000 cash.

Required

1. Prepare journal entries to record these transactions.

2. Prepare a table to compare the year-end cost and fair values of Ancore's trading debt securities. Year-end fair values: Target, $25,500; Kroger, $66,000; and Marshall, $117,000.
3. Prepare the adjusting entry to record the year-end fair value adjustment for the portfolio of trading debt securities.

Problem C-2B

Recording, adjusting, and reporting available-for-sale debt securities

P3

Paris Inc. began operations in Year 1. Following is a series of transactions and events involving its long-term debt investments in available-for-sale securities.

Year 1

Mar. 10 Purchased Apple bonds for $30,600.

Apr. 7 Purchased Ford notes for $56,250.

Sep. 1 Purchased Polaroid bonds for $28,200.

Dec. 31 Fair values for debt in the portfolio are Apple, $33,000; Ford, $54,600; and Polaroid, $29,400.

Year 2

Apr. 26 Sold all of the Ford notes for $51,250.

June 2 Purchased Duracell bonds for $34,650.

June 14 Purchased Sears notes for $25,200.

Nov. 27 Sold all of the Polaroid bonds for $30,600.

Dec. 31 Fair values for debt in the portfolio are Apple, $31,000; Duracell, $32,400; and Sears, $27,600.

Year 3

Jan. 28 Purchased Coca-Cola bonds for $40,000.

Aug. 22 Sold all of the Apple bonds for $25,800.

Sep. 3 Purchased Motorola notes for $84,000.

Oct. 9 Sold all of the Sears notes for $28,800.

Oct. 31 Sold all of the Duracell bonds for $27,000.

Dec. 31 Fair values for debt in the portfolio are Coca-Cola, $48,000, and Motorola, $82,000.

Required

1. Prepare journal entries to record these transactions and events and any year-end fair value adjustments to the portfolio of long-term available-for-sale debt securities.
2. Prepare a table that summarizes the (*a*) total cost, (*b*) total fair value adjustment, and (*c*) total fair value for the portfolio of long-term available-for-sale debt securities at each year-end.
3. Prepare a table that summarizes (*a*) the realized gains and losses and (*b*) the unrealized gains or losses for the portfolio of long-term available-for-sale debt securities at each year-end.

Check *(2b)* Fair Value Adj. bal.: 12/31/Year 1, $1,950 Dr.; 12/31/Year 2, $550 Dr. (3b) Unrealized Gain at 12/31/Year 3, $6,000

Problem C-3B

Debt investments in available-for-sale securities; unrealized and realized gains and losses

P3

Troy's long-term available-for-sale portfolio at the *start* of this year consists of the following.

Available-for-Sale Securities	Cost	Fair Value
Company R bonds	$559,125	$580,440
Company S notes	308,380	293,250
Company T bonds	147,295	151,800

Troy enters into the following transactions involving its page C-28 available-for-sale debt securities this year.

Jan. 13 Sold one-fourth of the Company S notes for $72,250.

Apr. 5 Purchased Company V bonds for $133,875.

Sep. 2 Sold all of the Company T bonds for $156,750.

Oct. 30 Purchased Company X notes for $48,750.

The fair values at December 31 are R, $568,125; S, $234,345; V, $134,940; and X, $45,625.

Check (1) Dec. 31: Cr. Fair Value Adj.-AFS, $690

Required

1. Prepare journal entries to record these transactions, including any necessary December 31 adjusting entry to record the fair value adjustment of the long-term investments in available-for-sale securities.
2. Determine the amount Troy reports on its December 31 balance sheet for its long-term investments in available-for-sale securities.
3. What amount of gains or losses on transactions relating to long-term investments in available-for-sale securities does Troy report on its income statement for this year?

Problem C-4B

Recording, adjusting, and reporting stock investments with insignificant influence

P4

Slip Systems had no short-term investments prior to this year. It had the following transactions this year involving short-term stock investments with insignificant influence.

Feb. 6 Purchased 3,400 shares of Nokia stock at $41 per share.

Apr. 7 Purchased 1,200 shares of Dell stock at $39 per share.

June 2 Purchased 2,500 shares of Merck stock at $72 per share.

30 Received a $1.00 per share cash dividend on the Nokia shares.

Aug. 11 Sold 850 shares of Nokia stock at $46 per share.

24 Received a $0.10 per share cash dividend on the Dell shares.

Nov. 9 Received a $1.50 per share cash dividend on the remaining Nokia shares.

Dec. 18 Received a $0.15 per share cash dividend on the Dell shares.

Required

1. Prepare journal entries to record the preceding transactions and events.
2. Prepare a table to compare the year-end cost and fair values of the short-term stock investments. The year-end fair values per share are Nokia, $40; Dell, $41; and Merck, $59.

Check (2) Cost = $331,350

(3) Dr. Unrealized Loss—Income, $32,650

3. Prepare an adjusting entry, if necessary, to record the year-end fair value adjustment for the portfolio of short-term stock investments.

Analysis Component

4. Prepare the current asset section of the balance sheet for the fair value adjustment to Slip's short-term investments.
5. Identify the dollar increase or decrease from Slip's short-term stock investments on (*a*) its income statement this year and (*b*) the equity section of its balance sheet at this year-end.

Problem C-5B

Accounting for long-term investments in stock with significant influence

P5

Brinkley Company, which began operations in Year 1, had the following transactions and events in its long-term investments.

Year 1

Jan. 5 Brinkley purchased 20,000 shares (25% of total) of Bloch's common stock for $200,500.

Aug. 1 Bloch declared and paid a cash dividend of $1.05 per share.

Dec. 31 Bloch's net income for the year is $82,000, and the fair value of its stock is $11.90 per share.

Year 2

Aug. 1 Bloch declared and paid a cash dividend of $1.35 per share.

Dec. 31 Bloch's net income for the year is $78,000, and the fair value of its stock is $13.65 per share.

Year 3

Jan. 8 Brinkley sold 5% (equal to 1,000 shares) of its investment in Bloch for $12,025 cash.

Required

Prepare journal entries to record these transactions and events for Brinkley. Assume that Brinkley has a significant influence over Bloch with its 25% share.

Problem C-6B

Accounting for long-term investments in stock without significant influence

P4

Refer to the transactions in Problem C-5B. Assume that page C-29 although Brinkley owns 25% of Bloch's outstanding stock, circumstances indicate that it does *not* have a significant influence over the investee.

Required

Prepare journal entries to record these transactions and events for Brinkley.

Serial problem began in Chapter 1. If previous chapter segments were not completed, the serial problem can begin at this point. It is available in Connect with an algorithmic option.

SERIAL PROBLEM

Business Solutions

P1

Alexander Image/Shutterstock

SP C While reviewing the March 31, 2022, balance sheet of **Business Solutions**, Santana Rey notes that the business has built a large cash balance of $68,057. Its most recent bank money market statement shows that the funds are earning an annualized return of 0.75%. S. Rey decides to make several investments with the desire to earn a higher return on the idle cash balance. Accordingly, in April 2022, Business Solutions makes the following investments in trading securities.

Apr. 16	Purchases Johnson & Johnson bonds for $10,000.
Apr. 30	Purchases Starbucks notes for $4,400.

On June 30, 2022, the fair value of the Johnson & Johnson bonds is $12,000 and the Starbucks notes is $3,800.

Required

1. Prepare journal entries to record the April purchases of trading securities by Business Solutions.
2. On June 30, 2022, prepare the adjusting entry to record any necessary fair value adjustment to its portfolio of trading securities.

connect

TABLEAU DASHBOARD ACTIVITIES

Tableau Dashboard Activities expose students to accounting analytics using visual displays. These assignments run in **Connect**. All are auto-gradable.

Tableau DA C-1 Quick Study, Accounting for stock investments with insignificant influence, **P4**—similar to Exercise C-8

Tableau DA C-2 Exercise, Accounting for stock investments with insignificant influence, **P4**—similar to Exercise C-10

Tableau DA C-3 Mini-Case, Reporting stock investments on financial statements, **P4**—similar to Exercise C-11

connect

GENERAL LEDGER

General Ledger (GL) Assignments expose students to general ledger software similar to that in practice. **GL** is part of Connect and **GL** assignments are auto-gradable and have algorithmic options.

GL C-1 prepare journal entries related to stock investments and assess their impact on financial statements.

GL C-2 prepare journal entries related to available-for-sale debt securities and assess their impact on financial statements.

Accounting Analysis connect

COMPANY ANALYSIS A1

AA C-1 Use **Apple**'s financial statements in Appendix A to answer the following.

1. Compute Apple's return on total assets for the years ended September 28, 2019, and September 29, 2018.
2. Is the change in Apple's return on total assets from part 1 favorable or unfavorable?
3. Apple acquired 100% of Beats Electronics (Beats by Dre) for $3 billion. How does Apple account for Beats using the equity method or consolidation?

COMPARATIVE ANALYSIS

A1

AA C-2 Key figures for **Apple** and **Google** follow.

Required

page C-30

$ millions	Apple			Google		
	Current Year	1 Year Prior	2 Years Prior	Current Year	1 Year Prior	2 Years Prior
Net income	$ 55,256	$ 59,531	$ 48,351	$ 34,343	$ 30,736	$ 12,662
Net sales	260,174	265,595	229,234	161,857	136,819	110,855
Total assets	338,516	365,725	375,319	275,909	232,792	197,295

1. Compute return on total assets for Apple and Google for the two most recent years.
2. Which of these two companies has the better return on total assets for the current year?
3. Compute both profit margin and total asset turnover for Apple and Google for the most recent year.

EXTENDED ANALYSIS

A1

AA C-3 Following are selected data from **Samsung**, **Apple**, and **Google**.

	Samsung			Apple		Google	
$ millions	Current Year	One Year Prior	Two Years Prior	Current Year	Prior Year	Current Year	Prior Year
Net income	$ 18,653	$ 38,049	$ 38,344	$ 55,256	$ 59,531	$ 34,343	$ 30,736
Net sales	197,691	209,163	217,755	260,174	265,595	161,857	136,819
Total assets	302,511	291,179	274,268	338,516	365,725	275,909	232,792

Required

1. Compute Samsung's return on total assets for the two most recent years.
2. For the current year, is Samsung's return on total assets better or worse than (*a*) Apple's and (*b*) Google's?
3. For the current year, compute Samsung's profit margin.
4. For the current year, compute Samsung's total asset turnover.

Discussion Questions

1. Under what two conditions should investments be classified as current assets?
2. On a balance sheet, what valuation must be reported for short-term debt investments in trading securities?
3. If a stock investment with insignificant influence costs $10,000 and is sold for $12,000, how should the difference between these two amounts be recorded?
4. Identify the three classes of debt investments and the three classes of equity investments.
5. Under what conditions should investments be classified as current assets? As long-term assets?
6. For investments in available-for-sale debt securities, how are unrealized (holding) gains and losses reported?

7. If a company purchases its only long-term investments in available-for-sale debt securities this period and their fair value is below cost at the balance sheet date, what entry is required to recognize this unrealized loss?

8. On a balance sheet, what valuation must be reported for debt securities classified as available-for-sale?

9. Under what circumstances are long-term investments in debt securities reported at cost and adjusted for amortization of any difference between cost and maturity value?

10. In accounting for investments in equity securities, when should the equity method be used?

11. Under what circumstances does a company prepare consolidated financial statements?

Beyond the Numbers

ETHICS CHALLENGE

P2 P3

BTN C-1 Kasey Hartman is the controller for Wholemart Company, which has numerous long-term investments in debt securities. Wholemart's investments are mainly in five-year bonds. Hartman is preparing its year-end financial statements. In accounting for long-term debt securities, she knows that each long-term investment must be designated as a held-to-maturity or an available-for-sale security. Interest rates rose sharply this past year, causing the portfolio's fair value to substantially decline. The company does not intend to hold the bonds for the entire five years. Hartman also earns a bonus each year, which is computed as a percent of net income.

Required

page C-31

1. Will Hartman's bonus depend in any way on the classification of the debt securities? Explain.

2. What criteria must Hartman use to classify the securities as held-to-maturity or available-for-sale?

3. Is there likely any company oversight of Hartman's classification of the securities? Explain.

COMMUNICATING IN PRACTICE

P4

BTN C-2 Assume that you are Jolee Company's accountant. Company owner Mary Jolee has reviewed the 2021 financial statements you prepared and questions the $6,000 loss reported on the sale of its investment in Kemper Co. common stock. Jolee acquired 50,000 shares of Kemper's common stock on December 31, 2019, at a cost of $500,000. This stock purchase represented a 40% interest in Kemper. The 2020 income statement reported that earnings from all investments were $126,000. On January 3, 2021, Jolee Company sold the Kemper stock for $575,000. Kemper did not pay any dividends during 2020 but reported a net income of $202,500 for that year. Mary Jolee believes that because the Kemper stock purchase price was $500,000 and was sold for $575,000, the 2021 income statement should report a $75,000 gain on the sale.

Required

Draft a half-page memorandum to Mary Jolee explaining why the $6,000 loss on sale of Kemper stock is correctly reported.

TEAMWORK IN ACTION

C2 P1 P2 P3 P4

BTN C-3 Each team member is to become an expert on a specific classification of long-term investments. This expertise will be used to facilitate other teammates' understanding of the concepts and procedures relevant to the classification chosen.

1. Each team member must select an area for expertise by choosing one of the following classifications of long-term investments.
   a. Held-to-maturity debt securities

b. Available-for-sale debt securities

c. Equity securities with significant influence

d. Equity securities with controlling influence

2. Learning teams are to disperse and expert teams are to be formed. Expert teams are made up of those who select the same area of expertise. The instructor will identify the location where each expert team will meet.

3. Expert teams will collaborate to develop a presentation based on the following requirements. Students must write the presentation in a format they can show to their learning teams in part 4.

Requirements for Expert Presentation

a. Write a transaction for the acquisition of this type of investment security. The transaction description is to include all necessary data to reflect the chosen classification.

b. Prepare the journal entry to record the acquisition.

[*Note:* The expert team on equity securities with controlling influence will substitute requirements (*d*) and (*e*) with a discussion of the reporting of these investments.]

c. Identify information necessary to complete the end-of-period adjustment for this investment.

d. Assuming that this is the only investment owned, prepare any necessary year-end entries.

e. Present the relevant balance sheet section(s).

4. Re-form learning teams. In rotation, experts are to present to their teams the presentations they developed in part 3. Experts are to encourage and respond to questions.

ENTREPRENEURIAL DECISION

P4

BTN C-4 Assume that **YC** makes an investment in Sustain Inc., a sustainability consulting firm. YC purchases 200 shares of Sustain stock for $15,500 cash. Sustain has 500 shares of common stock outstanding, and YC will be able to significantly influence its policies.

Required

1. Prepare the journal entry to record the investment in Sustain on January 1.
2. Sustain declares and pays a total cash dividend of $1,000. Prepare the journal entry to record YC's receipt of its share of the dividend on July 1.
3. Sustain reports net income of $5,000. Prepare the journal entry to record YC's share of those earnings on December 31.

page C-32

D Lean Principles and Accounting

Appendix Preview

LEAN BUSINESS MODEL

C1 Lean principles

Lean example

Lean overhead

Lean supply chain

Lean for services

NTK D-1

PRODUCTION PERFORMANCE

A1 Cycle time

Cycle efficiency

A2 Days in work in process inventory

NTK D-2

LEAN ACCOUNTING

P1 Key accounts

Conversion costs

Accounting entries

P2 Costs of quality

A3 Days in payables

NTK D-3

Learning Objectives

CONCEPTUAL

C1 Describe lean principles.

ANALYTICAL

A1 Compute cycle time and cycle efficiency, and explain their importance to production management.

A2 Compute days' sales in work in process inventory.

A3 Compute days' payable outstanding.

PROCEDURAL

P1 Record product costs using lean accounting.

P2 Classify quality costs and prepare a cost of quality report.

LEAN BUSINESS MODEL

C1

Describe lean principles.

Competition forces businesses to improve. One path to improvement is the **lean business model,** whose goals are to use fewer resources to deliver higher-quality products to satisfy customers. Exhibit D.1 shows key aspects of the lean business model. Lean business principles differ from those in traditional manufacturing. Lean business practices like continuous improvement, *just-in-time* inventory systems, and supply chain management aim to cut waste and increase productivity. Lean goals focus on the consumer and overall societal benefits.

EXHIBIT D.1

Lean Business Model

Lean Principles

Three key principles of the lean business model involve value streams, pull production, and zero waste and zero defects.

Value Streams Lean businesses aim to provide customers what they want, and when they want it. Customers increasingly want customized products, so manufacturers must produce quickly and without waste. Rather than build standard products in a long assembly line, lean manufacturers use smaller **value streams.** Value streams consist of all the activities needed to create customer value. For example, a food processor might have separate value streams for its trail mix, energy bars, and energy drinks. All of the processes for each product type occur in one value stream. A trail mix value stream is shown in Exhibit D.2.

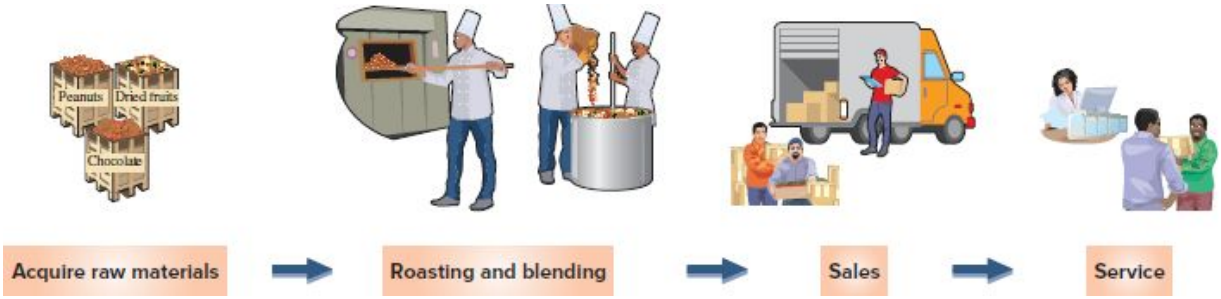


EXHIBIT D.2

Trail Mix Value Stream

Pull Production Lean manufacturing differs from traditional manufacturing. Lean manufacturers use **pull production,** where production begins with a customer order. Goods are "pulled" through the manufacturing process "just-in-time" and delivered directly to the customer after completion.

Push Production Traditional manufacturing uses **push production,** where goods are produced before a customer order and production is based on sales forecasts. Goods are "pushed" into inventory and wait for a customer order. Exhibit D.3 compares push production with pull production.

Push production has several challenges.

- Inaccurate sales forecasts can cause overproduction. This increases storage costs and risk of obsolescence (decrease in value).
- Inaccurate sales forecasts can cause underproduction. This creates stock-outs and lost sales.
- **Batch sizes (lot sizes),** which are the number of units produced after a machine setup, are high. This makes it hard to produce customized products. Large batch sizes can also produce more-defects before the issue is identified and production is stopped.

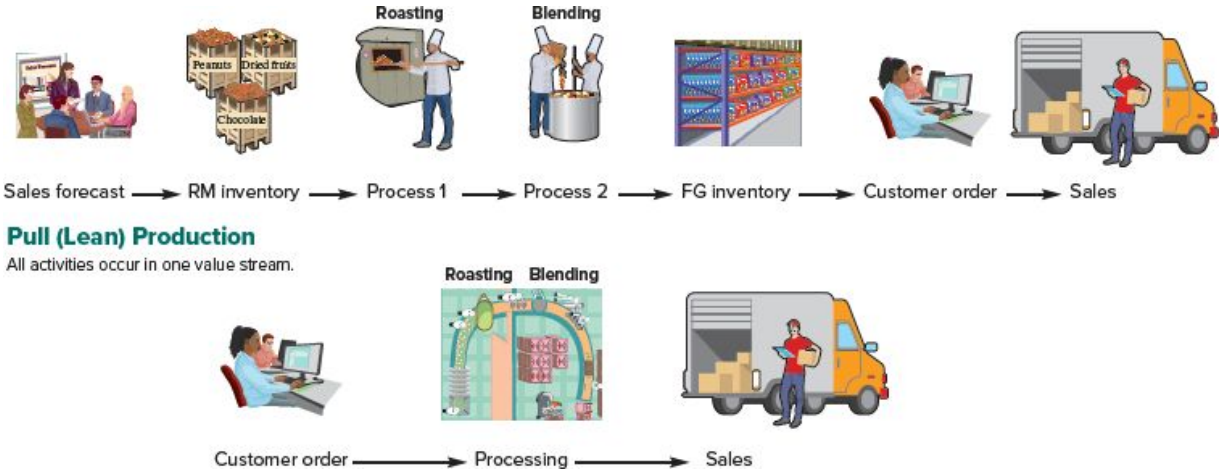


EXHIBIT D.3

Lean Business Model

Pull Production To address these issues, many turn to pull page D-3 production. Pull production follows a lean strategy which includes a focus on reducing (1) cycle time, (2) setup time, and (3) inventory levels.

Cycle Time **Cycle time (CT)** is the total time a production process takes, starting from putting raw materials into production to completing a finished good. This can be in minutes, such as with fast-food restaurants, or weeks, such as with jet engines. Lean businesses reduce cycle time by producing in smaller batch sizes and making goods to customer order. Smaller batch sizes reduce cycle time because goods spend less time waiting for other goods to finish in the production cycle. Customers get the goods they want more quickly.

Lean businesses focus on improving the following to reduce cycle time.

- *Process time*—Time spent working on and producing the product. Lean businesses reduce process time by simplifying the production process and by eliminating unwanted product features. } **Value-added**
- *Inspection time*—Time spent inspecting raw materials received, work in process in production, and finished goods before shipment. Lean businesses emphasize quality materials and processes to reduce inspection time.
- *Move time*—Time spent moving materials and inventory, and employee time spent moving around the production area. Lean businesses reduce move time by strategically placing tools and machinery in the production area. } **Non-value-added**
- *Wait time*—Time an order sits before or between production processes. Lean businesses reduce wait time by avoiding raw material order delays, production bottlenecks, and poor production scheduling.

Of the four parts of cycle time, only process time is a value-added time activity that adds value to the customer. Inspection, move, and wait time are **non-value-added time** activities because they do not add value to customers.

Setup Time **Setup time** is the amount of time to prepare a process for production; for example, preparing the roasting process to make trail mix. Setup time includes time spent starting and calibrating machines. Lean businesses want quick setups so they can reduce cycle time when producing goods to customer order in smaller batch sizes.

Inventory Levels Lean businesses believe holding inventory is wasteful and instead use *just-in-time* inventory. The following table compares how traditional and lean manufacturers manage inventory.

Inventory	Traditional Approach	Lean (Just-In-Time) Approach
Raw materials	Bought to hold in inventory; enters production based on sales forecast.	Bought after a customer order; enters production immediately after receipt.
Work in process	Larger; not a priority to reduce.	Reduced as cycle times get faster.
Finished goods	Held in inventory until sold.	Delivered to customers after goods are finished.

Zero Waste and Zero Defects Lean businesses aim for zero waste and zero defects. Employees of lean businesses can stop production if they see something wrong. Defective goods are not passed on to the next process. Instead, the source of the problem is identified and corrected before production resumes. Fewer defects lead to lower scrap and rework costs, fewer warranty claims, and increased customer satisfaction.

Lean Production Example

Nike implemented a lean approach to its clothes manufacturing in several countries. Clothes manufacturing requires sewing, ironing, and packing processes. Exhibit D.4 compares Nike's traditional approach to its new lean approach. Several benefits and cost savings are identified.

EXHIBIT D.4

Lean Production at Nike

	Traditional Approach	Lean Approach	Benefits from Lean Approach
Production layout	Sewing, ironing, and packing processes are physically separated.	All processes in the apparel value stream are located together.	Reduced move time of both employees and inventory.
Production starts with	Sales forecast.	Customer order.	Less inventory.
Quality control	End-of-line quality inspection.	Each employee inspects her own output before passing it to the next step.	Fewer defects.
Supervision	One supervisor for each process.	One supervisor for the entire value stream.	Reduced overhead costs.

Source: Distelhorst, Greg; Hainmueller, Jens; and Locke, Richard M. *Does Lean Improve Labor Standards? Management and Social Performance in the Nike Supply Chain*, August 29, 2015, Management Science, Vol. 63, Issue 3.

Lean Overhead Costs

Traditional manufacturers use methods like *activity-based costing* to allocate overhead costs to products. Lean manufacturers like **Illinois Tool Works** aim to eliminate overhead costs, not allocate them. Focusing on the 20% of its products that generate 80% of its profits, the company produces in separate value streams. Employees are responsible for all activities in their value streams. The company made major operational changes to implement a lean approach and increase profits. The table below shows how those changes reduced overhead costs.

Operational Change to Produce in Value Streams	Reduced Overhead Costs
Eliminate supervisors	Eliminate supervisor salaries and benefits.
Eliminate support departments	Costs of quality control, purchasing, customer service, design, maintenance, and scheduling are reduced and directly traced to each value stream.
Implement *just-in-time* to eliminate central warehouse	Costs of moving, storing, and controlling inventory are reduced and directly traced to each value stream.

After eliminating overhead costs, tracing *direct* costs to value streams, and treating any remaining *indirect* costs as period costs, the company no longer allocates costs. It doesn't track cost drivers like number of setups and number of purchase orders that are used in activity-based costing. Profits and employee and customer satisfaction

all improved. Source: Tatikonda, L., O'Brien, D., and Tatikonda, R. *Succeeding with 80/20*, Management Accounting, Vol. 80, No.8.

Supply Chain Management

Supply chain management or *logistics* is the control of materials, information, and finances as they move between suppliers, manufacturers, and customers. Lean businesses use supply chain management to ensure raw materials arrive just-in-time for production and customers receive their orders on schedule.

Mihajlo Maricic/Alamy Stock Photo

All types of businesses must manage their supply chains. **Nike** outsources all of its production, and it uses review programs to make sure its suppliers follow ethical practices. **Taco Bell**'s just-in-time preprocessed food deliveries require close coordination and information sharing with its suppliers.

One measure of success in supply chain management is in the demand for its services. A materials handling industry report forecasts over 1.4 million openings for logistics jobs in supply chain management. These include jobs for data analysts, marketers, human resource managers, and fulfillment center employees. Average annual salaries of around $100,000 are common for supply chain managers. The Council of Supply Chain Professionals (cscmp.org) has more information.

Lean Processes for Service Businesses

Lean principles also apply to retailers and service businesses. **Amazon** applied lean principles when it changed its fulfillment process to use machines for repetitive, low-value-added steps and human employees for high-value, complex work. As a result, the

number of defects (incorrect order fulfillments) was reduced. Amazon also applies lean principles to customer service. Employees make quick decisions to satisfy customers. If customers call about a defective product, employees can "stop the line" by removing the product from Amazon's website until the source of the defect is resolved. This lean approach reduces the number of defective products sold and increases customer satisfaction.

Taco Bell applies lean principles to food service. By focusing on customer value, management determined "We are in the business of feeding people, not making food." As a result, the company changed from food *processing* to food *assembly*. Ingredients are preprocessed in off-site facilities and shipped just-in-time to restaurants. Employees then assemble ingredients to suit customer orders. The lean approach decreases inventory levels and costs, and it increases quality and customer satisfaction.

NEED-TO-KNOW D-1

Lean Production

C1 

Part A For each item, identify whether it best applies to lean businesses (L) or traditional businesses (T).

1. Production begins with a sales forecast.
2. Only finished goods are inspected for quality.
3. Uses pull production.
4. Processes are located together.
5. Uses push production.
6. Produces in small batch sizes.

Solution

1. T **2.** T **3.** L **4.** L **5.** T **6.** L

Part B Identify which of the statements below are true (T) or false (F). Lean businesses aim to:

1. Reduce inventory levels.
2. Increase profits.
3. Produce in large batch sizes.
4. Increase long setup times.
5. Reduce wait time.
6. Reduce inspection time.

Solution

1. T **2.** T **3.** F **4.** F **5.** T **6.** T

Do More: QS D-1, QS D-2, E D-1

PRODUCTION PERFORMANCE

A1

Compute cycle time and cycle efficiency, and explain their importance to production management.

page D-6

Cycle Time and Cycle Efficiency

Lean businesses use many nonfinancial measures to evaluate the performance of their production processes. It is important to reduce the time it takes to produce products and to improve efficiency. Cycle time (CT) is the time it takes to produce a good or provide a service. It is computed using the equation in Exhibit D.5.

Cycle time = Process time + Inspection time + Move time + Wait time

EXHIBIT D.5

Cycle Time

Process time is the only activity that adds value to the customer (*value-added activity*). Inspection, move, and wait times do not add

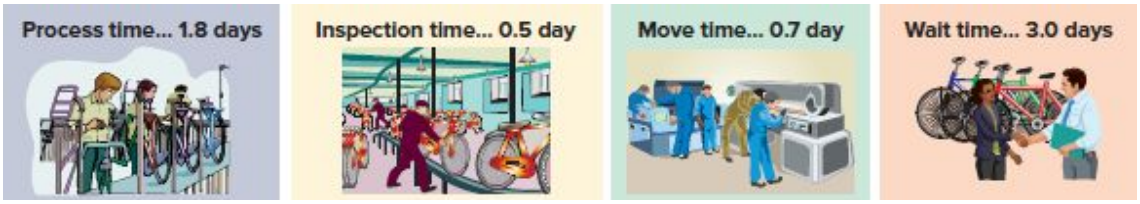
value to customers (*non-value-added activities*). Lean businesses try to reduce non-value-added time to improve **cycle efficiency (CE).** Cycle efficiency, defined in Exhibit D.6, measures the amount of cycle time spent on value-added activities. A CE of 1 (100%) means a value stream's time is spent entirely on value-added activities. If the CE is low, too much time is being spent on non-value-added activities and the production process should be reviewed with an aim to eliminate waste.

$$\text{Cycle efficiency} = \frac{\text{Value-added time}}{\text{Cycle time}}$$

EXHIBIT D.6

Cycle Efficiency

To illustrate, assume that Rocky Mountain Bikes receives and produces an order for 500 mountain bikes. It took the following times to produce this order.



Cycle time is 6.0 days (1.8 + 0.5 + 0.7 + 3.0 days). Cycle efficiency is computed as

$$\text{Cycle efficiency} = \frac{1.8 \text{ days}}{6.0 \text{ days}} = 0.30, \text{ or } 30\%$$

Time Type	Days	%
Value-added	1.8	30%
Non-value-added	4.2	70
Total	6.0	100%

Rocky Mountain Bikes's value-added time (its process time, or time spent working on the product) is 30%. The other 70% of time is spent on non-value-added activities. The 30% CE for Rocky Mountain Bikes is low. Employees and managers should try to reduce time spent on non-value-added activities. If the company can reduce its wait time by

2 days, its cycle time will be 4 days (computed as 6 days − 2 days). Its cycle efficiency will then be 0.45 (45%), computed as 1.8 days/4.0 days.

A2

Compute days' sales in work in process inventory.

Days' Sales in Work in Process Inventory

Lean businesses aim to reduce inventory. They typically do not have a separate Raw Materials Inventory account and hold few finished goods. This means the Work in Process Inventory account can be used to measure production efficiency. Work in process inventory reflects delay in getting products to customers, which lean businesses consider wasteful. Getting products to customers sooner by reducing work in process inventory can increase customer satisfaction. To measure production efficiency, we can use **days' sales in work in process inventory,** defined in Exhibit D.7. It's often rounded to the nearest whole day.

$$\text{Days' sales in work in process inventory} = \frac{\text{Work in process inventory}}{\text{Cost of goods sold}} \times 365$$

EXHIBIT D.7

Days' Sales in Work in Process Inventory

Axis Co., a computer maker, reports work in process inventory of $503 and cost of goods sold of $45,829. Axis computes its days' sales in work in process inventory as follows.

page D-7

$$\text{Days' sales in work in process inventory} = \frac{\$503}{\$45{,}829} \times 365 = 4 \text{ days}$$

Lower days' sales in work in process inventory means the company is completing its production cycle more quickly. Adopting a lean model should result in a lower number of days' sales in work in process inventory. As an example, if Axis Co. adopts a lean model and

reduces its work in process inventory by 20%, its days' sales in work in process inventory is 3 days, computed as follows.

$$\text{Days' sales in work in process inventory} = \frac{\$503 \times 80\%}{\$45{,}829} \times 365 = 3 \text{ days}$$

NEED-TO-KNOW D-2

Cycle Time and Cycle Efficiency

A1

Part 1

The following information is for an order produced by Tyler Co. Compute cycle time and cycle efficiency.

Process time . . .	8 days	Inspection time . . .	0.2 day	Move time . . .	0.4 day	Wait time . . .	1.4 days

Solution

Cycle time = Process time + Inspection time + Move time + Wait time
= 8 + 0.2 + 0.4 + 1.4 = 10 days

Cycle efficiency = Value-added time/Cycle time
= 8/10 = 80% → 80% of the company's time is spent on value-added activities. Only process time is considered value-added time.

Do More: QS D-9, QS D-10, E D-6, E D-7, E D-8, E D-9

Days' Sales in Work in Process Inventory

A2

Part 2

Use the following information to compute days' sales in work in process inventory.

Work in process inventory	$2,053	Cost of goods sold.	$46,828

Solution

Days' sales in work in process inventory = ($2,053/$46,828) × 365 = 16 days

Do More: QS D-11, E D-10, E D-11

LEAN ACCOUNTING

P1

Record product costs using lean accounting.

Key Accounts

Lean businesses usually have fewer transactions to record and use fewer accounts. The key accounts in lean accounting follow.

- **Work in Process Inventory** Lean businesses put raw materials immediately into production, so a separate Raw Materials Inventory account is not used. Raw materials purchases are recorded in Work in Process Inventory.
- **Conversion Costs** Direct labor, indirect labor, and other overhead costs are recorded in this account. In lean businesses, employees work within individual value streams and they do both direct and indirect labor tasks. For example, employees in a trail mix value stream might do roasting, blending, packaging, and cleaning duties. Therefore, all of these costs are accumulated in the Conversion Costs account.

Conversion Costs

In lean accounting, *budgeted* conversion costs are applied to work in process. For example, if a business budgets for $100,000 of conversion costs and 4,000 production hours in a value stream, the **conversion cost rate** is computed as follows.

$$\text{Conversion cost rate} = \frac{\text{Budgeted conversion costs}}{\text{Budgeted production hours}} = \frac{\$100{,}000}{4{,}000 \text{ hours}} = \$25 \text{ per production hour}$$

This rate can be expressed in terms of units of product. For example, if each unit requires 2 production hours, the conversion cost rate is $50 per unit ($25 × 2).

Accounting Entries

Point: Variations of lean accounting exist. Some use "backflush" accounting, where entries are delayed until goods are finished or sold.

Solshine manufactures solar panels. Each solar panel requires $40 of raw materials and $160 of conversion costs. The company produced and sold 200 solar panels for $480 each this period. Actual conversion costs equaled applied conversion costs. The relevant journal entries follow.

page D-8

①	Work in Process Inventory	8,000	
	Accounts Payable		8,000
	Acquired raw materials on credit (200 units × $40).		
②	Work in Process Inventory	32,000	
	Conversion Costs		32,000
	Apply conversion costs to production (200 units × $160).		
③	Conversion Costs	32,000	
	Various Accounts		32,000
	Record actual conversion costs (given).		

④	Accounts Receivable	96,000	
	Sales		96,000
	Record sales on credit (200 units × $480).		
⑤	Cost of Goods Sold	40,000	
	Work in Process Inventory		40,000
	Record cost of goods sold (200 × $200).		

① records raw materials purchased ($40 per panel × 200 panels produced = $8,000) as Work in Process Inventory. Separate raw materials inventory accounts are not used.

② applies conversion costs ($160 per panel × 200 panels produced = $32,000) to Work in Process Inventory. This applied conversion cost is based on a budgeted amount of conversion costs.

③ records actual conversion costs to produce 200 solar panels. This amount includes the actual costs of direct labor, indirect labor, and other overhead costs. The various credit accounts in this journal entry would include Salaries Payable, Wages Payable, Utilities Payable, Accumulated Depreciation—Manufacturing Equipment, and others.

④ records the sale of goods on account (200 panels sold × $480 sales price per panel = $96,000).

⑤ records the related cost of 200 panels sold (200 × $200 = $40,000). The cost per unit is the sum of $40 of raw materials and $160 of conversion costs. Because lean businesses make goods to order, finished product costs are immediately recorded in Cost of Goods Sold.

When Finished Goods Inventory Remains Lean businesses sometimes end an accounting period with finished but unsold goods. If instead of selling 200 panels, assume Solshine sold 185 panels and had 15 panels left in inventory. It records journal entries ①, ②, and ③ as above; but it records entries ④ and ⑤ as follows. Finished Goods Inventory is increased for the cost of goods *not* sold (15 units × $200). Cost of goods sold is computed as 185 units sold × $200 = $37,000.

④	Accounts Receivable	88,800	
	Sales		88,800
	Record sales on credit (185 units × $480 selling price).		

⑤	Finished Goods Inventory	3,000	
	Cost of Goods Sold	37,000	
	Work in Process Inventory		40,000
	Record inventory and cost of goods sold.		

NEED-TO-KNOW D-3

Lean Accounting Entries

P1

A lean manufacturer incurs $45 per unit in raw materials page D-9 costs and applies $75 per unit in conversion costs to produce office chairs. Each chair is sold for $170. In the current period, the business produced 500 units and sold 470 units. Prepare the necessary journal entries following lean accounting. Assume actual conversion costs equal applied conversion costs.

Solution

Work in Process Inventory	22,500	
Accounts Payable		22,500
Acquired raw materials on credit ($45 × 500).		
Work in Process Inventory	37,500	
Conversion Costs		37,500
Apply conversion costs to production ($75 × 500).		
Conversion Costs	37,500	
Various Accounts		37,500
Record actual conversion costs.		

Accounts Receivable	79,900	
Sales		79,900
Record sales on credit ($170 × 470).		
Finished Goods Inventory	3,600	
Cost of Goods Sold	56,400	
Work in Process Inventory		60,000
Record ending inventory ($120 × 30) and cost of goods sold ($120 × 470).		

Do More: QS D-3, QS D-4, QS D-5, QS D-6, E D-2, E D-3, E D-4

Costs of Quality

P2

Classify quality costs and prepare a cost of quality report.

Lean businesses assess the costs of quality to reduce non-value-added activities. **Costs of quality** are the costs incurred to produce the quality of products that satisfies customers. Exhibit D.8 shows examples of the four different types of quality costs.

EXHIBIT D.8

Types of Quality Costs

Costs of Good Quality Prevention and appraisal costs are incurred before a good or service is provided to a customer. The purpose of these costs is to reduce the chance the customer is provided a

defective good or service. These are the costs of trying to ensure that only good-quality items are produced.

- *Prevention* activities focus on quality training and improvement programs to ensure quality is built into the product or service. Working with good suppliers and performing equipment maintenance are other prevention activities.
- *Appraisal* activities include the costs of inspections to ensure that materials and supplies meet specifications and inspections of finished goods.

Costs of Poor Quality Internal and external failure costs are the costs of making poor-quality items.

- *Internal failure costs* are incurred after a company has manufactured a defective product but before that product has been delivered to a customer. Internal failure costs include the costs of reworking products, reinspecting reworked products, and scrap.
- *External failure costs* are incurred after a customer has been provided a defective product or service. Examples of this type of cost include costs of warranty repairs and costs of recalling products. This category also includes lost profits due to dissatisfied customers buying from other companies.

Point: *International Organization for Standardization (ISO)* develops standards on best practices involving: Quality management, Environmental management, Health and safety, Energy management, Food Safety, and IT security. Its ISO 9000 standards for quality management are the best known.

Exhibit D.9 shows a **cost of quality report,** which lists the costs of quality activities by category. In addition to dollar amounts, this report shows the percentage of the total costs of quality in each category. This company spends only 55% (25% + 30%) of its total cost of quality on the activities of good quality. Spending more on prevention and appraisal could reduce the costs of bad quality and reduce the costs of lost profits from dissatisfied customers.

Cost of Quality Report			
Quality Category	**Cost**	**Category Total**	**% of Total Cost of Quality**
Prevention			
Training	$25,000	$25,000	25%
Appraisal			
Inspecting materials	17,500		
Testing finished goods	12,500	30,000	30%
Internal failure			
Rework	8,400		
Scrap	7,600	16,000	16%
External failure			
Warranty claims	18,200		
Product recalls	10,800	29,000	29%
Total cost of quality		$100,000	100%

EXHIBIT D.9

Cost of Quality Report

CORPORATE SOCIAL RESPONSIBILITY

Peter Varga/Shutterstock

Nike implemented lean processes and achieved increased productivity, lower inventory levels, lower defect rates, and faster production. These improvements benefited the "profit" aspect of the triple bottom line, but lean processes can have other triple bottom line benefits. Nike saw major improvements in compliance with labor rules. Nike increased both profits and working conditions for employees ("people") in its supply chain.

Lean businesses also try to reduce waste. **Apple**'s *Environmental Responsibility Report* shows a focus on the "planet" aspect of the

triple bottom line. Apple strives for a **closed-loop supply chain,** where products are built using only renewable resources or recycled material, as shown in Exhibit D.10.

To achieve its goal, Apple works with its suppliers to use 100% recycled tin in the main part of its iPhone. It also has programs to encourage customers to recycle old devices. Robots disassemble millions of iPhones per year to reclaim materials.

EXHIBIT D.10

Closed-Loop Supply Chain

Decision Analysis Days' Payable Outstanding

A3

Compute days' payable outstanding.

Companies that buy on credit monitor how long they take to pay creditors. This is particularly important for lean businesses because they usually have long-term contracts with important suppliers. Taking too long to pay could harm important partnerships. Paying too soon, however, means the company has less cash available for other needs. **Days' payable outstanding,** defined in Exhibit D.11, is a measure of how long, on average, a company takes to pay its creditors (it is usually rounded to the nearest whole day).

$$\text{Days' payable outstanding} = \frac{\text{Accounts payable}}{\text{Cost of goods sold}} \times 365$$

EXHIBIT D.11

Days' Payable Outstanding

Nike's days' payable outstanding is shown in Exhibit D.12. Its days' payable outstanding is 44 days [($2,612/$21,643) × 365] in the current year. This increased from the two prior years. A company's days' payable outstanding can be compared to its typical credit terms and to its industry competitors. **Under Armour**'s days' payable outstanding was 81 at the end of the current year. A company with 30 days to pay and a days' payable outstanding of 12 days should consider paying its creditors later. On the other hand, a company with 30 days to pay and a days' payable outstanding of 55 days risks hurting its partnerships with key suppliers.

page D-11

Under Armour	Current Year
Accounts payable	$ 618 mil.
Cost of goods sold	$2,797 mil.
Days' payable	81 days

Company	$ millions	Current Year	One Year Prior	Two Years Prior
Nike	Accounts payable	$ 2,612	$ 2,279	$ 2,048
	Cost of goods sold	$21,643	$20,441	$19,038
	Days' payable outstanding	44 days	41 days	39 days
Under Armour	Days' payable outstanding	81 days	72 days	75 days

EXHIBIT D.12

Days' Payable Outstanding for Two Competitors

Days' payable outstanding varies across industries. **Yum Brands**'s (a restaurant operator) days' payable outstanding has been over 200 days in recent years. **Twitter** has about 52 days' payable outstanding.

Summary: Cheat Sheet

LEAN BUSINESS MODEL

Value streams: Activities that create customer value.

Pull production: Production starts with customer order.

Push production: Production starts with sales forecast.

PRODUCTION PERFORMANCE

Time Components

- Process time } **Value-added**
- Inspection time, Move time, Wait time } **Non-value-added**

$$\text{Cycle time} = \text{Process time} + \text{Inspection time} + \text{Move time} + \text{Wait time}$$

$$\text{Cycle efficiency} = \frac{\text{Value-added time}}{\text{Cycle time}}$$

Example: Process time = 1.8 days, Inspection time = 0.5 day, Move time = 0.7 day, Wait time = 3.0 days:

$$\text{Cycle time} = 1.8 + 0.5 + 0.7 + 3.0 = 6.0 \text{ days}$$

$$\text{Cycle efficiency} = \frac{1.8 \text{ days}}{6.0 \text{ days}} = 0.30 \text{ (or } 30\%)$$

$$\text{Days' sales in WIP} = \frac{\text{Work in process inventory}}{\text{Cost of goods sold}} \times 365$$

LEAN ACCOUNTING

$$\text{Conversion cost rate} = \frac{\text{Budgeted conversion costs}}{\text{Budgeted production hours}}$$

Entries for Materials and Conversion Costs

No separate Raw Materials Inventory account.

Acquire raw materials on credit

Work in Process Inventory	8,000	
Accounts Payable		8,000

Apply conversion costs to production

Work in Process Inventory (Conversion cost rate × Units of activity)	32,000	
Conversion Costs		32,000

Record actual conversion costs

Conversion Costs	32,000	
Various Accounts (Wages Payable, Acc. Dep.-Mfg. Eq., etc)		32,000

Cost of Quality Report

Quality Category	Cost	Category Total	% of Total Cost of Quality
Prevention			
Training	$25,000	$25,000	25%
Appraisal			
Inspecting materials	17,500		
Testing finished goods	12,500	30,000	30%
Internal failure			
Rework	8,400		
Scrap	7,600	16,000	16%
External failure			
Warranty claims	18,200		
Product recalls	10,800	29,000	29%
Total cost of quality		$100,000	100%

$$\text{Days' payable outstanding} = \frac{\text{Accounts payable}}{\text{Cost of goods sold}} \times 365$$

Key Terms

Batch size (lot size) (D-2)

Closed-loop supply chain (D-10)

Conversion cost rate (D-8)

Costs of quality (D-9)

Cost of quality report (D-10)

Cycle efficiency (CE) (D-6)

Cycle time (CT) (D-3)

Days' payable outstanding (D-11)

Days' sales in work in process inventory (D-6)

Lean business model (D-2)

Non-valued-added time (D-3)

Pull production (D-2)

Push production (D-2)

Setup time (D-3)

Supply chain management (D-5)

Value-added time (D-3)

Value stream (D-2)

connect

QUICK STUDY

page D-12

QS D-1

Lean business model **C1**

Identify each of the following as applying more to lean (L) or to traditional (T) businesses.

1. Production begins with sales forecasts.
2. Uses “pull” production.
3. Aims for zero defects.
4. Uses large batch sizes.
5. Quality is controlled at each process.
6. Uses just-in-time inventory systems.

QS D-2

Lean business model

C1

Identify each of the following as applying more to lean (L) or to traditional (T) businesses.

1. Production begins with a customer order.
2. Reducing defects is *not* a priority.
3. Inventory levels are lower.
4. Wait times are long.
5. Uses small batch sizes.

6. Quality control is only at product completion.
7. Cycle times are shorter.
8. Move times are longer.

QS D-3

Lean accounting for materials **P1**

Use lean accounting to prepare the journal entry to record the purchase of $28,000 of raw materials on credit.

QS D-4

Lean accounting for conversion costs **P1**

Use lean accounting to prepare journal entries for the following transactions.

1. Applied $43,600 of conversion costs to production.
2. Incurred actual conversion costs of $43,600. Credit "Various Accounts."

QS D-5

Lean accounting for cost of goods sold **P1**

Use lean accounting to prepare journal entries for the following transactions.

1. Sold $16,800 of goods on credit.
2. Recorded cost of goods sold of $11,760.

QS D-6

Lean accounting for COGS and inventory **P1**

Use lean accounting to prepare journal entries for the following transactions.

1. Sold $33,250 of goods on credit.

2. Recorded cost of goods sold of $23,250, and finished goods inventory of $1,860.

QS D-7

Conversion cost rate **P1**

A manufacturer budgets annual conversion costs of $1,207,500 and production of 2,100 hours. Compute the conversion cost rate per production hour.

QS D-8

Conversion cost rate

P1

A manufacturer budgets annual conversion costs of $1,000,000 and production of 1,600 hours.

1. Compute the conversion cost rate per production hour.

2. Prepare the journal entry to apply conversion costs to an order that used 65 production hours.

QS D-9

Cycle time and cycle efficiency

A1

Compute (*a*) cycle time and (*b*) cycle efficiency using the following information.

Process time	15 minutes	Move time	6 minutes
Inspection time	2 minutes	Wait time	37 minutes

QS D-10

Cycle time and cycle efficiency

A1

Compute (*a*) cycle time, (*b*) value-added time, (*c*) non-value-added time, and (*d*) cycle efficiency using the following information.

Process time	2.10 days	Move time	0.75 day
Inspection time	0.50 day	Wait time	0.15 day

QS D-11

Days' sales in work in process inventory **A2**

A company reports work in process inventory of $770 and cost of goods sold of $23,404. Compute days' sales in work in process inventory. Round the answer to the nearest whole day.

QS D-12

Cost of quality report

P2

Training machine operators	$ 50,000
Product recalls	20,000
Scrap of defective products	12,000
Inspecting finished goods	18,000
Total	$100,000

A lean manufacturer reports the following quality costs. Prepare a cost of quality report.

QS D-13

Cost of quality report for service business

P2

A restaurant reports the following quality costs. Prepare a cost of quality report.

Training cooks	$21,000
Scrap of incorrectly prepared food	3,000
Inspecting ingredients from suppliers	30,000
Free meals due to customer complaints	6,000
Total	$60,000

QS D-14

Days' payable outstanding

A3

A company reports accounts payable of $2,055 and cost of goods sold of $18,300. Compute days' payable outstanding. Round the answer to the nearest whole day.

QS D-15

Days’ payable outstanding

A3

A company reports accounts payable of $9,569 and cost of goods sold of $28,155. Compute days’ payable outstanding. Round the answer to the nearest whole day.

connect

EXERCISES

Exercise D-1

Lean business model

C1

Identify each of the following production processes as lean (L) or traditional (T).

1. The process produces standard goods, with no customization. Production begins with a sales forecast.
2. The process uses push production in large batch sizes.
3. Production occurs in value streams.

4. The production process begins when a customer makes an order.

5. Raw materials are delivered just-in-time for production to begin.

Exercise D-2

Lean accounting

P1

Use lean accounting to prepare journal entries for the following transactions.

1. Purchased $22,500 of raw materials on credit.

2. Applied conversion costs of $67,500.

3. Incurred actual conversion costs of $67,500. Credit “Various Accounts.”

4. Sold $120,000 of goods on credit.

5. Recorded cost of goods sold of $90,000.

Exercise D-3

Lean accounting

P1

Robo-Pool is a lean manufacturer of robotic pool vacuums. Each unit requires $225 of raw materials and $375 of conversion costs and is sold for $700. During a recent month, the company produced and sold 120 units. Use lean accounting to prepare journal entries for the following transactions.

1. Purchase of raw materials on credit.

2. Applied conversion costs to production.

3. Sold 120 units on credit.

4. Record cost of goods sold.

Exercise D-4

Lean accounting with inventory

P1

Robo-Pool is a lean manufacturer of robotic pool vacuums. Each unit requires $225 of raw materials and $375 of conversion costs and is sold for $700. During a recent month the company produced 120 units and sold 100 units. Use lean accounting to prepare journal entries to record each of the following.

1. Purchase of raw materials on credit.
2. Applied conversion costs to production.
3. Sold 100 units on credit.
4. Record ending inventory and cost of goods sold.

Exercise D-5

Conversion cost rate

P1

Dyzor is a lean manufacturer of wireless sound systems. Its wireless speaker value stream budgets $48,000 of conversion costs and 600 production hours for the next quarter. Each unit requires 2 production hours. Compute the conversion rate per production hour *and* per unit.

Exercise D-6

Cycle time and cycle efficiency

A1

Oakwood Company produces maple bookcases. The following information is available for the production of a recent order of 500 bookcases.

Process time	6 days	Move time	3 days
Inspection time	1 day	Wait time	5 days

1. Compute cycle time.
2. Compute cycle efficiency.
3. Management believes it can reduce move time by 1 day and wait time by 2 days by adopting lean manufacturing techniques. Compute cycle efficiency assuming the predictions are correct.

Exercise D-7

Cycle time and cycle efficiency

A1

Best Ink produces printers for personal computers. The following information is available for production of a recent order of 500 printers.

Process time	16 hours	Move time	9 hours
Inspection time	4 hours	Wait time	21 hours

1. Compute cycle time.
2. Compute cycle efficiency.
3. Management believes it can reduce inspection time by 2 hours and wait time by 8 hours by adopting lean manufacturing techniques. Compute cycle efficiency assuming the predictions are correct.

Exercise D-8

Cycle time

A1

A manufacturer makes T-shirts in several processes. Information on the components of cycle time follows. Compute (*a*) value-added time, (*b*) inspection time, (*c*) move time, (*d*) wait time, and (*e*) cycle time.

Cutting and sewing processing	18 min.	Wait time before moving to packaging	4 min.
Wait time before moving to ironing	6 min.	Moving shirts to packaging	2 min.
Moving shirts to ironing	5 min.	Packaging shirts	10 min.
Ironing shirts	8 min.	Quality inspection	12 min.

Exercise D-9

Cycle efficiency

A1

Management of a T-shirt manufacturer believes if the company applies lean principles, then cycle efficiency can be improved. The following are estimated completion times for different activities in the manufacturing process. Compute cycle efficiency for the (*a*) traditional approach and (*b*) lean approach.

Activity	Traditional	Lean	Activity	Traditional	Lean
Cutting and sewing processing	18 min.	18 min.	Wait time before moving to packaging	8 min.	2 min.
Wait time before moving to ironing	6 min.	3 min.	Moving shirts to packaging	6 min.	1 min.
Moving shirts to ironing	8 min.	4 min.	Packaging shirts	10 min.	10 min.
Ironing shirts	8 min.	8 min.	Quality inspection	16 min.	4 min.

Exercise D-10

Days' sales in work in process inventory

A2

Use the information below to answer the requirements.

	Current Year	Prior Year
Work in process inventory	$ 8,640	$ 13,284
Cost of goods sold	262,800	315,360

1 Compute days' sales in work in process inventory for the current year. page D-15

2. Compute days' sales in work in process inventory for the prior year.

3. Did days' sales in work in process inventory increase or decrease from the prior year?

Exercise D-11

Days' sales in work in process inventory

A2

	Current Year
Work in process inventory	$ 3,600
Cost of goods sold	219,000

Use the information below to answer the requirements.

1. Compute days' sales in work in process inventory for the current year.
2. If the company's work in process inventory were 20% lower, by how many days would days' sales in work in process inventory be reduced? Round to the nearest day.

Exercise D-12

Costs of quality

P2

Orion Motors manufactures cars. Classify each of the following quality costs as either prevention, appraisal, internal failure, or external failure.

1. Inspecting raw materials $60,000
2. Training lean business practices 55,000
3. Product recalls 9,000
4. Warranty claims $25,000
5. Equipment maintenance 45,000
6. Scrap of defective materials 6,000

Exercise D-13

Cost of quality report

P2

Refer to the information in Exercise D-12. Prepare a cost of quality report.

Exercise D-14

Days' payable outstanding

A3

Use the information below to answer the requirements.

	Current Year	Prior Year
Accounts payable	$ 1,080	$ 1,440
Cost of goods sold	43,800	65,700

1. Compute days' payable outstanding for the current year.
2. Compute days' payable outstanding for the prior year.
3. Did the company take longer to pay its creditors in the current year?

Exercise D-15

Days' payable outstanding

A3

Use the information below to answer the requirements.

	Current Year
Accounts payable	$ 19,310
Cost of goods sold	281,900

1. Compute days' payable outstanding for the current year. Round to the nearest day.

2. If the company's accounts payable were 8% lower, by how many days would days' payable outstanding be reduced? Round to the nearest day.

3. If the company's accounts payable were 8% higher, by how many days would days' payable outstanding be increased? Round to the nearest day.

connect

PROBLEMS

Problem D-1

Lean accounting

P1

Robo-Lawn is a lean manufacturer of robotic lawn mowers. page D-16 The company budgets $800,000 of conversion costs and 10,000 production hours for this year. The manufacturing of each mower requires 5 production hours and $250 of raw materials. During a recent quarter, the company produced 600 mowers and sold 580 mowers. Each mower is sold for $1,000.

Required

1. Compute the conversion cost rate per mower.

2. Prepare journal entries to record (*a*) purchase of raw materials on credit, (*b*) applied conversion costs to production, (*c*) sale of 580 mowers on credit, and (*d*) cost of goods sold and finished goods inventory.

Problem D-2

Lean accounting

P1

Auto-Motion is a lean manufacturer of self-driving wheelchairs. The company budgets $680,000 of conversion costs and 2,000 production hours for this year. The manufacturing of each wheelchair requires 25

production hours and raw materials costs of $4,300. The company started and completed 75 wheelchairs during the year and sold 68. Each wheelchair is sold for $15,000. Actual conversion costs equal applied conversion costs.

Required

1. Prepare journal entries to record (*a*) the purchase of raw materials on credit to produce 75 units, (*b*) applied conversion costs to the production of 75 units, (*c*) actual conversion costs of $637,500 (credit "Various Accounts"), (*d*) sale of 68 units on credit, and (*e*) ending inventory and cost of goods sold.
2. Compute the ending balances of Work in Process Inventory and Finished Goods Inventory. Assume each of these inventory accounts began the year with a balance of zero.

Problem D-3

Cycle time and cycle efficiency

A1

Ruiz Foods makes energy bars using a traditional manufacturing process. Raw materials are stored in inventory and then moved into production. Work in process inventory is moved across the company's three separate departments. The information below in the Traditional column is available for a recent order. If the company adopts lean manufacturing, management believes both move time and wait time can be reduced, as shown in the Lean column.

Activity	Traditional	Lean
Process time	24 hours	24 hours
Inspection time	4 hours	4 hours
Move time	6 hours	3 hours
Wait time	2 hours	1 hour

Required

1. Compute the total amount of non-value-added time under the traditional manufacturing process.

2. Compute cycle efficiency under the traditional manufacturing process. Round to two decimals.

3. Compute the total amount of non-value-added time under the proposed lean manufacturing process.

4. Compute cycle efficiency under the proposed lean manufacturing process. Round to two decimals.

5. Would the proposed lean approach improve cycle efficiency?

Discussion Questions

1. What are the three key principles of the lean business model?

2. How does *push* production differ from *pull* production?

3. What are three common problems with push production?

4. Define *supply chain management*.

5. **Apple** wants a closed-loop supply chain. Define a closed-loop supply chain and discuss APPLE methods the company uses to meet its goal.

6. Can management of a retail company like **Amazon** use lean techniques? Explain.

7. Define *setup time* and provide some examples of tasks that are included in setup time.

8. Why do lean accounting systems not use separate Raw Materials Inventory accounts?

9. Do lean accounting systems use Finished Goods Inventory accounts? Explain.

10. Define and describe *cycle time* and identify the components of cycle time.

11. Explain the difference between *value-added time* and *non-value-added time*.

12. Define and describe *cycle efficiency*.

13. Can management of a company like **Samsung** use cycle time and cycle efficiency **Samsung** as useful measures of performance? Explain.

Index

Note: Page numbers followed by *n* indicate information found in footnotes. **Bold** entries indicate defined terms.

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Chart of Accounts

Following is a typical chart of accounts, which is used in many assignments. Each company has its own unique set of accounts and numbering system. *An asterisk denotes a contra account.

Assets

Current Assets

101 Cash
102 Petty cash
103 Cash equivalents
104 Short-term investments
105 Fair value adjustment–_____ (ST)
106 Accounts receivable
107 Allowance for doubtful accounts*
108 Allowance for sales discounts*
109 Interest receivable
110 Rent receivable
111 Notes receivable
112 Legal fees receivable
119 Merchandise inventory (or Inventory)
120 _____ inventory
121 Inventory returns estimated
124 Office supplies
125 Store supplies
126 _____ supplies (or Supplies)
128 Prepaid insurance
129 Prepaid interest
131 Prepaid rent
132 Raw materials inventory

133 Work in process inventory, _____
134 Work in process inventory, _____
135 Finished goods inventory
136 Debt investments–Trading (ST)
137 Debt investments–Held-to-maturity (ST)
138 Debt investments–Available-for-sale (ST)
139 Stock investments (ST)

Long-Term Investments

141 Long-term investments
142 Fair value adjustment–_____ (LT)
144 Investment in _____
145 Bond sinking fund
146 Debt investments–Held-to-maturity (LT)
147 Debt investments–Available-for-sale (LT)
148 Stock investments (LT)
149 Equity method investments

Plant Assets (Property, Plant, & Equipment)

151 Automobiles
152 Accumulated depreciation–Automobiles*
153 Trucks
154 Accumulated depreciation–Trucks*
155 Boats
156 Accumulated depreciation–Boats*
157 Professional library
158 Accumulated depreciation–Professional library*
159 Law library
160 Accumulated depreciation–Law library*
161 Furniture
162 Accumulated depreciation–Furniture*
163 Office equipment

164 Accumulated depreciation–Office equipment*
165 Store equipment
166 Accumulated depreciation–Store equipment*
167 _____ equipment
168 Accumulated depreciation–_____ equipment*
169 Machinery
170 Accumulated depreciation–Machinery*
173 Building _____
174 Accumulated depreciation–Building _____*
175 Building _____
176 Accumulated depreciation–Building _____*
179 Land improvements _____
180 Accumulated depreciation–Land improvements _____*
181 Land improvements _____
182 Accumulated depreciation–Land improvements _____*
183 Land

Natural Resources

185 Mineral deposit
186 Accumulated depletion–Mineral deposit*

Intangible Assets

191 Patents
192 Leasehold
193 Franchise
194 Copyrights
195 Leasehold improvements
196 Licenses
197 Right-of-use asset
198 Accumulated amortization–_____*
199 Goodwill

Liabilities

Current Liabilities

201 Accounts payable
202 Insurance payable
203 Interest payable
204 Legal fees payable
207 Office salaries payable
208 Rent payable
209 Salaries payable
210 Wages payable
211 Accrued payroll payable
212 Factory wages payable
214 Estimated warranty liability
215 Income taxes payable
216 Common dividend payable
217 Preferred dividend payable
218 State unemployment taxes payable
219 Employee federal income taxes payable
221 Employee medical insurance payable
222 Employee retirement program payable
223 Employee union dues payable
224 Federal unemployment taxes payable
225 FICA taxes payable
226 Estimated vacation pay liability
227 Sales refund payable
228 Loan payable
229 Current portion of long-term debt

Unearned Revenues

230 Unearned consulting fees (or revenue)

231 Unearned legal fees (or revenue)
232 Unearned property management fees
233 Unearned _____ fees
234 Unearned _____ fees
235 Unearned janitorial revenue
236 Unearned _____ revenue
238 Unearned rent

Notes Payable

240 Short-term notes payable
241 Discount on short-term notes payable*
244 Current portion of long-term notes payable
245 Notes payable
251 Long-term notes payable
252 Discount on long-term notes payable*

Long-Term Liabilities

253 Lease liability
255 Bonds payable
256 Discount on bonds payable*
257 Premium on bonds payable
258 Deferred income tax liability

Equity

Owner's Equity

301 _____, Capital
302 _____, Withdrawals
303 _____, Capital
304 _____, Withdrawals
305 _____, Capital
306 _____, Withdrawals

Paid-In Capital

307 Common stock, $ _____ par value
308 Common stock, no-par value
309 Common stock, $ _____ stated value
310 Common stock dividend distributable
311 Paid-in capital in excess of par value, Common stock
312 Paid-in capital in excess of stated value, No-par common stock
313 Paid-in capital from retirement of common stock
314 Paid-in capital, Treasury stock
315 Preferred stock
316 Paid-in capital in excess of par value, Preferred stock

Retained Earnings

318 Retained earnings
319 Cash dividends (or Dividends)
320 Stock dividends

Other Equity Accounts

321 Treasury stock, Common*
322 Unrealized gain–Equity
323 Unrealized loss–Equity

Revenues

401 _____ fees earned
402 _____ revenues
403 _____ revenue
404 Revenues
405 Commissions revenue (or earned)
406 Rent revenue (or Rent earned)
407 Dividends revenue (or Dividends earned)
408 Earnings from investment in _____
409 Interest revenue (or Interest earned)

410 Sinking fund earnings
413 Sales
414 Sales returns and allowances*
415 Sales discounts*
420 Earnings from equity method investments

Cost of Sales

Cost of Goods Sold

502 Cost of goods sold
505 Purchases
506 Purchases returns and allowances*
507 Purchases discounts*
508 Transportation-in

Manufacturing

520 Raw materials purchases
521 Freight-in on raw materials
530 Direct labor
541 Indirect materials
542 Indirect labor
543 Factory insurance expired
544 Factory supervision
545 Factory supplies used
546 Factory utilities
547 Miscellaneous production costs
548 Property taxes on factory building
549 Property taxes on factory equipment
550 Rent on factory building
551 Repairs, factory equipment
552 Small tools written off
560 Depreciation of factory equipment

561 Depreciation of factory building
570 Conversion costs

Standard Cost Variances

580 Direct material quantity variance
581 Direct material price variance
582 Direct labor efficiency variance
583 Direct labor rate variance
584 Volume variance
585 Controllable variance

Expenses

Amortization, Depletion, and Depreciation

601 Amortization expense–_____
602 Amortization expense–_____
603 Depletion expense–_____
604 Depreciation expense–Boats
605 Depreciation expense–Automobiles
606 Depreciation expense–Building _____
607 Depreciation expense–Building _____
608 Depreciation expense–Land improvements _____
609 Depreciation expense–Land improvements _____
610 Depreciation expense–Law library
611 Depreciation expense–Trucks
612 Depreciation expense–_____ equipment
613 Depreciation expense–_____ equipment
614 Depreciation expense–_____
615 Depreciation expense–_____

Employee-Related Expenses

620 Office salaries expense
621 Sales salaries expense

622 Salaries expense
623 _____ wages expense
624 Employee benefits expense
625 Payroll taxes expense

Financial Expenses

630 Cash over and short
631 Discounts lost
632 Factoring fee expense
633 Interest expense

Insurance Expenses

635 Insurance expense–Delivery equipment
636 Insurance expense–Office equipment
637 Insurance expense–_____

Rental Expenses

640 Rent (or Rental) expense
641 Rent expense–Office space
642 Rent expense–Selling space
643 Press rental expense
644 Truck rental expense
645 _____ rental expense

Supplies Expenses

650 Office supplies expense
651 Store supplies expense
652 _____ supplies expense
653 _____ supplies expense

Miscellaneous Expenses

655 Advertising expense
656 Bad debts expense
657 Blueprinting expense

658 Boat expense
659 Collection expense
661 Concessions expense
662 Credit card expense
663 Delivery expense
664 Dumping expense
667 Equipment expense
668 Food and drinks expense
671 Gas and oil expense
672 General and administrative expense
673 Janitorial expense
674 Legal fees expense
676 Mileage expense
677 Miscellaneous expenses
678 Mower and tools expense
679 Operating expense
680 Organization expense
681 Permits expense
682 Postage expense
683 Property taxes expense
684 Repairs expense–_____
685 Repairs expense–_____
687 Selling expense
688 Telephone expense
689 Travel and entertainment expense
690 Utilities expense
691 Warranty expense
692 _____ expense
695 Income tax expense

Gains and Losses

701 Gain on retirement of bonds
702 Gain on sale of machinery
703 Gain on sale of investments
704 Gain on sale of trucks
705 Gain on _____
706 Foreign exchange gain or loss
801 Loss on disposal of machinery
802 Loss on exchange of equipment
803 Loss on exchange of _____
804 Loss on sale of notes
805 Loss on retirement of bonds
806 Loss on sale of investments
807 Loss on sale of machinery
808 Loss on _____
809 Unrealized gain–Income
810 Unrealized loss–Income
811 Impairment gain
812 Impairment loss
815 Gain on sale of debt investments
816 Loss on sale of debt investments
817 Gain on sale of stock investments
818 Loss on sale of stock investments

Clearing Accounts

901 Income summary
902 Factory overhead

BRIEF REVIEW: MANAGERIAL ANALYSES AND REPORTS

① Cost Types

Variable costs:	Total cost changes in proportion to volume of activity.
Fixed costs:	Total cost does not change in proportion to volume of activity.
Mixed costs:	Cost consists of both a variable and a fixed element.

② Product Costs

Direct materials:	Raw materials costs directly linked to finished product.
Direct labor:	Employee costs directly linked to finished product.
Overhead:	Production costs indirectly linked to finished product.

③ Costing Systems

Job order costing:	Costs assigned to each unique unit or batch of units.
Process costing:	Costs assigned to similar products that are mass-produced in a continuous manner.

④ Costing Ratios

Contribution margin ratio = (Sales − Variable costs)/Sales

Predetermined overhead rate = Estimated overhead costs/Estimated activity base

Break-even point in units = Total fixed costs/Contribution margin per unit

⑤ Planning and Control Metrics

Cost variance = Actual cost − Standard (budgeted) cost

Sales (revenue) variance = Actual sales − Standard (budgeted) sales

⑥ Capital Budgeting

Payback period = Time expected to recover initial investment cost

Accounting rate of return = Annual income/Average investment

Net present value (NPV) = PV of future cash flows − Initial investment cost

NPV rule: 1. Compute net present value (NPV in $).
2. If NPV > 0, then accept project; If NPV < 0, then reject project.

Internal rate of return rule: 1. Compute internal rate of return (IRR in %).
2. If IRR > hurdle rate, accept project; If IRR < hurdle rate, reject project.

⑦ Costing Terminology

Relevant range:	Organization's normal range of operating activity.
Direct cost:	Cost incurred for the benefit of one cost object.
Indirect cost:	Cost incurred for the benefit of more than one cost object.
Product cost:	Cost that is necessary and integral to finished products.
Period cost:	Cost identified more with a time period than with finished products.
Overhead cost:	Cost not separately or directly traceable to a cost object.
Relevant cost:	Cost that is pertinent to a decision.
Opportunity cost:	Benefit lost by choosing an action from two or more alternatives.
Sunk cost:	Cost already incurred that cannot be avoided or changed.
Out-of-pocket cost:	Requires a future outlay of cash.
Avoidable cost:	Can be eliminated by choosing one alternative over another.
Standard cost:	Cost computed using standard price and standard quantity.
Budget:	Formal statement of an organization's plans in monetary terms.
Break-even point:	Sales level at which an organization earns zero profit.
Incremental revenue:	Revenue earned if the organization takes a certain action.
Incremental cost:	Cost incurred only if the organization undertakes a certain action.
Incremental income:	Incremental revenue minus incremental cost.
Transfer price:	Price on transaction between divisions within a company.

⑧ Standard Cost Variances

Total materials variance = Materials price variance + Materials quantity variance

Total labor variance = Labor rate variance + Labor efficiency variance

Standard overhead rate = Flexible overhead budget at predicted activity level / Standard allocation base at predicted activity level

Standard overhead applied = Actual production × Standard amount of allocation base × Standard overhead rate

Total overhead variance = Actual total overhead − Standard overhead applied
or = Overhead controllable variance + Overhead volume variance

Controllable variance = Actual total overhead − Budgeted (flexible) overhead at units produced

Volume variance = Budgeted (flexible) overhead at units produced − Standard overhead applied

Materials price variance	= [AQ × AP] − [AQ × SP]
Materials quantity variance	= [AQ × SP] − [SQ × SP]
Labor rate variance	= [AH × AR] − [AH × SR]
Labor efficiency variance	= [AH × SR] − [SH × SR]

where AQ is Actual Quantity of materials; AP is Actual Price of materials; AH is Actual Hours of labor; AR is Actual Rate of wages; AVR is Actual Variable Rate of overhead; SQ is Standard Quantity of materials; SP is Standard Price of materials; SH is Standard Hours of labor; SR is Standard Rate of labor; SVR is Standard Variable Rate of overhead.

⑨ Sales Variances

Sales price variance	= [AS × AP] − [AS × BP]
Sales volume variance	= [AS × BP] − [BS × BP]

where AS = Actual Sales units; AP = Actual sales Price;
BP = Budgeted sales Price; BS = Budgeted Sales units (fixed budget).

Schedule of Cost of Goods Manufactured
For *period* Ended *date*

Direct materials	
Raw materials inventory, beginning	$ #
Raw materials purchases	#
Raw materials available for use	#
Less raw materials inventory, ending	(#)
Direct materials used	#
Direct labor	#
Factory overhead (applied)	#
Total manufacturing costs	#
Add work in process inventory, beginning	#
Total cost of work in process	#
Less work in process inventory, ending	(#)
Cost of goods manufactured	$ #

Contribution Margin Income Statement
For *period* Ended *date*

Sales	$ #
Variable costs	#
Contribution margin	#
Fixed costs	#
Income	$ #

Flexible Budget
For *period* Ended *date*

	Variable Amount per Unit	Total Fixed Cost	Flexible Budget for Unit Sales of #
Sales	$ #		$ #
Variable costs			
Examples: Direct materials, Direct labor, Delivery costs, Sales commissions	#		#
Total variable costs	#		#
Contribution margin	$ #		#
Fixed costs			
Examples: Depreciation, Property taxes, Supervisory salaries, Administrative salaries, Insurance		$ #	#
		#	#
Total fixed costs		$ #	#
Income			$ #

Total flexible budget costs = Total fixed costs + (Total variable costs per unit × Units of activity level)

Budget variance* = Budget amount − Actual amount

*Applies to both flexible and fixed budgets. *F* = Favorable variance; *U* = Unfavorable variance.

Activity-Based Costing Steps

① Identify activities and assign budgeted costs to activity cost pools.
② Compute an overhead activity rate for each activity cost pool.
③ Allocate overhead costs to cost objects (products).

Activity rate = Budgeted activity cost / Budgeted activity usage

Performance Measurement

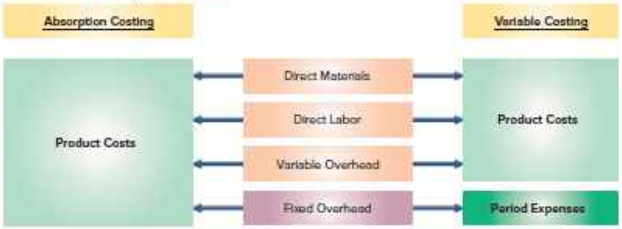
Return on investment = Income / Average assets

Residual income = Income − Target income

Balanced Scorecard Perspectives

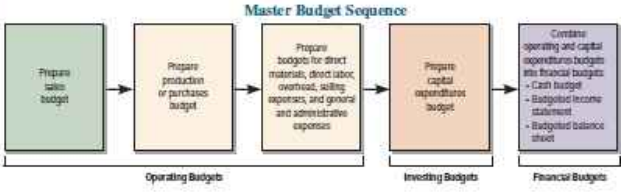
1. Customer
2. Internal processes
3. Innovation/learning
4. Financial

Variable and Absorption Costing



Absorption costing includes fixed overhead in product costs.
Variable costing includes fixed overhead in period expenses.

Master Budget Sequence



BRIEF REVIEW: FINANCIAL REPORTS AND TABLES

Income Statement*
For *period* Ended *date*

Net sales (revenues)		$ #
Cost of goods sold (cost of sales)		#
Gross margin (gross profit)		#
Operating expenses		
Examples: depreciation, salaries, wages, rent, utilities,	$ #	
interest, amortization, advertising, insurance,	#	
taxes, selling, general and administrative	#	
Total operating expenses		#
Nonoperating gains and losses (unusual and/or infrequent)		#
Net income (net profit or earnings)		$ #

*A typical chart of accounts is at the end of the text and classifies all accounts by financial statement categories.

Balance Sheet
Date

ASSETS		
Current assets		
Examples: cash, cash equivalents, short-term investments,	$ #	
accounts receivable, current portion of notes receivable,	#	
inventory, inventory returns estimated, prepaid expenses	#	
Total current assets		$ #
Long-term investments		
Examples: notes receivable, investment in stock, investment in bonds	#	
Total long-term investments		#
Plant assets		
Examples: equipment, machinery, buildings, land	#	
Total plant assets, net of depreciation		#
Intangibles		
Examples: patent, trademark, copyright, license, right-of-use, goodwill	#	
Total intangible assets, net of amortization		#
Total assets		$ #
LIABILITIES AND EQUITY		
Current liabilities		
Examples: accounts payable, wages payable, salaries payable,	$ #	
current notes payable, taxes payable, interest payable,	#	
unearned revenues, current portion of debt, sales refund payable	#	
Total current liabilities		$ #
Long-term liabilities		
Examples: notes payable, bonds payable, lease liability	#	
Total long-term liabilities		#
Total liabilities		#
Equity*		
Common stock		#
Paid-in capital in excess of par (or stated value)		#
Retained earnings		#
Less treasury stock		(#)
Total equity		#
Total liabilities and equity		$ #

Statement of Cash Flows
For *period* Ended *date*

Cash flows from operating activities	
[Prepared using the indirect (see below)† or direct method]	
Net cash provided (used) by operating activities	$ #
Cash flows from investing activities	
[List of individual investing inflows and outflows]	
Net cash provided (used) by investing activities	#
Cash flows from financing activities	
[List of individual financing inflows and outflows]	
Net cash provided (used) by financing activities	#
Net increase (decrease) in cash	$ #
Cash (and equivalents) balance at beginning of period	#
Cash (and equivalents) balance at end of period	$ #

Separate schedule or note disclosure of any "Noncash investing and financing transactions" is required.

†Indirect Method: Cash Flows from Operating Activities

Cash flows from operating activities		
Net income		$ #
Adjustments for operating items not providing or using cash		
+Noncash expenses and losses	$ #	
Examples: Expenses for depreciation, depletion, and amortization; losses from disposal of long-term assets and from retirement of debt		
–Noncash revenues and gains	#	
Examples: Gains from disposal of long-term assets and from retirement of debt		
Adjustments for changes in current assets and current liabilities		
+Decrease in noncash current operating assets	#	
–Increase in noncash current operating assets	#	
+Increase in current operating liabilities	#	
–Decrease in current operating liabilities	#	
Net cash provided (used) by operating activities		$ #

Statement of Retained Earnings
For *period* Ended *date*

Retained earnings, beginning		$ #
Add: Net income		#
		#
Less: Dividends		#
Net loss (if exists)		#
Retained earnings, ending		$ #

Statement of Stockholders' Equity*
For *period* Ended *date*

	Common Stock	Capital in Excess of Par	Retained Earnings	Treasury Stock	Total
Balances, beginning	$ #	$ #	$ #	$ #	$ #
Net income	⋮	⋮	⋮	⋮	⋮
Cash dividends	⋮	⋮	⋮	⋮	⋮
Stock issuance	⋮	⋮	⋮	⋮	⋮
Treasury stock purchase	⋮	⋮	⋮	⋮	⋮
Treasury stock reissuance	⋮	⋮	⋮	⋮	⋮
Other	⋮	⋮	⋮	⋮	⋮
Balances, ending	$ #	$ #	$ #	$ #	$ #

*Additional columns and account titles commonly include number of shares, preferred stock, unrealized gains and losses on available-for-sale securities, foreign currency translation, and comprehensive income.

Premium Bond Amortization (Straight-Line) Table*

Semiannual Period-End	Unamortized Bond Premium†	Bond Carrying Value‡
Bond life-start	$ #	$ #
	⋮	⋮
Bond life-end	0	par

*Bond carrying value is adjusted downward to par and its amortized premium downward to zero over the bond life (carrying value less unamortized bond premium equals par).
†Equals total bond premium less its accumulated amortization.
‡Equals bond par value plus its unamortized bond premium.

Discount Bond Amortization (Straight-Line) Table*

Semiannual Period-End	Unamortized Bond Discount†	Bond Carrying Value‡
Bond life-start	$ #	$ #
	⋮	⋮
Bond life-end	0	par

*Bond carrying value is adjusted upward to par and its amortized discount downward to zero over the bond life (unamortized bond discount plus carrying value equals par).
†Equals total bond discount less its accumulated amortization.
‡Equals bond par value less its unamortized bond discount.

Effective Interest Amortization Table for Bonds with Semiannual Interest Payment

Semiannual Interest Period-End	Cash Interest Paid[A]	Bond Interest Expense[B]	Discount or Premium Amortization[C]	Unamortized Discount or Premium[D]	Carrying Value[E]
#	#	#	#	#	#
⋮	⋮	⋮	⋮	⋮	⋮

[A]Par value multiplied by the semiannual contract rate.
[B]Prior period's carrying value multiplied by the semiannual market rate.
[C]The difference between interest paid and bond interest expense.
[D]Prior period's unamortized discount or premium less the current period's discount or premium amortization.
[E]Par value less unamortized discount or plus unamortized premium.

Installment Notes Payment Table

Period Ending Date	Beginning Balance	Payments: Debit Interest Expense	+	Debit Notes Payable	=	Credit Cash	Ending Balance
#	#	#		#		#	#
⋮	⋮	⋮		⋮		⋮	⋮

Bank Reconciliation
Date

Bank statement balance	$#	Book balance	$#
Add: Deposits in transit	#	Add: Interest earned & unrecorded cash receipts	#
Bank errors understating the balance	#	Book errors understating the balance	#
	#		#
Less: Outstanding checks	#	Less: Bank fees & NSF checks	#
Bank errors overstating the balance	#	Book errors overstating the balance	#
Adjusted bank balance	$#	**Adjusted book balance**	$#

Balances are equal (reconciled)

BRIEF REVIEW: SELECTED TRANSACTIONS AND RELATIONS

① Merchandising Transactions Summary—Perpetual Inventory System

	Merchandising Transactions	Merchandising Entries	Dr.	Cr.
Purchases	Purchasing merchandise for resale.	Merchandise Inventory	#	
		Cash or Accounts Payable		#
	Paying freight costs on purchases; FOB shipping point.	Merchandise Inventory	#	
		Cash		#
	Paying within discount period.	Accounts Payable	#	
		Merchandise Inventory		#
		Cash		#
	Paying outside discount period.	Accounts Payable	#	
		Cash		#
	Recording purchases returns or allowances.	Cash or Accounts Payable	#	
		Merchandise Inventory		#
Sales	Selling merchandise.	Cash or Accounts Receivable	#	
		Sales		#
		Cost of Goods Sold	#	
		Merchandise Inventory		#
	Receiving payment within discount period.	Cash	#	
		Sales Discounts	#	
		Accounts Receivable		#
	Receiving payment outside discount period.	Cash	#	
		Accounts Receivable		#
	Receiving sales returns of nondefective inventory.	Sales Returns and Allowances	#	
		Cash or Accounts Receivable		#
		Merchandise Inventory	#	
		Cost of Goods Sold		#
	Recognizing sales allowances.	Sales Returns and Allowances	#	
		Cash or Accounts Receivable		#
	Paying freight costs on sales; FOB destination.	Delivery Expense	#	
		Cash		#

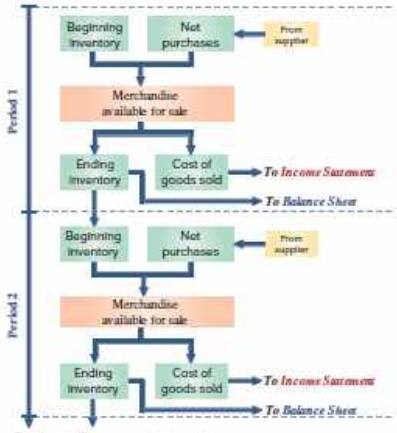
	Merchandising Events	Adjusting and Closing Entries	Dr.	Cr.
Adjusting	Adjustment for shrinkage (occurs when recorded amount larger than physical inventory).	Cost of Goods Sold	#	
		Merchandise Inventory		#
	Period-end adjustment for expected sales discounts.*	Sales Discounts	#	
		Allowance for Sales Discounts		#
	Period-end adjustment for expected returns—both revenue side and cost side.*	Sales Returns and Allowances	#	
		Sales Refund Payable		#
		Inventory Returns Estimated	#	
		Cost of Goods Sold		#
Closing	Closing temporary accounts with credit balances.	Sales	#	
		Income Summary		#
	Closing temporary accounts with debit balances.	Income Summary	#	
		Sales Returns and Allowances		#
		Sales Discounts		#
		Cost of Goods Sold		#
		Delivery Expense		#
		"Other Expenses"		#
	Close Income Summary to Retained Earnings.			
	Close Dividends to Retained Earnings.			

*Period-end adjustments depend on unadjusted balances, which can reverse the debit and credit in the adjusting entries shown; the entries in gray are covered in Appendix 4B.

② Stock Transactions Summary

	Stock Transactions	Stock Entries	Dr.	Cr.
Issue Common Stock	Issue par value common stock at par (par stock recorded at par).	Cash	#	
		Common Stock		#
	Issue par value common stock at premium (par stock recorded at par).	Cash	#	
		Common Stock		#
		Paid-In Capital in Excess of Par Value, Common Stock		#
	Issue no-par value common stock (no-par stock recorded at amount received).	Cash	#	
		Common Stock		#
	Issue stated value common stock at stated value (stated stock recorded at stated value).	Cash	#	
		Common Stock		#
	Issue stated value common stock at premium (stated stock recorded at stated value).	Cash	#	
		Common Stock		#
		Paid-In Capital in Excess of Stated Value, Common Stock		#
Issue Preferred Stock	Issue par value preferred stock at par (par stock recorded at par).	Cash	#	
		Preferred Stock		#
	Issue par value preferred stock at premium (par stock recorded at par).	Cash	#	
		Preferred Stock		#
		Paid-In Capital in Excess of Par Value, Preferred Stock		#
Reacquire Common Stock	Reacquire its own common stock (treasury stock recorded at cost).	Treasury Stock, Common	#	
		Cash		#
Reissue Common Stock	Reissue its treasury stock at cost (treasury stock removed at cost).	Cash	#	
		Treasury Stock, Common		#
	Reissue its treasury stock above cost (treasury stock removed at cost).	Cash	#	
		Treasury Stock, Common		#
		Paid-In Capital, Treasury		#
	Reissue its treasury stock below cost (treasury stock removed at cost).	Cash	#	
		Paid-In Capital, Treasury	#	
		Treasury Stock, Common		#

② Merchandising Cash Flows



③ Credit Terms and Amounts

④ Bad Debts Estimation

⑤ Bond Valuation

⑥ Financial Statement Effects of Dividends and Splits

	Cash Dividend	Small Stock Dividend	Large Stock Dividend	Stock Split
Total assets	Decrease	No change	No change	No change
Total liabilities	No change	No change	No change	No change
Total equity	Decrease	No change	No change	No change
Common stock	No change	Increase	Increase	No change
Paid-in capital in excess of par	No change	Increase	No change	No change
Retained earnings	Decrease	Decrease	Decrease	No change

⑦ A Rose by Any Other Name

The same financial statement sometimes receives different titles. Following are some of the more common aliases.*

Balance Sheet	Statement of Financial Position Statement of Financial Condition
Income Statement	Statement of Income Operating Statement Statement of Operations Statement of Operating Activity Earnings Statement Statement of Earnings Profit and Loss (P&L) Statement
Statement of Cash Flows	Statement of Cash Flow Cash Flows Statement Statement of Changes in Cash Position Statement of Changes in Financial Position
Statement of Stockholders' Equity	Statement of Shareholders' Equity Statement of Changes in Shareholders' Equity Statement of Stockholders' Equity and Comprehensive Income Statement of Changes in Owner's Equity Statement of Changes in Owner's Capital Statement of Changes in Capital Accounts

*The term **Consolidated** often precedes or follows these statement titles to reflect the combination of different entities such as a parent company and its subsidiaries.

BRIEF REVIEW: FUNDAMENTALS AND ANALYSES

FUNDAMENTALS

① Accounting Equation

Assets	=	Liabilities	+	Equity
↑ Debit for increases	↓ Credit for decreases	↓ Debit for decreases	↑ Credit for increases	↓ Debit for decreases	↑ Credit for increases

Contributed Capital* + Retained Earnings

Common Stock − Dividends + Revenues − Expenses

Dr. for decreases	Cr. for increases	Dr. for increases	Cr. for decreases	Dr. for decreases	Cr. for increases	Dr. for increases	Cr. for decreases

Indicates normal balance.

*Includes common stock and any preferred stock.

② Accounting Cycle

③ Adjustments and Entries

Type	Adjusting Entry	
Deferred Assets (or Prepaid Expenses)	Dr. Expense	Cr. Asset*
Deferred Liabilities (or Unearned Revenues)	Dr. Liability	Cr. Revenue
Accrued Expenses	Dr. Expense	Cr. Liability
Accrued Revenues	Dr. Asset	Cr. Revenue

*For depreciation, credit Accumulated Depreciation (contra asset).

④ Four-Step Closing Process

1. Transfer revenue and gain account balances to Income Summary.
2. Transfer expense and loss account balances to Income Summary.
3. Transfer Income Summary balance to Retained Earnings.
4. Transfer Dividends balance to Retained Earnings.

⑤ Accounting Concepts

Characteristics	Assumptions	Principles	Constraints
Relevance	Business entity	Measurement	Cost-benefit
Faithful representation	Going concern	Revenue recognition	
	Monetary unit	Expense recognition	
	Time period	Full disclosure	

⑥ Ownership of Inventory

Shipping Terms	Ownership Transfers at	Goods in Transit Owned by	Transportation Costs Paid by
FOB shipping point	Shipping point	Buyer	Buyer: Merchandise Inventory . . . #; Cash . . . #; Cash . . . #
FOB destination	Destination	Seller	Seller: Delivery Expense . . . #; Cash . . . #

⑦ Inventory Costing Methods

- Specific identification (SI)
- First-in, first-out (FIFO)
- Weighted-average (WA)
- Last-in, first-out (LIFO)

⑧ Depreciation and Depletion

Straight-line: $\dfrac{\text{Cost} - \text{Salvage value}}{\text{Useful life in periods}}$

Units-of-production: $\dfrac{\text{Cost} - \text{Salvage value}}{\text{Useful life in units}} \times$ Units produced in current period

Declining-balance: Rate* × Beginning-of-period book value

*Rate is often double the straight-line rate, or 2 × (1/Useful life)

Depletion: $\dfrac{\text{Cost} - \text{Salvage value}}{\text{Total capacity in units}} \times$ Units extracted in current period

⑨ Interest Computation

Interest = Principal (face) × Rate × Time

⑩ Accounting for Investment Securities

Classification	Investments Account Reported at
Short-Term Investment in Securities	
Debt Investments—Held-to-Maturity	Cost (without any discount or premium amortization)
Debt Investments—Trading	Fair value (with fair value adjustment to income)
Debt Investments—Available-for-Sale	Fair value (with fair value adjustment to equity)
Stock Investments—Insignificant Influence	Fair value (with fair value adjustment to income)
Long-Term Investment in Securities	
Debt Investments—Held-to-Maturity	Cost (with any discount or premium amortization)
Debt Investments—Available-for-Sale	Fair value (with fair value adjustment to equity)
Stock Investments—Insignificant Influence	Fair value (with fair value adjustment to income)
Equity Method Investments—significant influence	Equity method (no fair value adjustment)
Consolidated Investments—controlling influence	Consolidation method (no fair value adjustment)

ANALYSES

① Liquidity and Efficiency

Current ratio = $\dfrac{\text{Current assets}}{\text{Current liabilities}}$ — pp. 107 & 512

Working capital = Current assets − Current liabilities — p. 512

Acid-test ratio = $\dfrac{\text{Cash + Short-term investments + Current receivables}}{\text{Current liabilities}}$ — pp. 168 & 513

Accounts receivable turnover = $\dfrac{\text{Net sales}}{\text{Average accounts receivable, net}}$ — pp. 295 & 513

Inventory turnover = $\dfrac{\text{Cost of goods sold}}{\text{Average inventory}}$ — pp. 213 & 513

Days' sales uncollected = $\dfrac{\text{Accounts receivable, net}}{\text{Net sales}} \times 365$ — pp. 260 & 514

Days' sales in inventory = $\dfrac{\text{Ending inventory}}{\text{Cost of goods sold}} \times 365$ — pp. 213 & 514

Days' payable outstanding (or Days' sales in payables) = $\dfrac{\text{Accounts payable}}{\text{Cost of goods sold}} \times 365$ — p. 879

Cash conversion cycle = Days' sales uncollected + Days' sales in inventory − Days' payable outstanding — p. 878

Total asset turnover = $\dfrac{\text{Net sales}}{\text{Average total assets}}$ — pp. 329 & 514

② Solvency

Debt ratio = $\dfrac{\text{Total liabilities}}{\text{Total assets}}$ Equity ratio = $\dfrac{\text{Total equity}}{\text{Total assets}}$ — p. 61

Debt-to-equity = $\dfrac{\text{Total liabilities}}{\text{Total equity}}$ — pp. 399 & 515

Times interest earned = $\dfrac{\text{Income before interest expense and income taxes}}{\text{Interest expense}}$ — pp. 360 & 515

③ Profitability

Profit margin ratio = $\dfrac{\text{Net income}}{\text{Net sales}}$ — pp. 107 & 515

Gross margin ratio = $\dfrac{\text{Net sales} - \text{Cost of goods sold}}{\text{Net sales}}$ — p. 169

Return on total assets = $\dfrac{\text{Net income}}{\text{Average total assets}}$ — pp. 18 & 515

= Profit margin ratio × Total asset turnover — p. 515

Return on equity = $\dfrac{\text{Net income}}{\text{Average total equity}}$ — p. 516

Basic earnings per share = $\dfrac{\text{Net income} - \text{Preferred dividends}}{\text{Weighted-average common shares outstanding}}$ — p. 438

Cash flow on total assets = $\dfrac{\text{Cash flow from operations}}{\text{Average total assets}}$ — p. 473

④ Market

Price-earnings ratio = $\dfrac{\text{Market price per share}}{\text{Earnings per share}}$ — pp. 438 & 516

Dividend yield = $\dfrac{\text{Annual cash dividends per share}}{\text{Market price per share}}$ — pp. 438 & 516

Residual income = Net income − Target net income — p. 873

PAYROLL TAXES

Year-to-Date Pay Bracket (Set Yearly)	Employee Taxes	Employer Taxes
$0 to $7,000	FICA—Medicare FICA—Social Security State & Federal Income Tax	FICA—Medicare FICA—Social Security FUTA SUTA
$7,000 to $137,700	FICA—Medicare FICA—Social Security State & Federal Income Tax	FICA—Medicare FICA—Social Security
Above $137,700	FICA—Medicare State & Federal Income Tax	FICA—Medicare

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