



MANAGERIAL ACCOUNTING

TOOLS FOR BUSINESS DECISION-MAKING

FOURTH CANADIAN EDITION

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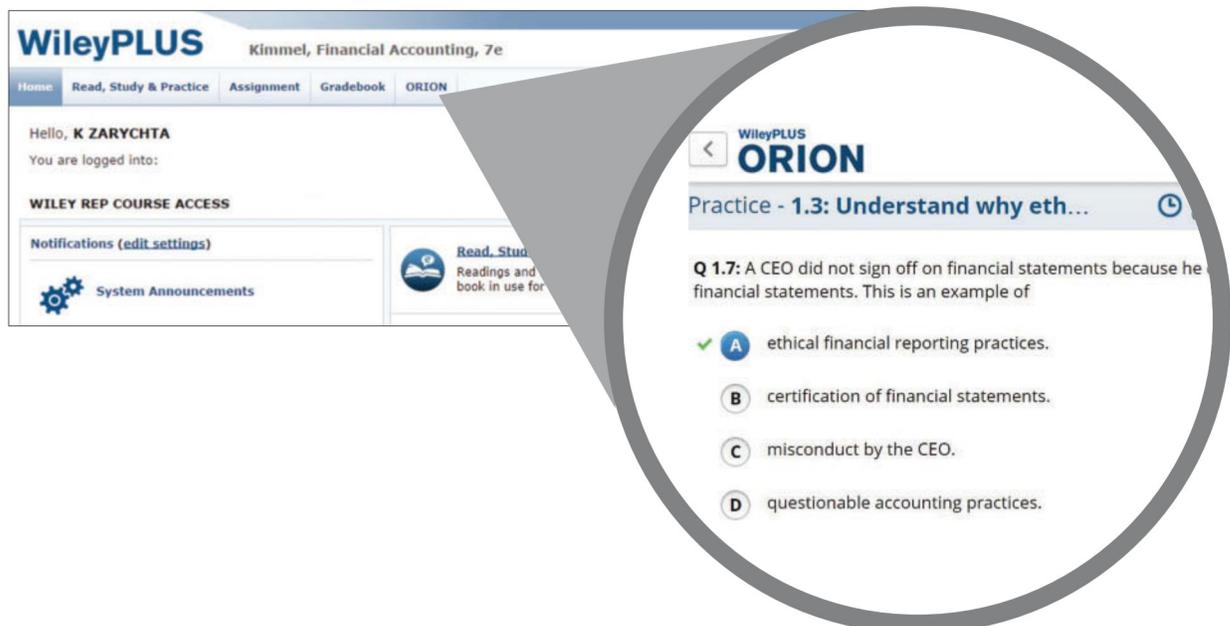
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WileyPLUS Kimmel, Financial Accounting, 7e

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Q 1.7: A CEO did not sign off on financial statements because he financial statements. This is an example of

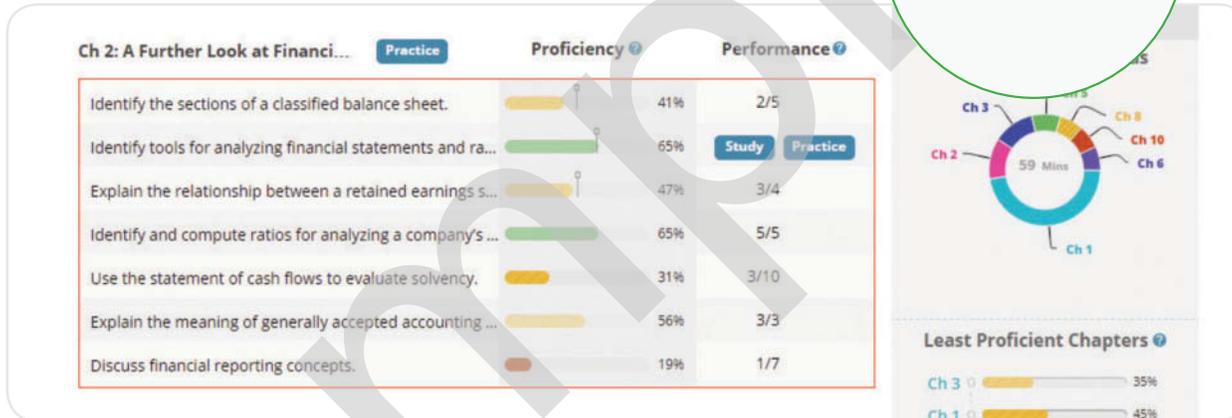
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- B** certification of financial statements.
- C** misconduct by the CEO.
- D** questionable accounting practices.

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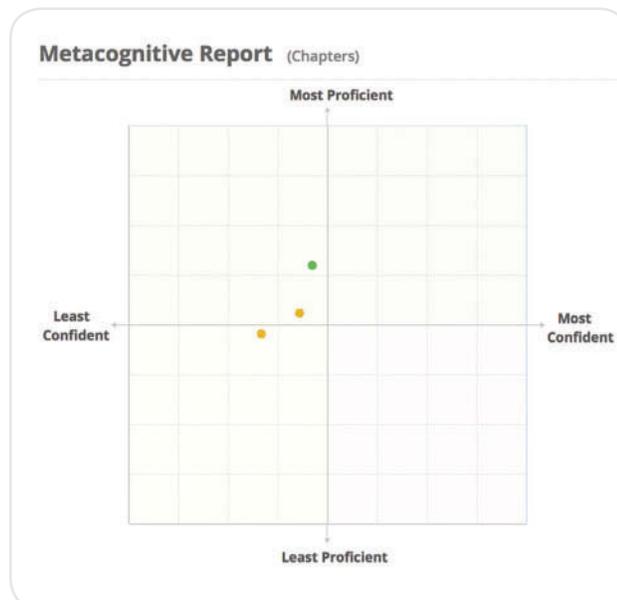
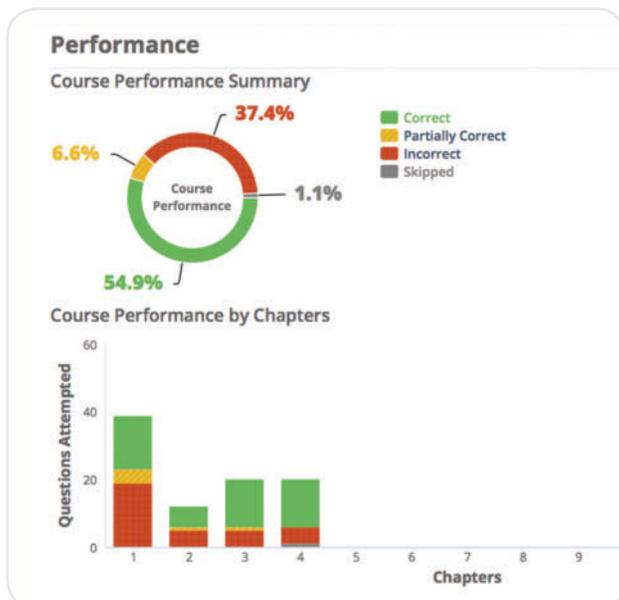
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MANAGERIAL ACCOUNTING

TOOLS FOR BUSINESS DECISION-MAKING

Fourth Canadian Edition

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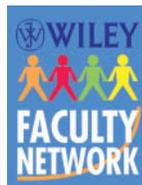
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ABOUT THE AUTHORS

U.S. Edition

Jerry J. Weygandt, Ph.D., CPA, is the Arthur Andersen Alumni Emeritus Professor of Accounting at the University of Wisconsin—Madison. He holds a Ph.D. in accounting from the University of Illinois. Articles by Professor Weygandt have appeared in *Accounting Review*, *Journal of Accounting Research*, *Accounting Horizons*, *Journal of Accountancy*, and other academic and professional journals. Professor Weygandt is author of other accounting and financial reporting books and is a member of the American Accounting Association, the American Institute of Certified Public Accountants, and the Wisconsin Society of Certified Public Accountants. He has served on numerous committees of the American Accounting Association and as a member of the editorial board of *Accounting Review*; he has also served as President and Secretary-Treasurer of the American

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Paul D. Kimmel, Ph.D., CPA, received his bachelor's degree from the University of Minnesota and his doctorate in accounting from the University of Wisconsin. He is an Associate Professor at the University of Wisconsin—Milwaukee, and has public accounting experience with Deloitte & Touche. He was the recipient of the UWM School of Business Advisory Council Teaching Award, the Reggie Taite Excellence in Teaching Award, and a three-time winner of the Outstanding Teaching Assistant Award at the University of Wisconsin. He is also a recipient of the Elijah Watts Sells Award for Honorary Distinction for his results on the CPA exam. He is a member of the American

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Donald E. Kieso, Ph.D., CPA, received his bachelor's degree from Aurora University and his doctorate in accounting from the University of Illinois. He has served as chairman of the Department of Accountancy and is currently the KPMG Emeritus Professor of Accounting at Northern Illinois University. He has public accounting experience with Price Waterhouse & Co. and Arthur Andersen & Co. and research experience with the Research Division of the American Institute of Certified Public Accountants. He is a recipient of NIU's Teaching Excellence Award and four Golden Apple Teaching Awards. Professor Kieso is a member of the American Accounting Association, the American Institute of Certified Public Accountants, and the Illinois CPA Society. He has served as a member of the Board of Directors of the Illinois CPA Society, the

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Canadian Edition

Ibrahim M. Aly, Ph.D., is a professor in the Department of Accountancy at the John Molson School of Business, Concordia University, where he has been on faculty since 1989. Professor Aly holds a Ph.D. and MBA (with distinction) in accounting from the University of North Texas, as well as an M.S. and B.Comm. in accounting with distinction from Cairo University, Egypt. Professor Aly has taught at a variety of universities in Egypt, Saudi Arabia, the United States, and Canada and he has developed and coordinated many accounting courses at both the undergraduate and graduate levels. He participated in the Symposium on Models of Accounting Education, sponsored by the Accounting Education Change Commission of the American Accounting Association. Throughout his many years of teaching, Professor Aly's method of instruction has consistently been met with high praise from his students. He won the College of

Business Teaching Innovation Award for two consecutive years. Professor Aly has published in reputable refereed journals in the fields of managerial accounting, financial accounting, behavioural accounting, and accounting education. In addition, he has previously published a book on management accounting entitled *Readings in Management Accounting: New Rules for New Games in Manufacturing and Service Organizations*. He has presented his work at over 35 scholarly national and international conferences, and been chosen as the Department of Accountancy Research Professor. He has organized the department's luncheon presentations series and the Ph.D. visiting speaker series, both of which provide an indispensable academic service to graduate students and professors. Professor Aly has given numerous workshops and seminars on financial and managerial accounting.

ACKNOWLEDGEMENTS

I would like to express my appreciation to the many people who have contributed to the development of this textbook. I gratefully acknowledge the valuable suggestions that I received from instructors of managerial accounting, including users of the previous editions of the text. Their contribution significantly improved the content and pedagogy of the final product.

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I would like to extend my sincere appreciation to the U.S. authors of this textbook for their willingness to share their work with me. They have advanced the discussion of management accounting from that established in traditional textbooks, which focused on “number-crunchers,” to a more modern view of accountants as critical participants in the business decision-making process. The features of this book will help accounting students discover a reasonable balance between learning managerial accounting techniques and gaining essential skills and how to apply them when they enter the workforce.

My appreciation is also extended to CPA Canada for permission to use or adapt problems from past examinations.

I express my gratitude to the many fine people at John Wiley & Sons Canada who have professionally guided this text through the development and publication process. In particular, I acknowledge the publisher, Veronica Visentin, for her interest in and support of this fourth Canadian edition of the textbook. In addition, I extend my appreciation to Wiley Canada’s editorial staff, who were terrific in guiding me through this challenging process, especially Zoë Craig, Acquisitions Editor; Deanna Durnford, Supplements Coordinator; Daleara Hirjikaka, Developmental Editor; Anita Osborne, Marketing Manager; Karen Staudinger, Editorial Manager; and Carolyn Wells, Vice-President, Digital & Business Solutions. I also extend my appreciation to all other members of the publishing team at John Wiley & Sons Canada who worked together to complete this project. The editorial expertise of Laurel Hyatt, Zofia Laubitz, Denise Showers, and Belle Wong is also very much appreciated.

Finally, special thanks and gratitude are extended to my family for their support and encouragement.

Suggestions and comments from users—instructors and students alike—will be appreciated.

Ibrahim Aly
Montreal, Quebec

What's New?

WileyPLUS with ORION

Available in WileyPLUS with Orion, an adaptive study and practice tool that helps students build proficiency in course topics. Up to 400 new, multiple-choice questions were written for each chapter.

Updated Content and Design

We scrutinized all chapter material to find new ways to engage students and help them learn accounting concepts. Up-to-date coverage and new discussions of important managerial accounting topics include Chapter 1, **sustainable business**, Chapter 7 **retain or replace equipment**, and Chapter 9, **total cost pricing**. Homework problems were updated in all chapters.

New learning objective modules join practice and textbook concepts. Most learning objectives now close with a **DO IT!** exercise and solution. The new learning objective modules help students practise their understanding before they move on to different topics in other learning objectives. The new learning objective approach motivates students and helps them make the best use of their time.

WileyPLUS Videos

Over 100 videos are available in WileyPLUS. The videos walk students through relevant homework problems and solutions, review important concepts, and explore topics in a real-world context.

Student Practice and Solutions

New practice opportunities with solutions are integrated throughout the textbook and WileyPLUS course. Each textbook chapter provides students with learning objective summaries, multiple-choice questions with answers, and both Comprehensive Do It! and Using the Decision Toolkit problems with solutions. Also, learning objectives in the textbook are followed by a Do It! exercise with an accompanying solution.

In WileyPLUS, selected brief exercises, Do It! exercises, and exercises are available for practice with each chapter. Where possible, questions are algorithmic, providing students with multiple opportunities for advanced practice.

Real World Context: Feature Stories and Comprehensive Problems

New feature stories apply chapter topics to new real-world company examples. Beginning in Chapter 1, we introduce **Current Designs**, a US-based kayak-making company with Canadian origins. We then follow up with a new decision-making problem in every chapter based on this real-world company. Each problem presents realistic managerial accounting situations that students must analyze to determine the best course of action. This problem is accompanied by a continuing Excel tutorial in each chapter. Throughout the chapters, the real-world insight boxes show how people in actual companies make decisions using accounting information. Answers to the critical thinking questions that follow each box are provided in the instructor's manual.

Comprehensive Homework Material with Excel

Each chapter concludes with revised Self-Test Questions, Brief Exercises, Do It! Review, Exercises, and Problems. Exercises and problems marked with a pencil icon help students practice business writing skills. Items marked with a handshake icon focus on accounting situations faced by service companies. An icon identifies Exercises and Problems that can be solved using Excel templates on the book's companion website and in WileyPLUS. The Waterways Continuing Problem uses the business activities of a fictional company, to help students apply managerial accounting topics to a realistic entrepreneurial situation. A continuing Excel tutorial is available at the end of each chapter with the Decision-Making at Current Designs problem.

More information about the fourth edition is available on the book's website at www.wiley.com/go/managerialcanada.

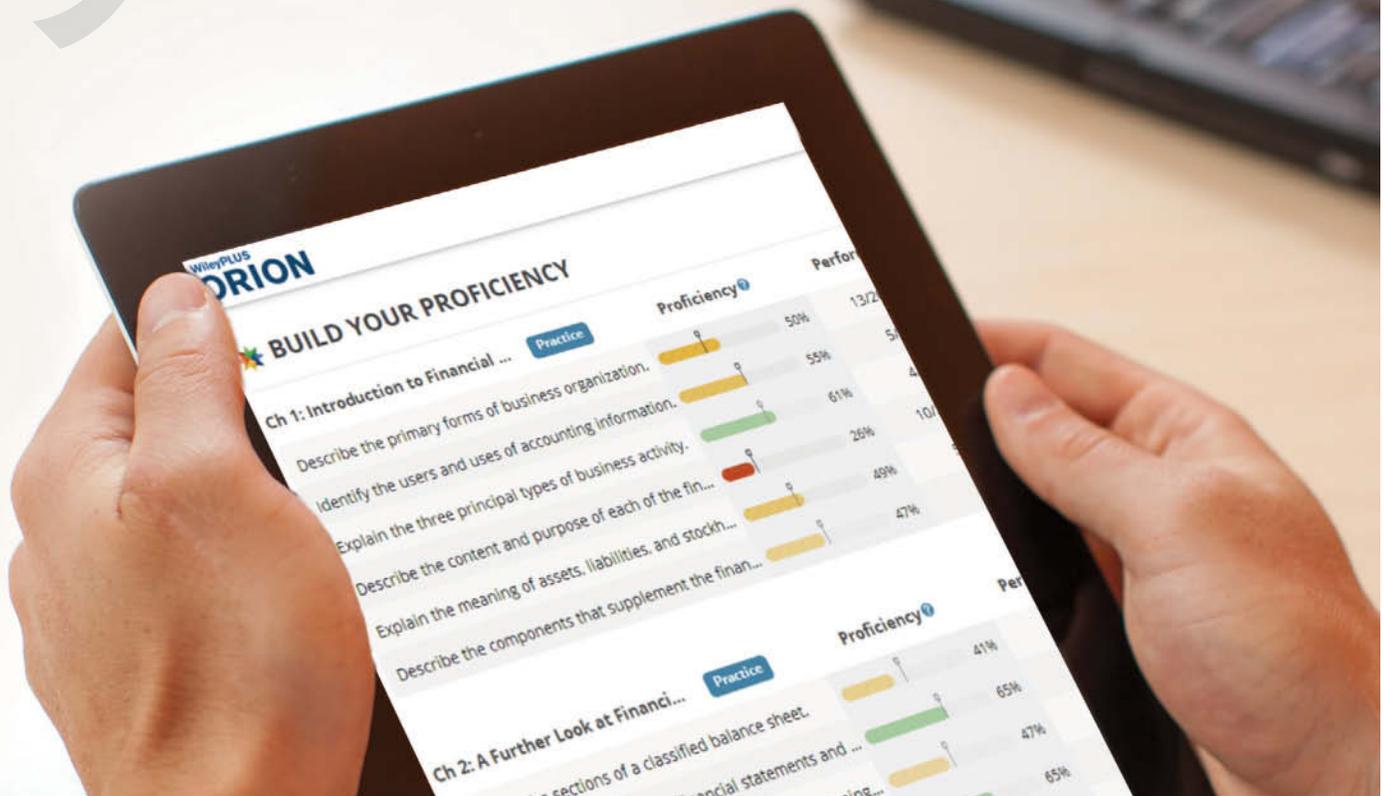


Practice Made Simple

The Team for Success is focused on helping students get the most out of their accounting course by **making practice simple**. Both in the printed text and the online environment of *WileyPLUS*, new opportunities for self-guided practice allow students to check their knowledge of accounting concepts, skills, and problem-solving techniques as they receive individual feedback at the question, learning objective, and course level.

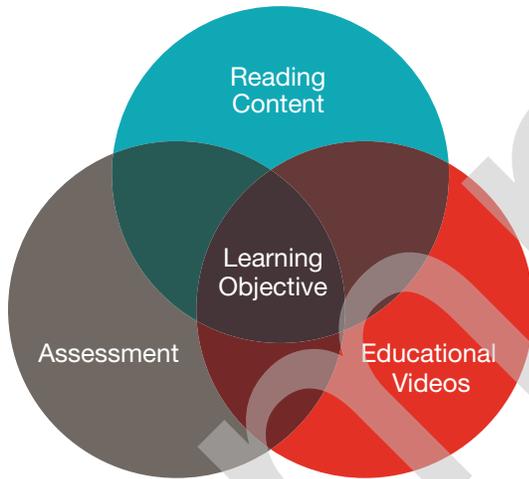
Personalized Practice

Based on cognitive science, **WileyPLUS with ORION** is a personalized, adaptive learning experience that gives students the practice they need to build proficiency on topics while using their study time most effectively. The adaptive engine is powered by hundreds of unique questions per chapter, giving students endless opportunities for practice throughout the course.



Streamlined Learning Objectives

Newly streamlined learning objectives help students make the best use of their time outside of class. Each learning objective contains a variety of practice and assessment questions, review material, and educational videos, so that no matter where students begin their work, the relevant resources and practice are readily accessible.



Review and Practice

Students have more opportunities for self-guided practice in the text and in WileyPLUS.

PRACTISE ASSIGNMENT
Chapter 5 Problem Material
Exercises 5-1
Exercises 5-21
Exercises 5-27
Exercises 5-31 (Review)
Exercise 5-34

Review Score
Review Results by Study Objective

(b)
The parts of this question must be completed in order. This part will be available when a student completes the part above.
Calculate the overhead rate using the activity-based costing approach. (Round answers to 2 decimal places, e.g. 15.25.)

Cost Pool	Overhead rate
Machining	\$ 111.00 per machine hour
Machine set-up	\$ 127.07 per set-up

(c)
The parts of this question must be completed in order. This part will be available when a student completes the part above.
Determine the difference in allocation between the two approaches. (Round answers to 0 decimal places, e.g. 1,225.)

	Traditional costing	Activity-based costing	Difference
Standard	\$ 65,842	\$ 76,123	7,487
Custom	\$ 179,203	\$ 186,805	-7,602

The text includes worked out solutions to select questions, exercises, and problems, plus:

- Learning Objectives Review
- Glossary Review
- Practice Multiple-Choice Questions
- Do It! Exercises and Solutions
- Comprehensive Do It! Problem and Solutions
- Using the Decision Toolkit Problems and Solutions

WileyPLUS includes updated practice assignments featuring several Do ITs, Brief Exercises, and Exercises, giving students the opportunity to check their work or see the answer and solution after their final attempt.

BEFORE YOU GO ON...

Do It! Work in Process
Danielle Company is working on two job orders. The job cost sheets show the following:
Direct materials—Job No. 120, \$6,000; Job No. 121, \$3,600
Direct labour—Job No. 120, \$4,000; Job No. 121, \$2,000
Manufacturing overhead—Job No. 120, \$5,000; Job No. 121, \$2,500
Prepare the three summary entries to record the assignment of costs to Work in Process Inventory from the data on the job cost sheets.

Action Plan

- Recognize that Work in Process Inventory is the control account for all unfinished job cost sheets.
- Debit Work in Process Inventory for the materials, labour, and overhead charged to the job cost sheets.
- Credit the accounts that were debited when the manufacturing costs were accumulated.

Solution
The three summary entries are as follows:

Work in Process Inventory (\$6,000 + \$3,600)	9,600	9,600
Raw Materials Inventory To assign materials to jobs.		
Work in Process Inventory (\$4,000 + \$2,000)	6,000	6,000
Factory Labour To assign labour to jobs.		
Work in Process Inventory (\$5,000 + \$2,500)	7,500	7,500
Manufacturing Overhead To assign overhead to jobs.		

Related exercise material: BE3-6, E3-18, E3-22, and Do It! D3-14.



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Managerial Accounting

The Navigator is a learning system that prompts you to use the learning aids in the chapter and helps you set priorities as you study.

The Navigator

Chapter 1

- Scan *Study Objectives*
- Read *Feature Story*
- Read *Chapter Preview*
- Read text and answer *Before You Go On* p. 5, p. 8, p. 12, p. 18
- Review *Summary of Study Objectives*
- Answer *Self-Study Questions*
- Complete assignments



study objectives

Study Objectives give you a framework for learning the specific concepts covered in the chapter.



After studying this chapter, you should be able to do the following:

1. Explain the distinguishing features of managerial accounting.
2. Identify the three broad functions of management and the role of management accountants in an organizational structure.
3. Explain the importance of business ethics.
4. Identify changes and trends in managerial accounting.

The **Feature Story** helps you picture how the chapter topic relates to the real world of business and accounting. You will find references to the story throughout the chapter.

ACCOUNTING KEEPS BUSINESSES AFLOAT

Growing up on Vancouver Island, Brian Henry explored the beautiful coastline by kayak. Feeling the need to have better equipment that was suited to the rugged environment, Mr. Henry began building sea kayaks for himself and his friends. In the late 1970s, that turned into a business, Current Designs, which expanded to design and build kayaks out of increasingly sophisticated materials. Over the years, Current Designs teamed up with world-famous kayakers to design models sold all over the world.

Meanwhile, on the inland waterways of Minnesota, Mike Cichanowski grew up paddling a canoe to explore the Mississippi River. He, too, started designing and building his own boats—in this case, canoes—and eventually took out a bank loan and built his own small shop, giving birth to the company Wenonah Canoe.

In 1991, as kayaking became more popular, Wenonah Canoe became the U.S. distributor of Current Designs kayaks. By 1999, Mr. Cichanowski made another critical business decision when Wenonah Canoe purchased majority ownership of Current Designs. In 2004, Mr. Cichanowski moved Current Designs' operations in Victoria to Minnesota, saying that 70% of boats made in Victoria were shipped to the United States. "The logistics of invoicing, shipping and handling those boats multiple times has led the company to look at a strategy of consolidating manufacturing and shipping at a single U.S. location," Wenonah said in a news release.

Today, Wenonah Canoe's 90 employees produce and sell about 12,000 canoes and kayaks per year through 500 retailers around the world.

Entrepreneurs like Mr. Cichanowski and Mr. Henry will tell you that business success is "a three-legged stool." The first leg is the knowledge and commitment to make a great product. Wenonah's canoes and Current Designs' kayaks are widely regarded as among the very best. The second leg is the ability to sell your product. Both companies started off making great boats, but it took a little longer to figure out how to sell them.

The third leg is not something that you would immediately associate with entrepreneurial success. It is what goes on behind the scenes—accounting. Good accounting information is absolutely critical to the countless decisions, big and small, that ensure the survival and growth of companies. Good accounting information allowed Mr. Henry to decide to sell to Wenonah and Mr. Cichanowski to decide to buy Current Designs and later move its production to Minnesota.

Bottom line: No matter how good your product is, and no matter how many units you sell, if you don't have a firm grip on your numbers, you are up a creek without a paddle.

Sources: Darrell Ehrlick, "Wenonah Canoe Buys Kayak Firm; Move Will Bring Jobs to Winona," *WinonaDailyNews.com*, April 19, 2011; Sea Stachura, "Wenonah Canoe Steers Straight in the Recession," *Minnesota Public Radio*, www.mprnews.org, March 20, 2009; Norman Gidney, "Kayak Maker to Shut Down," *Victoria Times Colonist*, April 30, 2004, p. B4; Current Designs corporate website, www.cdkayak.com; Wenonah Canoe corporate website, www.wenonah.com.

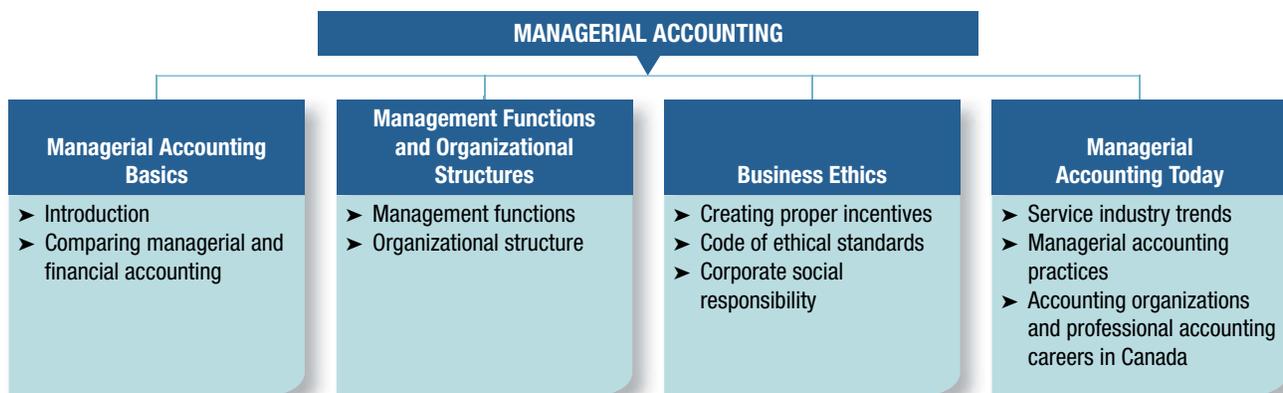


Preview of Chapter 1

The **Preview** describes the purpose of the chapter and outlines the major topics and subtopics in it.

This chapter focuses on issues dealing with the field and substance of managerial accounting. In a previous financial accounting course, you learned about the form and content of **financial statements for external users** of financial information, such as shareholders and creditors. These financial statements are the main product of financial accounting. Managerial accounting focuses primarily on the preparation of **reports for internal users** of financial information, such as the managers and officers of a company. Managers are evaluated on the results of their decisions. In today's rapidly changing global environment, managers must often make decisions that determine their company's fate—and their own. Managerial accounting provides tools that help management make decisions and evaluate the effectiveness of those decisions.

The chapter is organized as follows:



Managerial Accounting Basics

INTRODUCTION

STUDY OBJECTIVE 1

Explain the distinguishing features of managerial accounting.

Essential terms and concepts are printed in blue where they first appear and are defined in the end-of-chapter Glossary.

Managerial accounting, also called management accounting, is a field of accounting that provides economic and financial information for managers and other internal users.

The skills that you will learn in this course will be vital to your future success in business. You don't believe us? Let's look at some examples of some of the crucial activities of employees at **Current Designs**, and where those activities are addressed in this textbook.

In order to know whether it is making a profit, Current Designs needs accurate information about the cost of each kayak. But first, we explain the field and substance of managerial accounting (Chapter 1). Chapter 2 explains various managerial cost concepts that are useful in planning, directing, and controlling. We also present cost flows and the process of cost accumulation in a manufacturing environment and costs and how they are reported in the financial statements. Chapters 3, 4, and 5 calculate the cost of providing a service or manufacturing a product. And to stay profitable, Current Designs must adjust the number of kayaks it produces in light of changes in economic conditions and consumer tastes. It then needs to understand how changes in the number of kayaks it produces impact its production costs and profitability (Chapter 6). Further, Current Designs' managers must often consider alternative courses of action. For example, should the company accept a special order from a customer, produce a particular kayak component internally or outsource it, or continue or discontinue a particular product line (Chapter 7)? Chapter 8 evaluates the impact on decision-making of alternative approaches for costing inventory. Finally, one of the most important, and most difficult, decisions is what price to charge for the kayaks (Chapter 9). In order to plan for the future, Current Designs prepares budgets (Chapter 10), and it then compares its budgeted numbers with its actual results to evaluate performance and identify areas that need to change (Chapters 11 and 12). Finally, it sometimes needs to make substantial investment decisions, such as the building of a new plant or the purchase of new equipment (Chapter 13).

Someday, you are going to face decisions just like these. You may end up in sales, marketing, management, production, or finance. You may work for a company that provides medical care, produces software, or serves up mouth-watering meals. No matter what your position is, and no matter what your product, the skills you acquire in this class will increase your chances of business success. Put another way, in business you can either guess, or you can make an informed decision. As the CEO of Microsoft once noted: "If you're supposed to be making money in business and supposed to be satisfying customers and building market share, there are numbers that characterize those things. And if somebody can't speak to me quantitatively about it, then I'm nervous." This course gives you the skills you need to quantify information so you can make informed business decisions.

Managerial accounting applies to all types of businesses—service, merchandising, and manufacturing. It also applies to all forms of business organizations—proprietorships, partnerships, and corporations. Managerial accounting is needed in not-for-profit entities, including governments, as well as in profit-oriented enterprises.

In the past, managerial accountants were primarily engaged in cost accounting: collecting and reporting costs to management. Recently, that role has changed significantly. First, as the manufacturing environment has become more automated, methods used to determine the amount and type of cost in a product have changed. Second, today's managerial accountants are now responsible for strategic cost management; that is, they help management evaluate how well the company is employing its resources. As a result, managerial accountants now serve as team members alongside personnel from production, marketing, and engineering when the company makes critical strategic decisions.

COMPARING MANAGERIAL AND FINANCIAL ACCOUNTING

There are both similarities and differences between managerial and financial accounting. First, both fields deal with the economic events of a business. Thus, their interests overlap. For example, *determining* the unit cost of manufacturing a product is part of managerial accounting. *Reporting* the total cost of goods manufactured and sold is part of financial accounting. In addition, both

managerial and financial accounting require that a company’s economic events be quantified and communicated to interested parties.

Illustration 1-1 summarizes the principal differences between financial accounting and managerial accounting. The varied needs for economic data among interested parties are the reason for many of the differences.

Illustration 1-1
Differences between financial and managerial accounting

Feature	Financial Accounting	Managerial Accounting
Primary Users of Reports	External users: shareholders, creditors, and regulators.	Internal users: officers and managers.
Types and Frequency of Reports	Financial statements. Quarterly and annually.	Internal reports. As frequently as needed.
Purpose of Reports	General-purpose.	Special-purpose for specific decisions.
Content of Reports	Pertains to business as a whole. Highly aggregated (condensed). Limited to double-entry accounting and cost data. Generally accepted accounting principles.	Pertains to subunits of the business. Very detailed. Extends beyond double-entry accounting to any relevant data. Standard is relevance to decisions.
Verification Process	Audited by CPA (chartered professional accountant).	No independent audits.

BEFORE YOU GO ON...

► Do It! Managerial Accounting Concepts

Indicate whether the following statements are true or false.

1. Managerial accountants have a single role within an organization: collecting and reporting costs to management.
2. Financial accounting reports are general-purpose and intended for external users.
3. Managerial accounting reports are special-purpose and issued as frequently as needed.

Action Plan

- Understand that managerial accounting is a field of accounting that provides economic and financial information for managers and other internal users.
- Understand that financial accounting provides information for external users.

Solution

1. False. Managerial accountants determine product costs. In addition, managerial accountants are now held responsible for evaluating how well the company is employing its resources. As a result, when the company makes critical strategic decisions, managerial accountants serve as team members alongside personnel from production, marketing, and engineering.
2. True.
3. True.

Related exercise material: **E1-3, E1-7, and E1-8, and Do It! D1-1.**

The **Do It!** Exercises ask you to put newly acquired knowledge to work. They outline the Action Plan necessary to complete the exercise, and they show a Solution.



Management Functions and Organizational Structures

MANAGEMENT FUNCTIONS

STUDY OBJECTIVE 2

Identify the three broad functions of management and the role of management accountants in an organizational structure.

Managers' activities and responsibilities can be classified into three broad functions:

1. Planning
2. Directing
3. Controlling

In performing these functions, managers make decisions that have a significant impact on the organization.

Planning requires management to look ahead and to establish objectives. These objectives are often diverse: maximizing short-term profits and market share, maintaining a commitment to environmental protection, and contributing to social programs. For example, Hewlett-Packard, in an attempt to gain a stronger foothold in the computer industry, greatly reduced its prices to compete with Dell. A key objective of management is to add **value** to the business under its control. Value is usually measured by the trading price of the company's shares and by the potential selling price of the company.

Directing involves coordinating a company's diverse activities and human resources to produce a smoothly running operation. This includes implementing planned objectives and providing necessary incentives to motivate employees. For example, manufacturers such as General Motors of Canada Ltd., Magna International Inc., and Dare Foods Ltd. must coordinate their purchasing, manufacturing, warehousing, and selling. Service corporations such as Air Canada, Telus, and CGI must coordinate their scheduling, sales, service, and acquisitions of equipment and supplies. Directing also involves selecting executives, appointing managers and supervisors, and hiring and training employees.

The third management function, **controlling**, is the process of keeping the company's activities on track. In controlling operations, managers determine whether planned goals are being achieved. When there are deviations from target objectives, managers must decide what changes are needed to get back on track. Scandals at companies like Nortel Networks and Hollinger Inc. attest to the fact that companies must have adequate controls to ensure that the company develops and distributes accurate information.

How do managers achieve control? A smart manager in a small operation can make personal observations, ask good questions, and know how to evaluate the answers. But using this approach in a large organization would result in chaos. Imagine the president of Current Designs trying to determine whether planned objectives are being met without some record of what has happened and what is expected to occur. Thus, large businesses typically use a formal system of evaluation. These systems include such features as budgets, responsibility centres, and performance evaluation reports—all of which are features of managerial accounting.

Decision-making is not a separate management function. Rather, it is the outcome of the exercise of good judgement in planning, directing, and controlling.

Business Insight examples illustrate interesting situations in real companies and show how decisions are made based on accounting information.



BUSINESS INSIGHT

"Lean" Luxury

Louis Vuitton is a French manufacturer of high-end handbags, luggage, and shoes. Its reputation for quality and style allows it to charge up to several thousand dollars for an item. But often in the past, when demand was hot, supply was nonexistent—shelves were empty, and would-be buyers left empty-handed.

Luxury-goods manufacturers used to consider stock-outs to be a good thing, but Louis Vuitton changed its attitude. The company adopted "lean" processes used by car manufacturers and electronics companies to speed up production. Work is done by flexible teams, with jobs organized based on how long a task takes. Team members were reconfigured into U-shaped workspaces to save time and floor

space, and robots are used in some factories to save workers from walking to get more materials. By reducing wasted time and eliminating bottlenecks, what used to take 20 to 30 workers eight days to do now takes 6 to 12 workers one day. Also, production employees who used to specialize on a single task on a single product are now multiskilled. This allows them to quickly switch products to meet demand.

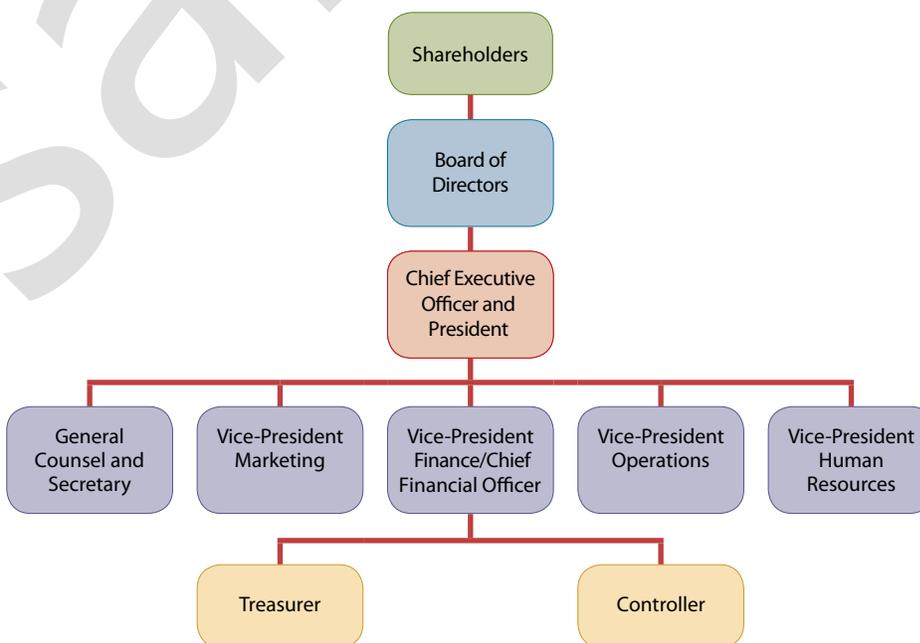
To make sure that the factory is making the right products, within a week of a product launch, Louis Vuitton stores around the world feed sales information to the headquarters in France, and production is adjusted accordingly. Finally, the new production processes have also improved quality. Returns of some products are down by two thirds, which makes quite a difference to the bottom line when the products are pricey.

Sources: Hugues Pichon, "Lean à la Mode," *Lean Management Journal*, November 2012, p. 29; "Louis Vuitton, l'industriel," *L'Usine Nouvelle*, July 7, 2011; Christina Passariello, "At Vuitton, Growth in Small Batches," *Wall Street Journal*, June 27, 2011; Christina Passariello, "Louis Vuitton Tries Modern Methods on Factory Lines," *Wall Street Journal*, October 9, 2006.

What are some of the steps that this company has taken in order to ensure that production meets demand?

ORGANIZATIONAL STRUCTURES

In order to assist in carrying out management functions, most companies prepare **organization charts** that show the interrelationships of activities and the delegation of authority and responsibility within the company. Illustration 1-2 provides a typical organization chart showing the delegation of responsibility.



► **Illustration 1-2**
Corporation organization chart

Shareholders own the corporation, but they manage it indirectly through a **board of directors**, which they elect. Even not-for-profit organizations have boards of directors. The board formulates the operating policies for the company or organization. The board also selects officers, such as a president and one or more vice-presidents, to execute policy and perform daily management functions.

The **chief executive officer (CEO)** has overall responsibility for managing the business. Obviously, even in a small business, in order to accomplish organizational objectives, the company relies on the delegation of responsibilities. As the organization chart in Illustration 1-2 shows, the CEO delegates responsibility to other officers. Each member of the organization has a clearly defined role to play.

Responsibilities within the company are frequently classified as either line or staff positions. Employees with **line positions** are directly involved in the company's main revenue-generating operating activities. Examples of line positions would be the vice-president of operations, vice-president of marketing, plant managers, supervisors, and production personnel. Employees with **staff positions** are involved in activities that support the efforts of the line employees. In firms like General Motors or Petro-Canada, employees in the finance, legal, and human resources departments have staff positions. While the activities of staff employees are vital to the company, these employees are really there only to serve the line employees involved in the company's main operations.

The **chief financial officer (CFO)** is responsible for all of the accounting and finance issues the company faces. The CFO is supported by the **controller** and the **treasurer**. The controller's responsibilities include (1) maintaining the accounting records; (2) maintaining an adequate system of internal control; and (3) preparing financial statements, tax returns, and internal reports. The treasurer has custody of the corporation's funds and is responsible for maintaining the company's cash position.

Also serving the CFO are the **internal audit staff**. The audit staff's responsibilities include reviewing the reliability and integrity of financial information provided by the controller and treasurer. Audit staff members also ensure that internal control systems are functioning properly to safeguard corporate assets. In addition, they investigate compliance with policies and regulations and, in many companies, they determine whether resources are being used in the most economical and efficient fashion.

The vice-president of operations oversees employees with line positions. For example, the company might have multiple plant managers, and each one would report to the vice-president of operations. Each plant would also have department managers, such as fabricating, painting, and shipping managers, each reporting to the plant manager.

BEFORE YOU GO ON...

► Do It! Managerial Accounting Concepts

Indicate whether the following statement is true or false.

1. Managers' activities and responsibilities can be classified into three broad functions: cost accounting, budgeting, and internal control.

Action Plan

- Analyze which users require which different types of information.

Solution

1. False. Managers' activities are classified into three broad functions: planning, directing, and controlling. Planning requires managers to look ahead to establish objectives. Directing involves coordinating a company's diverse activities and human resources to produce a smooth-running operation. Controlling is keeping the company's activities on track.

Related exercise material: **E1-5** and **E1-6**, and **Do It! D1-1**.



Business Ethics

STUDY OBJECTIVE 3

Explain the importance of business ethics.

All employees in an organization are expected to act ethically in their business activities. Given the importance of ethical behaviour to corporations and their owners (shareholders), an increasing number of organizations provide codes of business ethics for their employees.

Despite these efforts, recent business scandals have resulted in massive investment losses and large employee layoffs. A recent survey of fraud by international accounting firm KPMG reported a 13% increase in instances of corporate fraud compared with five years earlier. It noted that while employee fraud (such things as expense account abuse, payroll fraud, and theft of assets) represented 60% of all instances of fraud, financial reporting fraud (the intentional misstatement of financial

reports) was the most costly to companies. That should not be surprising given the long list of companies, such as Nortel, Enron, Global Crossing, and WorldCom, that have engaged in or been accused of engaging in massive financial frauds, which have led to huge financial losses and thousands of lost jobs.

CREATING PROPER INCENTIVES

Companies like BCE, CGI, Motorola, IBM, and Nike use complex systems to control and evaluate the actions of managers. They dedicate substantial resources to monitor and effectively evaluate the actions of employees. Unfortunately, these systems and controls sometimes unwittingly create incentives for managers to take unethical actions. For example, companies prepare budgets to provide direction. Because the budget is also used as an evaluation tool, some managers try to play a “game” by using budgetary slack; that is, they build some slack into the budget by underestimating their division’s predicted performance so that it will be easier to meet their performance targets. On the other hand, if the budget is set at unattainable levels, managers sometimes take unethical actions to meet the targets in order to receive higher compensation or, in some cases, keep their jobs.



BUSINESS INSIGHT

Ethics Breach at Nortel

Canadian-based Nortel Networks Corp. was once the largest supplier of telecommunications equipment in the world. In 2004, Nortel fired CEO Frank Dunn and two other senior executives in connection with an internal probe of the company’s financial practices. Later that year, Nortel fired seven more financial managers as it continued to sort out the accounting scandal that led to the dismissal of its president. The financial shenanigans drew the attention of federal prosecutors from the U.S. Attorney’s office in Dallas, and from the RCMP. Dunn and two other former senior executives were charged with fraud, but found not guilty in 2013 as the judge said the accounting decisions that led to the charges were either not fraudulent or were immaterial for such a large company as Nortel. Securities regulators in both countries were also looking into the accounting irregularities that caused Nortel to restate its results for several years. Among other things, the company said it actually lost money in the first half of 2003, whereas it had previously reported a net profit of \$40 million. In 2006, Nortel reached an agreement in principle for proposed global settlement of class action litigation launched by shareholders who suffered huge losses as Nortel’s stock price plummeted. The company agreed to pay U.S. \$575 million cash and issue common shares representing 14.5% of current equity. In 2009, Nortel declared bankruptcy and liquidated, auctioning off its patents for \$4.5 billion.

Sources: Janet McFarland and Richard Blackwell, “Three Former Nortel Executives Found Not Guilty of Fraud,” *The Globe and Mail*, January 14, 2013; Charles Arthur, “Nortel Patents Sold for \$4.5bn,” *The Guardian*, July 1, 2011; James Bagnall, “The Beginning of the End: How an Accounting Scandal Permanently Weakened Nortel,” *The Ottawa Citizen*, November 2, 2009; “Nortel Cheques in the Mail,” *The Gazette*, May 16, 2008, B-1; Jeffrey Bartash, “U.S. Investigators Target Nortel,” www.cbs.marketwatch.com, May 14, 2004.

What can companies do to create disincentives for managers to act unethically?

Unethical actions similar to those committed at Nortel have also taken place in the United States. For example, in recent years, airline manufacturer Boeing has been plagued by a series of scandals, including charges of overbilling, corporate espionage, and illegal conflicts of interest. Some long-time employees of Boeing blame the decline in ethics on a change in the corporate culture that took place after Boeing merged with McDonnell Douglas. They suggest that evaluation systems that were implemented after the merger to monitor results and evaluate employee performance made employees believe they needed to succeed no matter what.

Although manufacturing companies need to establish production goals for their processes, if controls are not effective and realistic, problems develop. To illustrate, Schering-Plough, a pharmaceutical manufacturer, found that employees were so concerned with meeting production standards that they failed to monitor the quality of the product, and as a result the dosages were often wrong.



CODE OF ETHICAL STANDARDS

In response to corporate scandals in 2000 and 2001, the U.S. Congress enacted legislation to help prevent lapses in internal control. This legislation, referred to as the Sarbanes-Oxley Act of 2002 (SOX), had important implications for the financial community. One result of SOX was the clarification of top management's responsibility for the company's financial statements. CEOs and CFOs must now certify that financial statements give a fair presentation of the company's operating results and its financial condition. In addition, top managers must certify that the company maintains an adequate system of internal controls to safeguard the company's assets and ensure accurate financial reports.

Another result of Sarbanes-Oxley is that companies now pay more attention to the composition of the board of directors. In particular, members of the audit committee of the board of directors must all be entirely independent (that is, non-employees) and at least one must be a financial expert.

Finally, to increase the likelihood of compliance with the rules that are part of the new legislation, the law substantially increases the penalties for misconduct.

In Canada, as discussed in the December 2003 issue of *CA Magazine*, "after the Bre-X Minerals Ltd., Cinar, and Livent Inc. scandals, steps were also taken to remedy market and financial manipulations . . . the Canadian Securities Administrators, federal and provincial securities regulators, the Office of the Superintendent of Financial Institutions (OSFI) and the accounting profession set up the Canadian Public Accountability Board (CPAB), which is charged with overseeing the independence and transparency of the Canadian accounting system. According to the OSFI, "The mission of the CPAB is to contribute to public confidence in the integrity of financial reporting of Canadian public companies by promoting high quality, independent auditing . . ."

In January 2004, the Ontario Securities Commission (OSC), in conjunction with the Canadian Securities Administrators, introduced regulations governing the composition and duties of audit committees, as well as their members' behaviour. The new regulations were also adopted by all provincial and territorial securities regulators, except for British Columbia's. "The rules are as robust as parallel rules required by the U.S. Sarbanes-Oxley legislation, but address unique Canadian concerns," said OSC chair David Brown in a release announcing the proposed rules.¹

Canadian corporate governance regulation was established in 2005. National Policy 58-201 Corporate Governance Guidelines provides guidance on corporate governance practices for various reasons including the need to achieve a balance between protecting investors and encouraging fair and efficient capital markets.

To provide guidance for managerial accountants, the U.S. Institute of Management Accountants (IMA) has developed a code of ethical standards entitled IMA Standards of Ethical Conduct for Practitioners of Management Accounting and Financial Management. The code states that management accountants should not commit acts in violation of these standards, nor should they condone such acts by others within their organizations. In Canada, each province has its own code of ethics and rules and guidelines of professional conduct.

In Canada, the professional accounting organization plays an important role in promoting high standards of ethics in the accounting profession. These standards of ethics can be used as guidelines in dealing with the public and the association's members. The IMA's **Statement of Ethical Professional Practice** provides the following codes of conduct regarding **competence, confidentiality, integrity, and credibility**:

Competence

Management accountants have a responsibility to

- maintain professional competence.
- perform professional duties in accordance with relevant laws, regulations, and technical standards.
- prepare complete and clear reports and recommendations.

¹Gilles des Roberts, "On the hot seat," *CA Magazine* (December 2003).

- communicate professional limitations that would preclude responsible judgement or successful performance of an activity.

Confidentiality

Management accountants have a responsibility to

- refrain from disclosing confidential information.
- inform subordinates as to how to handle confidential information.
- refrain from using confidential information for unethical or illegal advantage.

Integrity

Management accountants have a responsibility to

- avoid conflicts of interest.
- refrain from activity that would prejudice their ability to carry out their duties ethically.
- refrain from engaging in or supporting any activity that would discredit the accounting profession.

Credibility

Management accountants have a responsibility to

- communicate information fairly and objectively.
- disclose fully all relevant information that could reasonably be expected to influence a user's understanding of the reports, comments, and recommendations presented.

CORPORATE SOCIAL RESPONSIBILITY

Another aspect of business ethics is the growing trend toward **corporate social responsibility**. Many companies have begun to evaluate not just corporate profitability but also corporate social responsibility. In addition to profitability, corporate social responsibility considers a company's efforts to employ sustainable business practices with regard to its employees and the environment. This is sometimes referred to as the **triple bottom line** because it evaluates a company's performance with regard to people, planet, and profit. These companies are still striving to maximize profits—in a competitive world, they won't survive long if they don't. In fact, you might recognize a few of the names on the Forbes.com list of the 100 most sustainable companies in the world, such as General Electric, adidas, Toyota, Coca-Cola, or Starbucks. These companies have learned that with a long-term, sustainable approach, they can maximize profits while also acting in the best interest of their employees, their communities, and the environment. At various points within this textbook, we will discuss situations where real companies use the very skills that you are learning to evaluate decisions from a sustainable perspective.

Sustainable business practices present numerous issues for management and managerial accountants. First, companies must decide what items need to be measured, generally those that are of utmost importance to its stakeholders. For example, a particular company might be most concerned with minimizing water pollution or maximizing employee safety. Then, for each item identified, the company must determine measurable attributes that provide relevant information about the company's performance with regard to that item, such as amount of waste released into public waterways or number of accidents per 1,000 hours worked. Finally, the company needs to consider the materiality of the item, the cost of measuring these attributes, and the reliability of the measurements. If the company uses this information to make decisions, then accuracy is critical. Of particular concern is whether the measurements can be verified by an outside third party. Unlike financial reporting, the reporting of sustainable business practices currently has no agreed-upon standard-setter. A number of organizations have, however, published sustainability reporting guidelines. Illustration 1-3 provides a list of major categories in guidelines from the Global Reporting Initiative and from the International Organization for Standardization (ISO), and a sample of topics or "aspects" that companies might consider within each category.

	Social					
	Economic	Environmental	Labour Practices and Decent Work	Human Rights	Society	Product Responsibility
Global Reporting Initiative aspects	Economic performance	Energy	Occupational health and safety	Child labour	Anti-corruption	Customer health and safety
	Procurement practices	Effluents and waste	Training and education	Indigenous rights	Anti-competitive behaviour	Product and service labelling
ISO 26000:2010 aspects	Social investment	Sustainable resource use	Conditions of work and social protection	Discrimination and vulnerable groups	Fair operating practices	Protecting consumers' health and safety
	Wealth and income creation	Climate change mitigation and adaptation	Human development and training in the workplace	Civil and political rights	Responsible political involvement	Fair marketing, factual and unbiased information and fair contractual practices

Sources: Global Reporting Initiative, *G4 Sustainability Reporting Guidelines*; Global Reporting Initiative and International Organization for Standardization, "IGRI G4 Guidelines and ISO 26000:2010: How to Use the GRI G4 Guidelines and ISO 26000 in Conjunction"; James Margolis, "The Global Reporting Initiative (GRI) Issues New Guidelines—What Will These Mean for Business?," ERM Group Inc., July 23, 2013.

► Illustration 1-3

Categories and sample aspects in Global Reporting Initiative and ISO 26000:2010 guidelines

BEFORE YOU GO ON...

► Do It! Managerial Accounting Concepts

Indicate whether the following statements are true or false.

1. As a result of the Sarbanes-Oxley Act of 2002, managerial accounting reports must now comply with accounting principles accepted by the accounting profession.
2. Top managers must certify that a company maintains an adequate system of internal controls.
3. A company's efforts to employ sustainable business practices with regard to its employees, society, and the environment is referred to as corporate social responsibility.

Action Plan

- Understand the importance of espousing and promoting high standards of ethics in the accounting profession.

Solution

1. False. SOX clarifies top management's responsibility for the company's financial statements. In addition, top managers must certify that the company maintains an adequate system of internal control to safeguard the company's assets and ensure accurate financial reports.
2. True.
3. True.

Related exercise material: **E1-4** and **Do It! D1-1**.



Managerial Accounting Today

STUDY OBJECTIVE 4

Identify changes and trends in managerial accounting.

To compete successfully in today's deregulated global environment, many Canadian and American manufacturing and service industries have begun implementing strategic management programs. These are designed to improve quality, reduce costs, and regain the competitive position the companies once held in the world marketplace. This approach focuses on the long-term goals and objectives of

the organization, as well as a full analysis of the environment in which the business is operating. The analysis covers all the internal operations and resources of the organization, as well as the external aspects of its environment. It includes competitors, suppliers, customers, and legal and regulatory changes, as well as the economy as a whole.

This new approach requires changes to traditional management accounting, which has been widely criticized for being too narrow, highly quantitative, and aimed at the needs of financial reporting, and for contributing little to the overall policy and direction of the organization. In this regard, as one author says, management accounting needs to be released from the factory floor so that it can meet market challenges directly.² The result is a new variety of management accounting that expands the information provided to decision makers. The following section explains the expanding role of management accounting in the twenty-first century.

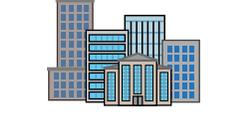
SERVICE INDUSTRY TRENDS

In recent decades, the Canadian and U.S. economies in general have shifted toward an emphasis on providing services, rather than goods. Today over 50% of Canadian and U.S. workers are employed by service companies, and that percentage is expected to increase in coming years. Most of the techniques that you will learn in this course are equally applicable to service and manufacturing entities.

Managers of service companies look to managerial accounting to answer many questions. Illustration 1-4 presents examples of such questions. In some instances, the managerial accountant may need to develop new systems for measuring the cost of serving individual customers. In others, he or she may need new operating controls to improve the quality and efficiency of specific services. Many of the examples we present in subsequent chapters will relate to service companies. To highlight the relevance of the techniques used in this course for service companies, we have placed a service company icon next to those items in the end-of-chapter materials that relate to non-manufacturing companies.

Illustration 1-4

Service industries and companies and the managerial accounting questions they face

Industry/Company	Questions Faced by Service-Company Managers
	Transportation (WestJet Airlines) <ul style="list-style-type: none"> • whether to buy new or used planes • whether to service a new route
	Package delivery services (Purolator, FedEx) <ul style="list-style-type: none"> • what fee structure to use • what mode of transportation to use
	Telecommunications (BCE Inc.) <ul style="list-style-type: none"> • what fee structure to use • whether to service a new community • how many households it will take to break even • whether to invest in a new satellite or lay new cable
	Professional services (lawyers, accountants, dentists) <ul style="list-style-type: none"> • how much to charge for particular services • how much office overhead to allocate to particular jobs • how efficient and productive individual staff members are
	Financial institutions (Bank of Montreal, TD Waterhouse) <ul style="list-style-type: none"> • which services to charge for, and which to provide for free • whether to build a new branch office or to install a new ATM • whether fees should vary depending on the size of the customers' accounts
	Health care (TLC The Laser Center Inc.) <ul style="list-style-type: none"> • whether to invest in new equipment • how much to charge for various services • how to measure the quality of the services provided

²M. Bromwich, "The Case for Strategic Management Accounting: The Role of Accounting Information for Strategy in Competitive Markets," *Accounting, Organizations and Society*, 25 (2) (1990): 221.

MANAGERIAL ACCOUNTING PRACTICES

As discussed earlier, the practice of managerial accounting has changed significantly in recent years to better meet the needs of managers. The following sections explain some well-established managerial accounting practices.

Focus on the Value Chain

The **value chain** refers to all activities associated with providing a product or service. For a manufacturer, these include research and development, product design, the acquisition of raw materials, production, sales and marketing, delivery, customer relations, and subsequent service. Illustration 1-5 shows the value chain for a manufacturer. In recent years, companies have made huge advances in analyzing all stages of the value chain in an effort to improve productivity and eliminate waste, all while continually trying to improve quality. Japanese automobile manufacturer Toyota pioneered many of these innovations.



► Illustration 1-5

A manufacturer's value chain

In the 1980s, many companies purchased giant machines to replace humans in the manufacturing process. These machines were designed to produce large batches of products. In recent years, these manufacturing processes have been recognized as being very wasteful. They require vast amounts of inventory storage capacity and a lot of movement of materials. Consequently, many companies have re-engineered their manufacturing processes. For example, the manufacturing company Pratt and Whitney has replaced many of its large machines with smaller, more flexible ones, and has begun reorganizing its plants for a more efficient flow of goods. With these changes, Pratt and Whitney was able to reduce the time that its turbine engine blades spend in the grinding section from 10 days to two hours. It also cut the total amount of time spent making a blade from 22 days to 7 days. The improvements that have resulted from analyses of the value chain have made companies far more responsive to customer needs, and have improved profitability.

Technological Change

Technology has played a large role in the value chain. Computerization and automation have permitted companies to be more effective in streamlining production, thus enhancing the value chain. For example, many companies now employ **enterprise resource planning (ERP) software systems**, such as those provided by SAP, which provide a comprehensive, centralized, and integrated source of information that is used to manage all major business processes, from purchasing to manufacturing to recording human resources.

In large companies, an ERP system might replace as many as 200 individual software packages. For example, an ERP system can eliminate the need for individual software packages for personnel, inventory management, receivables, and payroll. Because the value chain goes beyond the walls of the company, ERP systems also collect information from and provide it to the company's major suppliers, customers, and business partners. The largest ERP provider, the German corporation SAP, has more than 36,000 customers worldwide.

Another example of technological change is **computer-integrated manufacturing (CIM)**. Using CIM, many companies can now manufacture products that are untouched by human hands. An example is the use of robotic equipment in the steel and automobile industries. Workers monitor the manufacturing process by watching instrument panels. Automation significantly reduces direct labour costs in many cases.

Also, the widespread use of computers has greatly reduced the cost of accumulating, storing, and reporting managerial accounting information. Computers now make it possible to do more detailed costing of products, processes, and services than was possible under manual processing.

Technology is also affecting the value chain through business-to-business (B2B) e-commerce on the Internet. The Internet has dramatically changed the way corporations do business with one another. Inter-organizational information systems connected over the Internet enable customers and suppliers to share information nearly instantaneously. In addition, the Internet has changed the marketplace, often cutting out intermediaries (the “middlemen”). The automobile, airline, hotel, and electronics industries have made commitments to purchase some or all of their supplies and raw materials in the huge B2B electronic marketplaces. For example, Hilton Hotels recently committed itself to purchasing as much as \$1.5 billion of bedsheets, pest control services, and other items from an on-line supplier, PurchasePro.com.

Just-in-Time Inventory Methods

Many companies have significantly lowered their inventory levels and costs by using **just-in-time (JIT) inventory** methods, which is an innovation that resulted from the focus on the value chain. Under a just-in-time method, goods are manufactured or purchased just in time for use. Alcoa Canada is famous for having developed a system for making products in response to individual customer requests, with each product custom made to meet each customer’s particular specifications. Another example is Dell Corporation, which takes less than 48 hours to assemble a computer to customer specifications and put it on a truck. By integrating its information systems with those of its suppliers, Dell reduced its inventories to nearly zero. This is a huge advantage in an industry where products become obsolete nearly overnight. No wonder that JIT is sometimes also called “lean production.”

Quality

JIT inventory systems also require an increased emphasis on product quality. If products are produced only as they are needed, it is very costly for the company to have to stop production because of defects or machine breakdowns. Many companies have installed **total quality management (TQM)** systems to reduce defects in finished products. The goal is to achieve zero defects. These systems require timely data on defective products, rework costs, and the cost of honouring warranty contracts. Often this information is used to help redesign the product in a way that makes it less likely to have a defect. Or it may be used to re-engineer the production process to reduce set-up time and decrease the potential for error. TQM systems also provide information on non-financial measures, such as customer satisfaction, the number of service calls, and the time needed to generate reports. Attention to these measures, which employees can control, leads to increased profitability and improves all aspects of the value chain.

Activity-Based Costing

Overhead costs have become an increasingly large component of product and service costs. By definition, overhead costs cannot be directly traced to individual products. But to determine each product’s cost, overhead must be allocated to the various products. In order to obtain more accurate product costs, many companies now allocate overhead using **activity-based costing (ABC)**. Under ABC, overhead is allocated based on each product’s use of economic resources as it undergoes various activities. For example, the company can keep track of the cost of setting up machines for each batch of a production process. Then a particular product can be allocated part of the total set-up cost based on the number of set-ups that product required.

Activity-based costing is beneficial because it results in more accurate product costing and in more careful scrutiny of all activities in the **supply chain**. For example, if a product’s cost is high because it requires a high number of set-ups, management will be motivated to determine how to produce the product using as few machine set-ups as possible. ABC is now widely used by both manufacturing and service companies. Chapter 5 discusses ABC further.

Theory of Constraints

All companies have certain aspects of their business that create “bottlenecks”—constraints that limit the company’s potential profitability. An important aspect of managing the value chain is identifying these constraints. The **theory of constraints** is a specific approach used to identify and manage constraints in order to achieve the company’s goals. Automobile manufacturer General Motors is using the theory of constraints in all of its North American plants. The company has found that it is most profitable when it focuses on fixing bottlenecks, rather than worrying about whether all aspects of the company are functioning at full capacity. It has greatly improved the company’s ability to effectively use overtime labour while meeting customer demand. Chapter 7 discusses applications of the theory of constraints.

Lean Manufacturing

Lean manufacturing is a process increasingly used by many firms to manage their operations more efficiently and with more control. It sets out to eliminate waste and to concentrate more accurately on the needs of the customer. The process is in contrast to traditional mass-production operations, which maximize profits through efficiency of machine utilization and economies of scale and require large amounts of direct labour to complete most products. Today most products require little direct labour to complete, due in large part to advancements in automation. Customers now dictate requirements to suppliers and often look for smaller quantities of individualized products. Lean manufacturing was developed in response to this changing manufacturing environment.

Researchers have highlighted five basic principles that are crucial to the lean thinking process: specify value, identify the value stream, create flow, respond to customer pull or demands, and aim for perfection.

Step one, value, is the process of “target costing,” which is the acceptable cost customers are willing to pay for a specific product. The key is to achieve the optimal price for customers while realizing the greatest profit potential for the company. Step two, the value stream, is the entire flow of a product’s life cycle through each stage of production. It is the central element in understanding how a company can evaluate what is value-added and what is waste. Step three, the flow, refers to the need for the production process to have a continuous flow. Any disruptions in the value stream can have detrimental effects on the functioning of a company and on its customer satisfaction. Step four, the pull principle, states that a product should not be made until a customer orders it. To achieve this pull approach, the company’s production capacity is flexible and each stage of the value chain is well designed and defined. The final principle, perfection, deals with the target quality that management seeks to obtain via its customers’ needs.

Changing traditional mass-production thinking to lean thinking requires changes in the ways companies control, measure, and account for their processes. Chapters 8 and 9 discuss some applications of lean manufacturing.



BUSINESS INSIGHT

“Lean” Labour

Manufacturing employment has been steadily falling in Canada, shedding 278,000 jobs from 2000 to 2007 and another 188,000 jobs shortly after the 2008–09 recession. One reason for that is that many factories have adopted lean manufacturing practices. This means that production relies less on large numbers of low-skilled workers, and more on machines and a few highly skilled workers. But these highly skilled workers tend to have more job security. With lean manufacturing, a single employee can support far more dollars in sales. Thus, it requires a larger decline in sales before an employee would need to be laid off in order to continue to break even. Also, because the employees are highly skilled, employers are reluctant to lose the investment in training them. Instead of layoffs, many manufacturers have resorted to cutting employee hours.

Sources: Statistics Canada, *Canada Year Book* 2011, Catalogue number 11-402-X; Timothy Aepfel and Justin Lahart, “Lean Factories Find It Hard to Cut Jobs Even in a Slump,” *Wall Street Journal Online*, March 9, 2009; Kronos, “The Lean Workforce: Applying Lean Principles to Improve Workforce Management,” 2009.

Would you characterize labour costs as being a fixed cost, a variable cost, or something else in this situation?

Balanced Scorecard

As companies implement various business practice innovations, managers have sometimes focused too enthusiastically on the latest innovation and paid less attention to other areas of the business. For example, in focusing on improving quality, companies sometimes lose sight of cost/benefit considerations. Similarly, in focusing on reducing inventory levels through just-in-time inventory, companies sometimes lose sales due to inventory shortages. The **balanced scorecard** is a performance-measurement approach that uses both financial and non-financial measures to evaluate all aspects of a company's operations in an *integrated* way. As shown in the figure in the margin, the performance measures are linked by cause and effect to ensure that they all connect to the company's overall objectives.

For example, the company may want to increase its return on assets, a common financial performance measure (calculated as net income divided by average total assets). It will then identify a series of linked goals that, if each one is accomplished, will ultimately result in an increase in return on assets. For example, in order to increase return on assets, sales must increase. In order to increase sales, customer satisfaction must be increased. In order to increase customer satisfaction, product defects must be reduced. In order to reduce product defects, employee training must be increased. Note the linkage, which starts with employee training and ends with return on assets. Each objective will have associated performance measures.

The use of the balanced scorecard is widespread among some well-known and respected companies. For example, Hilton Hotels Corporation uses the balanced scorecard to evaluate the performance of employees at all of its hotel chains. Walmart employs the balanced scorecard, and actually extends its use to evaluation of its suppliers. For example, Walmart recently awarded Welch Company the "Dry Grocery Division Supplier of the Year Award" for its balanced scorecard results. The Palladium Group, a U.S. management consulting firm, even has awards for effective use of the balanced scorecard. Among the recent recipients of the Balanced Scorecard Hall of Fame Award is the Canadian Blood Services, for "achieving breakthrough performance results using the Balanced Scorecard."³ The balanced scorecard is discussed further in Chapter 12.



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ACCOUNTING ORGANIZATIONS AND PROFESSIONAL ACCOUNTING CAREERS IN CANADA

In Canada the accounting profession has recently been reorganized by the founding of CPA Canada (Chartered Professional Accountants) in 2013, into which the three legacy accounting bodies (Chartered Accountants (CA), Certified Management Accountants (CMA), and Certified General Accountants (CGA) were merged. At the time of writing, all provincial/territorial CA and CMA Orders had chosen to belong to CPA Canada as had most CGA provincial bodies with the exception of CGA Ontario and Manitoba.

Because of the risks and opportunities facing the accounting profession in Canada and worldwide, CPA Canada was founded to create a larger unified profession that would mean a more prominent and cohesive Canadian presence internationally. For instance, the AICPA (American Institute of Certified Public Accountants) is aggressively seeking to expand its global footprint by opening exam centres for the U.S. CPA exam outside of the United States. In conjunction with the CIMA (Chartered Institute of Management Accountants-U.K.) the AICPA jointly developed a new global management accounting designation (CGMA).

Further it was thought that CPA Canada could provide enhanced professional development and training opportunities as well as improved services and benefits to its members by eliminating duplication and competition among the former accounting bodies. Lifelong learning is an important part of the profession and as a CPA, member professional development continues through taking courses, some leading to specializations such as tax, forensic accounting, strategic management, and public sector accounting.

³Palladium Group news release, "Palladium Group Honors Canadian Blood Services and the Republic of Korea's Ministry of Government Administration and Home Affairs with Prestigious BSC Hall of Fame Award" (October 10, 2007); www.thepalladiumgroup.com.

BEFORE YOU GO ON...

►Do It! Trends in Managerial Accounting

Match the descriptions that follow with the corresponding terms.

Descriptions:

- _____ All activities associated with providing a product or service.
- _____ A method of allocating overhead based on each product's use of activities in making the product.
- _____ Systems implemented to reduce defects in finished products with the goal of achieving zero defects.
- _____ A performance-measurement approach that uses both financial and non-financial measures, tied to company objectives, to evaluate a company's operations in an integrated fashion.
- _____ Inventory system in which goods are manufactured or purchased just as they are needed for use.

Terms:

- | | |
|----------------------------------|------------------------------------|
| (a) Activity-based costing | (d) Total quality management (TQM) |
| (b) Balanced scorecard | (e) Value chain |
| (c) Just-in-time (JIT) inventory | |

Action Plan

- Develop a forward-looking view, in order to advise and provide information to various members of the organization.
- Understand current business trends and issues.

Solution

1. e 2. a 3. d 4. b 5. c

Related exercise material: **E1-9** and **Do it! D1-2**.


the
navigator

**ALL ABOUT YOU***How Sharp Are Your Decision-Making Skills?*

As you will see in this text, good financial information is crucial for management decision-making. You've already made important decisions in choosing a university, a program, and courses. What factors went into your decision—how much was factual and how much was intuitive? Do you feel you made the right decisions? A 2013 survey of first-year students at 35 Canadian universities found that more than 9 in 10 said they were satisfied with their decision to attend their university. This is good news for them, because the average university undergraduate tuition in Canada for the 2013–14 year was \$5,772, so a lot of money is at stake.

What Do You Think?

Suppose you haven't chosen a major yet. You research information on expected salaries for graduates in various fields. Should you choose your major based on potential earnings?

YES—University is costly and hard work so I want to see a good return on my money and time invested.

NO—I want to study and work in a field that I love; the money will follow.

Sources: Statistics Canada, "University Tuition Fees, 2013/2014," *The Daily*, September 12, 2013; Canadian University Survey Consortium, "2013 First-Year University Student Survey Master Report," June 2013; Business Development Bank of Canada, "Top 7 Decision-Making Tips for Managers," June 13, 2010.

Summary of Study Objectives

The Summary of Study Objectives repeats the main points related to the Study Objectives. It gives you an opportunity to review what you have learned.

1. Explain the distinguishing features of managerial accounting.

Managerial accounting is needed in all types of businesses—service, merchandising, and manufacturing. It also applies to all forms of business organization—proprietorships, partnerships, and corporations. Managerial accounting is needed in not-for-profit entities, as well as in profit-oriented enterprises. Managerial accounting provides tools that help management make decisions and evaluate the effectiveness of those decisions.

The distinguishing features of managerial accounting are

- the primary users of reports—internal users, who are officers, department heads, managers, and supervisors in the company;
- the type and frequency of reports—internal reports that are issued as frequently as needed;
- the purpose of reports—to provide special-purpose information for a particular user for a specific decision;
- the content of reports—pertains to subunits of the business and may be very detailed and may extend beyond the double-entry accounting system; the reporting standard is relevant to the decision being made; and
- the verification of reports—no independent audits.

2. Identify the three broad functions of management and the role of management accountants in an organizational structure.

The three functions are planning, directing, and controlling. Planning requires management to look ahead and to establish objectives. Directing involves coordinating a company's diverse activities and human resources to produce a smoothly running operation. Controlling is the process of keeping the activities on track.

Management accountants serve as staff members in an organization and play an important role in providing the required information for decision-making.

3. Explain the importance of business ethics.

All employees in an organization are expected to act ethically in their business activities. In Canada, the professional accounting organization promotes high standards of ethics in the accounting profession. These standards of ethics can be used as guidelines in dealing with the public and the organizations' members. In the United States, the Institute of Management Accountants' Statement of Ethical Professional Practice provides the codes of conduct regarding competence, confidentiality, integrity, and credibility. Moreover, companies are now evaluating their performance with regard to their corporate social responsibility.

4. Identify changes and trends in managerial accounting.

Managerial accounting has experienced many changes in recent years. Among these are a shift toward meeting the needs of service companies and improving practices to better meet the needs of managers. Improved practices include a focus on managing the value chain through techniques such as just-in-time inventory, and technological applications such as enterprise resource planning (ERP). In addition, techniques have been developed to improve decision-making, such as the theory of constraints and activity-based costing (ABC). Finally, many companies now use the balanced scorecard in order to have a more comprehensive view of the company's operations.

In Canada, the accounting profession has recently been reorganized by the founding of CPA Canada (Chartered Professional Accountants) in 2013, and into which the three legacy accounting bodies—Chartered Accountants (CA), Certified Management Accountants (CMA), and Certified General Accountants (CGA)—were merged.



Glossary

Activity-based costing (ABC) A method of allocating overhead based on each product's use of activities. (p. 15)

Balanced scorecard A performance-measurement approach that uses both financial and non-financial measures that are tied to company objectives to evaluate a company's operations in an integrated way. (p. 17)

Board of directors The group of officials elected by the shareholders of a corporation or non-profit organization to formulate operating policies, select officers, and otherwise manage the company. (p. 7)

Chief executive officer (CEO) The corporate officer who has overall responsibility for managing the business; he or she delegates parts of that responsibility to other corporate officers. (p. 7)

Chief financial officer (CFO) The corporate officer who is responsible for all of a company's accounting and finance issues. (p. 8)

Controller The financial officer who is responsible for a company's accounting records, system of internal control, and

preparation of financial statements, tax returns, and internal reports. (p. 8)

Corporate social responsibility The efforts of a company to employ sustainable business practices with regard to its employees and the environment. (p. 11).

Enterprise resource planning (ERP) software system Software that provides a comprehensive, centralized, integrated source of information that is used to manage all major business processes. (p. 14)

Just-in-time (JIT) inventory An inventory system in which goods are manufactured or purchased just in time for use. (p. 15)

Line positions Jobs that are directly involved in a company's main revenue-generating operating activities. (p. 8)

Managerial accounting A field of accounting that provides economic and financial information for managers and other internal users. (p. 4)

Staff positions Jobs that support the efforts of line employees. (p. 8)

Supply chain All activities from the receipt of an order to the delivery of a product or service. (p. 15)

Theory of constraints The practice of identifying constraints that impede a company's ability to provide a good or service, and dealing with the constraints to maximize profitability. (p. 16)

Total quality management (TQM) Systems implemented to reduce defects in finished products with the goal of achieving zero defects. (p. 15)

Treasurer The financial officer who is responsible for the custody of a company's funds and for maintaining its cash position. (p. 8)

Triple bottom line The evaluation of a company's social responsibility performance with regard to people, planet, and profit. (p. 11)

Value chain All activities associated with providing a product or service. (p. 14)

WileyPLUS

Self-Test, Exercises, and many more components are available for practice in WileyPLUS.

Self-Study Questions

Answers are at the end of the chapter.

- (SO 1) 1. Managerial accounting
- (a) is governed by generally accepted accounting principles.
 - (b) emphasizes special-purpose information.
 - (c) pertains to the entity as a whole and is highly aggregated.
 - (d) is limited to cost data.
- (SO 3) 2. Which of the following is not one of the categories in the *Statement of Ethical Professional Practice*?
- (a) Confidentiality
 - (b) Competence
 - (c) Integrity
 - (d) Independence
- (SO 2) 3. The management of an organization performs several broad functions. They are
- (a) planning, directing, and selling.
 - (b) planning, directing, and controlling.
 - (c) planning, manufacturing, and controlling.
 - (d) directing, manufacturing, and controlling.
- (SO 4) 4. Which one of the following is **not** a main component of the value chain sequence?
- (a) ERP
 - (b) Sales and marketing
 - (c) Production
 - (d) Customer relations
- (SO 4) 5. What is "balanced" in the balanced scorecard approach?
- (a) The number of products produced
 - (b) The emphasis on financial and non-financial performance measurements
 - (c) The amount of costs allocated to products
 - (d) The number of defects found on each product
- (SO 1) 6. Managerial accounting information is generally prepared for
- (a) shareholders.
 - (b) managers.
 - (c) regulatory agencies.
 - (d) investors.
- (SO 1) 7. Managerial accounting information
- (a) pertains to the entity as a whole and is highly aggregated.
 - (b) must be prepared according to generally accepted accounting principles.
 - (c) pertains to subunits of the entity and may be very detailed.
 - (d) is prepared only once a year.
- (SO 1) 8. The major reporting standard for management accountants is
- (a) the *Statement of Ethical Professional Practice*.
 - (b) the Sarbanes-Oxley Act of 2002.
 - (c) relevance to decisions.
 - (d) generally accepted accounting principles.
- (SO 4) 9. Which of the following managerial accounting techniques attempts to allocate manufacturing overhead in a more meaningful fashion?
- (a) Just-in-time inventory
 - (b) Total quality management
 - (c) Balanced scorecard
 - (d) Activity-based costing
- (SO 3) 10. Corporate social responsibility refers to:
- (a) the practice by management of reviewing all business processes in an effort to increase productivity and eliminate waste.
 - (b) an approach used to allocate overhead based on each product's use of activities.
 - (c) the attempt by management to identify and eliminate constraints within the value chain.
 - (d) efforts by companies to employ sustainable business practices with regard to employees and the environment.



Do It! Review

D1-1 Indicate whether the following statements are true or false.

(SO 1, 2, 3)

Identify managerial accounting concepts.

1. Managerial accountants explain and report manufacturing and nonmanufacturing costs, determine cost behaviours, and perform cost-volume-profit analysis, but are not involved in the budget process.
2. Financial accounting reports pertain to subunits of the business and are very detailed.
3. Managerial accounting reports must follow generally accepted accounting principles and are audited by chartered accountants.
4. Managers' activities and responsibilities can be classified into three broad functions: planning, directing, and controlling.
5. As a result of the Sarbanes-Oxley Act of 2002, top managers must certify that the company maintains an adequate system of internal control.
6. Management accountants follow a code of ethics developed by the U.S. Institute of Management Accountants.

D1-2 Match the descriptions that follow with the corresponding terms.

(SO 4)

Identify trends in managerial accounting.

Descriptions:

1. _____ Inventory system in which goods are manufactured or purchased just as they are needed for sale
2. _____ A method of allocating overhead based on each product's use of activities in making the product
3. _____ Systems that are especially important to firms adopting just-in-time inventory methods
4. _____ One part of the value chain for a manufacturing company
5. _____ The North American economy is trending toward this
6. _____ A performance-measurement approach that uses both financial and nonfinancial measures, tied to company objectives, to evaluate a company's operations in an integrated fashion

Terms:

- | | |
|------------------------------------|--|
| (a) Activity-based costing | (d) Research and development, and product design |
| (b) Balanced scorecard | (e) Service industries |
| (c) Total quality management (TQM) | (f) Just-in-time (JIT) inventory |

Exercises

E1-3 The following table compares various features between managerial and financial accounting:

(SO 1)

Explain the distinguishing features of managerial accounting.

	<u>Financial Accounting</u>	<u>Managerial Accounting</u>
Primary users		
Type of reports		
Frequency of reports		
Purpose of reports		
Content of reports		
Verification		

Instructions

Complete the table above.

E1-4 The U.S. Institute of Management Accountants has promulgated ethical standards for managerial accountants.

(SO 3)

Explain the importance of business ethics.

Instructions

Identify the four specific standards.

E1-5 Listed below are the three functions of the management of an organization.

(SO 2)

Identify the three broad functions of management.

1. Planning
2. Directing
3. Controlling

Instructions

Identify which of the following statements best describes each of the above functions:

- (a) _____ requires management to look ahead and to establish objectives. A key objective of management is to add value to the business.
- (b) _____ involves coordinating a company's diverse activities and human resources to produce a smoothly running operation. This function relates to the implementation of planned objectives.

- (c) _____ is the process of keeping the activities on track. Management must determine whether goals are being met and what changes are necessary when there are deviations.

(SO 2)

Identify the role of management accountants in an organizational structure.

E1-6 The following is a list of terms related to a company's organizational structure:

- | | |
|----------------------------------|----------------------------------|
| 1. _____ Board of directors | 5. _____ Line position |
| 2. _____ Chief financial officer | 6. _____ Chief executive officer |
| 3. _____ Treasurer | 7. _____ Staff position |
| 4. _____ Controller | |

Instructions

Match each of the above terms with the appropriate statement below.

- Employee who has overall responsibility for managing the business
- Employees who are directly involved in the company's primary revenue-generating activities
- Employee with overall responsibility for all accounting and finance issues
- Group of people elected by the shareholders that selects and oversees company officers and formulates operating policies
- Employee who provides support services to those employees who are directly involved in the company's primary revenue-generating activities
- Employee who maintains accounting records and the system of internal controls, and prepares financial statements, tax returns, and internal reports
- Employee who has custody of the company's funds and maintains the company's cash position

(SO 1)

Explain the distinguishing features of managerial accounting.

E1-7 Financial accounting information and managerial accounting information have a number of distinguishing characteristics, which are listed below.

- _____ 1. General-purpose reports
- _____ 2. Reports are used internally
- _____ 3. Prepared in accordance with generally accepted accounting principles
- _____ 4. Special-purpose reports
- _____ 5. Limited to historical cost data
- _____ 6. Reporting standard is relevant to the decision to be made
- _____ 7. Financial statements
- _____ 8. Reports generally pertain to the business as a whole
- _____ 9. Reports generally pertain to subunits
- _____ 10. Reports issued quarterly or annually

Instructions

For each of the characteristics listed above, indicate which characteristics are more closely related to financial accounting by placing the letter "F" in the space to the left of the item and indicate those characteristics that are more closely associated with managerial accounting by placing the letter "M" to the left of the item.

(SO 1)

Explain the distinguishing features of managerial accounting.

E1-8 Chris Koplinski has prepared the following list of statements about managerial accounting and financial accounting.

- Financial accounting focuses on providing information to internal users.
- Analyzing cost-volume-profit relationships is part of managerial accounting.
- Preparation of budgets is part of financial accounting.
- Managerial accounting applies only to merchandising and manufacturing companies.
- Both managerial accounting and financial accounting deal with many of the same economic events.
- Managerial accounting reports are prepared only quarterly and annually.
- Financial accounting reports are general-purpose reports.
- Managerial accounting reports pertain to subunits of the business.
- Managerial accounting reports must comply with generally accepted accounting principles.
- Although managerial accountants are expected to behave ethically, there is no code of ethical standards for managerial accountants.

Instructions

Identify each statement as true or false. If false, indicate how to correct the statement.

E1-9 The following is a list of terms related to managerial accounting practices.

1. Activity-based costing
2. Just-in-time inventory
3. Balanced scorecard
4. Value chain

(SO 4)

Identify various managerial accounting practices.

Instructions

Match each of the terms with the statement below that best describes the term.

- (a) _____ A performance-measurement technique that attempts to consider and evaluate all aspects of performance using financial and nonfinancial measures in an integrated fashion
- (b) _____ The group of activities associated with providing a product or service
- (c) _____ An approach used to reduce the cost associated with handling and holding inventory by reducing the amount of inventory on hand
- (d) _____ A method used to allocate overhead to products based on each product's use of the activities that cause the incurrence of the overhead cost

Cases



C1-10 Love All is a fairly large manufacturing company of hockey equipment, located in Toronto. The company manufactures hockey sticks, pucks, clothing, and skates, all bearing the company's distinctive logo, a large green question mark on a white flocked hockey puck. The company's sales have been increasing over the past 10 years.

The hockey sticks division has recently implemented several advanced manufacturing techniques. Robot arms hold the hockey sticks in place while glue dries, and machine vision systems check for defects. The engineering and design team uses computerized drafting and testing of new products. The following managers work in the hockey sticks division:

Hayley Geagea, sales manager (supervises all sales representatives)
Luc Lemieux, technical specialist (supervises computer programmers)

Gary Richardson, cost accounting manager (supervises cost accountants)

Manny Cordoza, production supervisor (supervises all manufacturing employees)

Patrick Dumoulin, engineer (supervises all new-product design teams)

Instructions

- (a) What are the primary information needs of each manager?
- (b) Which, if any, financial accounting report(s) is each likely to use?
- (c) Name one special-purpose management accounting report that could be designed for each manager. Include the name of the report, the information it would contain, and how frequently it should be issued.



C1-11 Million Dollar Mills is a manufacturing firm. The company carefully prepares all financial statements in accordance with Accounting Standards for Private Enterprises (ASPE), and gives a copy of all financial statements to each department. In addition, the company keeps records on quality control, safety, and its environmental pollution. It then prepares "scorecards" for each department indicating their performance. Recently, the financial impact of the second set of information was added, and the information has been used in the evaluation of employees for merit pay and promotions.

At the most recent employee meeting, Thanh Nguyen, marketing manager, expressed his discomfort with the system. He said there was

no guarantee that the second set of information was fair, since there were no generally accepted principles for this kind of information. He also said that it was kind of like keeping two sets of books—one following all legal requirements, and the other one actually used by the company.

Instructions

- (a) Is it ethical to evaluate managers in the way described? Explain briefly.
- (b) Name at least two safeguards the company could build into its system to ensure the ethical treatment of employees.

Ethics cases ask you to reflect on typical ethical dilemmas, analyze the stakeholders and the issues involved, and decide on an appropriate course of action.

“All About You” Activity



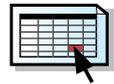
C1-12 The primary purpose of managerial accounting is to provide information useful for management decisions. Many of the managerial accounting techniques that you learn in this course will be useful for decisions you make in your everyday life. After you graduate, one of the next important decisions you'll have to make is where to work.

Instructions

Suppose that you go for job interviews and are given an offer of employment by two competing firms for the same entry-level position. They

are offering the same salary and benefits. Their offices are in different cities. They are both public companies, so their annual reports containing financial and other information are available to you for free on their websites. For each of the following factors, provide an example of the numerical information you would need to help decide which firm to work for.

- Which company is currently more profitable
- Which city is more economical to live in
- Which company has better long-term prospects
- Which company might have more opportunities for advancement



Decision-Making at Current Designs

Each chapter contains an exercise based on *Current Designs*, the company that was featured at the beginning of this chapter. We are excited to present hypothetical managerial accounting situations that are based on the operations of a real company. However, to protect the proprietary nature of this information, the amounts in these exercises are realistic but not the actual data that would be found in *Current Designs*' accounting records. Students can also work through this exercise following an Excel tutorial available in WileyPLUS and the book's companion website. Each chapter's tutorial focuses on a different Excel function or feature.

DMI-1 Mike Cichanowski founded Wenonah Canoe and later purchased Current Designs, a company that designs and manufactures kayaks. The kayak-manufacturing facility is located just a few minutes from the canoe company's headquarters in Winona, Minnesota.

Current Designs makes kayaks using two different processes. The rotational moulding process uses high temperature to melt polyethylene powder in a closed rotating metal mould to produce a complete kayak hull and deck in a single piece. These kayaks are less labour-intensive and less expensive for the company to produce and sell.

Its other kayaks use the vacuum-bagged composite lamination process (which we will refer to as the composite process). Layers of

fibreglass or Kevlar® are carefully placed by hand in a mould and are bonded with resin. Then, a high-pressure vacuum is used to eliminate any excess resin that would otherwise add weight and reduce strength of the finished kayak. These kayaks require a great deal of skilled labour as each boat is individually finished. The exquisite finish of the vacuum bagged composite kayaks gave rise to Current Designs' tag line, "A work of art, made for life."

Current Designs has the following managers:

Mike Cichanowski, CEO
 Diane Buswell, Contoller
 Deb Welch, Purchasing Manager
 Bill Johnson, Sales Manager
 Dave Thill, Kayak Plant Manager
 Rick Thruene, Production Manager for Composite Kayaks

Instructions

- What are the primary information needs of each manager?
- Name one special-purpose management accounting report that could be designed for each manager. Include the name of the report, the information it would contain, and how frequently it should be issued.

Waterways Continuing Problem

WCP-1 Waterways Corporation is a private company providing irrigation and drainage products and services for residential, commercial, and public sector projects, including farms, parks, and sports fields. It has a plant located in a small city north of Toronto that manufactures the products it markets to retail outlets across Canada. It also maintains a division that provides installation and warranty servicing in the Greater Toronto Area.

The mission of Waterways is to manufacture quality parts that can be used for effective water management, be it drainage or irrigation. The company hopes to satisfy its customers with its products, provide rapid and responsible service, and serve the community and the employees who represent it in each community.

The company has been growing rapidly, so management is considering new ideas to help the company continue its growth and maintain the high quality of its products. Waterways was founded by Phil Clark Sr., who has since retired. He continues to own a majority of the company shares. Now his son, Phil Clark Jr., is the company president and chief executive officer (CEO). Working with Phil from the company's inception is his brother, Ben, whose sprinkler designs and ideas about the installation of proper systems have been a major reason for the company's success. Ben is the vice-president of operations who oversees all aspects of design and production in the company.

The plant itself is managed by Ryan Smith, who reports to Ben. First-line supervisors reporting to Ryan are responsible for the plant employees. The plant makes all of the parts for the irrigation and drainage systems. The purchasing department is managed by Jo Chan, who also reports to Ryan.

The installation and training division is overseen by service vice-president Lee Williams, who supervises the managers of the six local installation operations. Each of these local managers hires his or her own local service people. These service employees are trained at headquarters under Lee's direction because of the uniqueness of the company's products.

Kim Martin acts as vice-president of human resources. Kim manages a small team that is responsible for human resource devel-

opment, salary administration, and group benefits. Each department does its own hiring. Madison Tremblay is the sales and marketing vice-president, with a sales force of 10 experienced professionals.

The accounting and finance division of the company is headed by Jordan Leigh, CA, as vice-president of finance and chief financial officer (CFO). There is a small staff of professionally designated accountants, including a controller and a treasurer, and a clerical staff who maintain the financial records.

Instructions

Based on the information provided, construct an organizational chart for Waterways Corporation.

Answers to Self-Study Questions

1. b 2. d 3. b 4. a 5. b 6. b 7. c 8. c 9. d 10. d

Remember to go
back to the beginning
of the chapter to
check off your
completed work!



Managerial Cost Concepts and Cost Behaviour Analysis

The Navigator

Chapter 2

- Scan *Study Objectives*
- Read *Feature Story*
- Read *Chapter Preview*
- Read text and answer *Before You Go On* p. 32, p. 36, p. 39, p. 43
- Work *Using the Decision Toolkit*
- Review *Summary of Study Objectives*
- Review *Decision Toolkit—A Summary*
- Work *Comprehensive Do It!*
- Answer *Self-Study Questions*
- Complete assignments



study objectives

After studying this chapter, you should be able to do the following:

1. Define the three classes of manufacturing costs and differentiate between product costs and period costs.
2. Explain variable, fixed, and mixed costs and the relevant range.
3. Apply the high-low method to determine the components of mixed costs.
4. Demonstrate how to calculate cost of goods manufactured and prepare financial statements for a manufacturer.



MINING COST-CUTTING POTENTIAL

The Potash Corporation of Saskatchewan Inc. is the world's largest fertilizer company by capacity. Because fertilizer is a commodity—in other words, the market determines the price, which can fluctuate widely based on supply and demand—PotashCorp must control its costs in order to make a profit.

PotashCorp's primary products are potash, phosphate, and nitrogen, used to make fertilizer and also livestock feed and industrial goods, including soap, water softeners, and plastics. The corporation operates in seven countries. Potash is mined from evaporated sea deposits, mainly found in PotashCorp's mines across Saskatchewan. Phosphate comes from rocks made from marine fossils, and nitrogen is found in air but must be converted into other products, such as ammonia and urea, to help plants grow. All of these products require machinery- and labour-intensive processes. In 2013, on sales of U.S. \$7.3 billion, PotashCorp's major expenses—cost of goods sold and cost of freight, transportation, and distribution—added up to \$4.5 billion.

In order to reduce costs, the corporation in 2013 announced that it would reduce its workforce in Canada, the United States, and Trinidad by about 18%. "This was not an easy decision but it is a necessary one," said then-President and Chief Executive Officer Bill Doyle. PotashCorp planned to close higher-cost facilities and increase production at its lowest-cost operations. The corporation expected that it could reduce the cost of producing one tonne of potash by \$15 to \$20 in 2014, and by \$20 to \$30 per tonne in 2016.

In another cost-cutting move, the corporation launched a project to start recovering and using some of the coarse phosphate that usually becomes waste at its phosphate mine in North Carolina. PotashCorp says the project increased the mine's production and lowered the mine's costs.

PotashCorp recently added 2,000 custom-built, high-capacity rail cars to its owned and leased fleet that ships products to the United States in order to increase volumes per train load, which reduces transportation costs per load.

While high costs are usually a challenge for businesses, they can sometimes work to their advantage. In the case of PotashCorp, it notes that the high cost of developing new potash mines is a barrier to more competitors entering the business. The corporation estimates it would cost at least \$4.2 billion and take more than seven years to build a new 2-million-tonne potash mine in Saskatchewan, home to half the world's potash deposits. While these staggering capital costs keep competitors at bay, it also means that PotashCorp has been expanding all of its existing mines rather than building new ones.

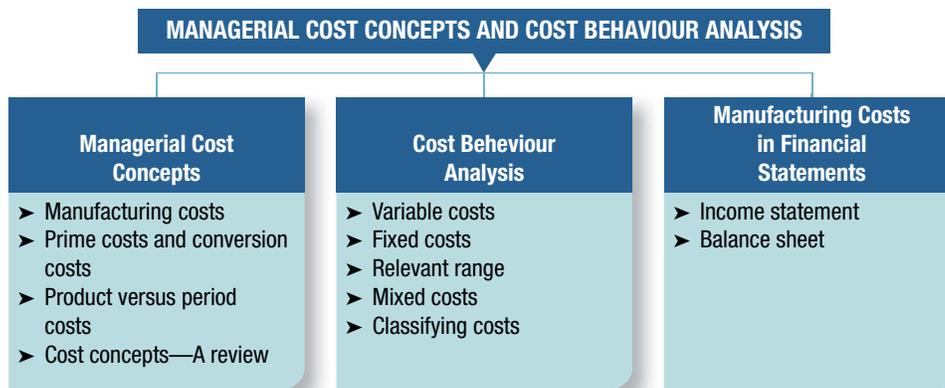
Sources: PotashCorp, 2013 Annual Integrated Report; "PotashCorp Announces Operating and Workforce Changes," PotashCorp news release and accompanying video statement from William Doyle, December 3, 2013; Brent Jang, "In Aftermath of Cartel Breakup, Potash Prices Slide," *The Globe and Mail*, August 22, 2013; "5 Ws and an H about P," PotashCorp, n.d.



Preview of Chapter 2

This chapter focuses on issues illustrated in the feature story about Potash Corporation of Saskatchewan Inc. These include determining and controlling the costs of materials, labour, and overhead and the relationship between costs and profits. Managers use cost information to make various decisions. They need to understand a variety of cost concepts and how changes in the level of business activity affect these costs. In this chapter, we explain various managerial cost concepts that are useful in planning, directing, and controlling. We also present cost flows and the process of cost accumulation in a manufacturing environment.

The chapter is organized as follows:



Managerial Cost Concepts

STUDY OBJECTIVE 1

Define the three classes of manufacturing costs and differentiate between product costs and period costs.

In order for managers at companies like PotashCorp to plan, direct, and control operations effectively, they need good information. One very important type of information is related to costs. Managers should ask questions such as the following:

1. What costs are involved in making a product or providing a service?
2. If we decrease production volume, will costs decrease?
3. What impact will automation have on total costs?
4. How can we best control costs?

To answer these questions, managers need reliable and relevant cost information. We now explain and illustrate the various cost categories that management uses. But first, **what does cost mean?** Accountants define cost as an economic resource given up or foregone to accomplish a particular objective. **What does cost object mean?** A cost object is anything for which we want to calculate a cost, such as a product (soft drink), a product line, or service, or a process for which cost information is measured and accumulated. Management accountants use different systems, or classifications, to develop cost information.

MANUFACTURING COSTS

Manufacturing consists of activities and processes that convert raw materials into finished goods. In contrast, merchandising sells goods in the same form in which they are purchased. Manufacturing costs are typically classified as shown in Illustration 2-1.

Illustration 2-1

Classifications of manufacturing costs



Direct Materials

To obtain the materials that will be converted into the finished product, the manufacturer purchases raw materials. **Raw materials** are the basic materials and parts used in the manufacturing process. For example, auto manufacturers such as General Motors of Canada, Honda Canada, and Ford Motor Co. of Canada, use steel, plastics, and tires as raw materials in making cars.

Raw materials that can be physically and directly associated with the finished product during the manufacturing process are called **direct materials**. Examples include flour in the baking of bread, syrup in the bottling of soft drinks, and steel in the making of automobiles. In the feature story, the direct materials for PotashCorp are potash, phosphate, and nitrogen.

However, some raw materials cannot be easily associated with the finished product. These are called indirect materials. **Indirect materials** have one of two characteristics: (1) they do not physically become part of the finished product, such as lubricants and polishing compounds, or (2) they cannot be easily traced because their physical association with the finished product is too small in terms of cost, such as sandpaper and glue. Companies account for indirect materials as part of the **manufacturing overhead**.

Helpful Hint

A manufacturer uses masking tape to protect certain sections of its product while other sections are painted. The tape is removed and thrown away when the paint is dry. Is the tape a direct or indirect material? Answer: Indirect

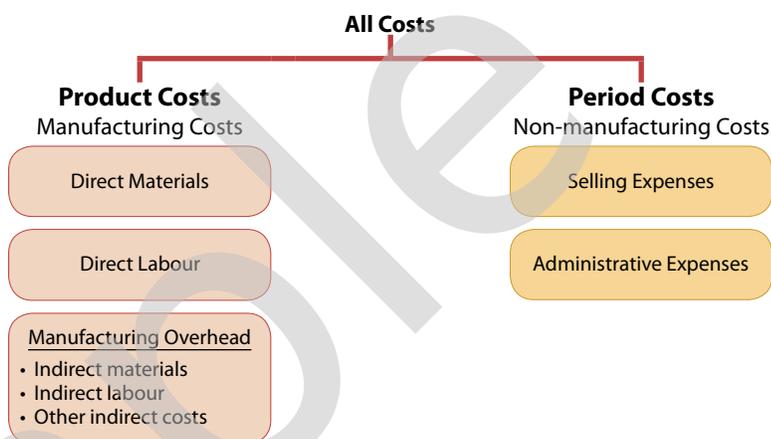
Direct Labour



Direct Labour

The work of factory employees that can be physically and directly associated with converting raw materials into finished goods is called **direct labour**. Bottlers at Cott Corporation and bakers at McCain Foods are employees whose activities are usually classified as direct labour. But some work of factory employees cannot be easily associated with the finished product. This work is called indirect labour. **Indirect labour** has one of two characteristics: (1) it is the work of factory employees that has no

Illustration 2-3
Product versus period costs



COST CONCEPTS—A REVIEW

Product Costing for Manufacturing Companies

You will learn a number of cost concepts in this chapter. Because many of these concepts are new, we provide here an extended example for review. Suppose you started your own snowboard factory, Terrain Park Boards. Think that's impossible? Burton Snowboards was started by Jake Burton Carpenter when he was only 23 years old. Jake initially experimented with 100 different prototype designs before settling on a final design. Then Jake, along with two relatives and a friend, started making 50 boards per day in Collingwood, Ontario. Unfortunately, while they made a lot of boards in their first year, they were only able to sell 300 of them. To get by during those early years, Jake taught tennis and tended bar to pay the bills.

Here are some of the costs that your snowboard factory would incur.

1. The materials cost of each snowboard (wood cores, fiberglass, resins, metal screw holes, metal edges, and ink) is \$30.
2. The labour costs (for example, to trim and shape each board using jigsaws and band saws) are \$40.
3. Depreciation on the factory building and equipment (for example, presses, grinding machines, and lacquer machines) used to make the snowboards is \$25,000 per year.
4. Property taxes on the factory building (where the snowboards are made) are \$6,000 per year.
5. Advertising costs (mostly on-line and catalogue) are \$30,000 per year.
6. Sales commissions related to snowboard sales are \$20 per snowboard.
7. Salaries for maintenance employees are \$45,000 per year.
8. The plant manager's salary is \$70,000.
9. The cost of shipping is \$8 per snowboard.

Illustration 2-4 shows how Terrain Park Boards would assign these manufacturing and selling costs to the various categories.

Illustration 2-4
Assignment of costs to cost categories

Cost Item	Product Costs			Period Costs
	Direct Materials	Direct Labour	Manufacturing Overhead	
1. Material cost (\$30) per board	X			
2. Labour costs (\$40) per board		X		
3. Depreciation on factory equipment (\$25,000 per year)			X	
4. Property taxes on factory building (\$6,000 per year)			X	
5. Advertising costs (\$30,000 per year)				X
6. Sales commissions (\$20 per board)				X
7. Maintenance salaries (factory facilities) (\$45,000 per year)			X	
8. Salary of plant manager (\$70,000)			X	
9. Cost of shipping boards (\$8 per board)				X

Remember that total manufacturing costs are the sum of the **product costs**—direct materials, direct labour, and manufacturing overhead. If Terrain Park Boards produces 10,000 snowboards the first year, the total manufacturing costs would be \$846,000, as shown in Illustration 2-5.

Cost Number and Item	Manufacturing Cost
1. Material cost ($\$30 \times 10,000$)	\$300,000
2. Labour cost ($\$40 \times 10,000$)	400,000
3. Depreciation on factory equipment	25,000
4. Property taxes on factory building	6,000
5. Advertising costs ($\$30,000/\text{year}$)*	X
6. Sales commissions ($\$20/\text{door}$)*	X
7. Maintenance salaries (factory facilities)	45,000
8. Salary of plant manager	70,000
9. Cost of shipping boards ($\$8$ per board)*	X
Total manufacturing costs	<u>\$846,000</u>

*Period costs or selling expenses

► Illustration 2-5

Calculation of total manufacturing costs

Knowing the total manufacturing costs, Terrain Park Boards can calculate the manufacturing cost per unit. Assuming 10,000 units, the cost to produce one snowboard is \$84.60 ($\$846,000 \div 10,000$ units).

In subsequent chapters, we will use extensively the cost concepts discussed in this chapter. Study Illustration 2-4 carefully. If you do not understand any of these classifications of manufacturing costs, go back and reread the appropriate section in this chapter.

Product Costing for Service Industries

This chapter focuses on product costs for manufacturers. But as stated in Chapter 1, the Canadian and U.S. economies in general have shifted toward an emphasis on providing services, rather than on producing goods. Today more than 50% of North American workers are employed by service companies. Airlines, marketing agencies, cable television companies, and restaurants are just a few examples of service companies. How do service companies differ from manufacturing companies when it comes to product costing? One good way to differentiate these two types of companies is by how quickly the product is used or consumed by the customer—services are consumed immediately. For example, when a restaurant produces a meal, that meal is not put in inventory, but it is instead consumed immediately. An airline uses special equipment to provide its product, but again, the output of that equipment is consumed immediately by the customer in the form of a flight. And a marketing agency performs services for its clients that are immediately consumed by the customer in the form of a marketing plan. For a manufacturing company, such as Bombardier Inc., there is often a long lead time before its product (such as an airplane) is used or consumed by the customer.

In presenting our initial examples, we used manufacturing companies because accounting for the manufacturing environment requires the use of the broadest range of accounts. That is, the accounts used by service companies represent a subset of those used by manufacturers because service companies are not producing inventory. Neither the restaurant, the airline, nor the marketing agency discussed above produces an inventoriable product. However, just like a manufacturer, each needs to keep track of the costs of its services in order to know whether it is generating a profit. A successful restaurateur needs to know the cost of each offering on the menu, an airline needs to know the cost of flight service to each destination, and a marketing agency needs to know the cost to develop a marketing plan. Thus, the techniques shown in this chapter to accumulate manufacturing costs to determine manufacturing inventory are equally useful for determining the costs of providing services.

For example, let's consider the costs that Hewlett-Packard (HP) might incur on a consulting engagement. A significant portion of its costs would be salaries of consulting personnel. It might also incur travel costs, materials, software costs, and depreciation charges on equipment used by the employees to provide the consulting service. In the same way that it needs to keep track of the cost of manufacturing its computers and printers, HP needs to know what its costs are on each

consulting job. It could prepare a cost of services provided schedule similar to the cost of goods manufactured schedule in Illustration 2-17 later in the chapter. The structure would be essentially the same as the cost of goods manufactured schedule, but section headings would be reflective of the costs of the particular service organization.



BUSINESS INSIGHT

Grounded in Cost Control

Calgary-based WestJet Airlines has competed on price with full-service competitor Air Canada since the budget airline first took to the skies. How does it keep its fares lower? By keeping costs under control. For example, it has one centralized ground operations office, instead of one in every airport, and its pilots all work from Calgary headquarters instead of regional bases. WestJet and its regional service Encore use just two types of plane—the Boeing 737 and Bombardier Q400—to lower maintenance bills. It's managed to rein in its costs at an estimated one-third lower than those of Air Canada. As a result, WestJet was able to add value for shareholders by paying its first-ever dividend in early 2011, becoming one of the few airlines in the world to do so.

Sources: Ross Marowits, The Canadian Press, "WestJet Unveils Launch of Encore Eastern Expansion with First Service in Toronto," *The Globe and Mail*, January 20, 2014; Brent Jang, "WestJet Shares Appear Ready for Takeoff," *The Globe and Mail*, January 19, 2011; Scott Deveau, "WestJet Initiates Dividend, Share Buyback," *Financial Post*, November 3, 2010; James Careless, "Today's Efficient Flight Departments," *Wings Magazine*, May-June 2010.

What are some other ways that airlines can keep costs down?

BEFORE YOU GO ON...

► Do It! Managerial Cost Concepts

A bicycle company has these costs: tires, salaries of employees who put tires on the wheels, factory building depreciation, lubricants, spokes, salary of factory manager, handlebars, and salaries of factory maintenance employees. Classify each cost as direct materials, direct labour, or overhead.

Action Plan

- Classify as direct materials any raw materials that can be physically and directly associated with the finished product.
- Classify as direct labour the work of factory employees that can be physically and directly associated with the finished product.
- Classify as manufacturing overhead any costs that are indirectly associated with the finished product.

Solution

Tires, spokes, and handlebars are direct materials. Salaries of employees who put tires on the wheels are direct labour. All of the other costs are manufacturing overhead.

Related exercise material: **BE2-1, BE2-2, BE2-3, BE2-9, E2-18, E2-19, E2-20, E2-21, E2-22, E2-29,** and **Do It! D2-14.**



Cost Behaviour Analysis

STUDY OBJECTIVE 2

Explain variable, fixed, and mixed costs and the relevant range.

Cost behaviour analysis is the study of how specific costs respond to changes in the level of business activity. As you might expect, some costs change and others remain the same. For example, for an airline company such as Air Canada or WestJet, the longer the flight, the higher the fuel costs. On the other hand, Montreal General Hospital's employee costs to run the emergency room on any particular night are relatively constant regardless of the number of patients treated. Knowledge of cost behaviour helps management plan activities and decide between alternative courses of action.

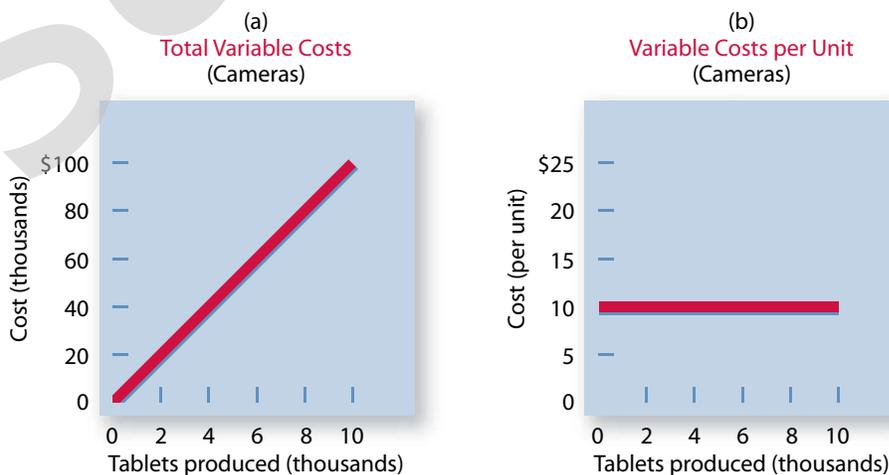
The starting point in cost behaviour analysis is measuring the key business activities. Activity levels may be expressed in terms of sales dollars (in a retail company), kilometres driven (in a trucking company), room occupancy (in a hotel), or dance classes taught (by a dance studio). Many companies use more than one measurement base. A manufacturer, for example, may use direct labour hours or units of output for manufacturing costs, and sales revenue or units sold for selling expenses.

For an activity level to be useful in cost behaviour analysis, changes in the level or volume of activity should be correlated with changes in costs. The activity level selected is referred to as the activity (or volume) index. The **activity index** identifies the activity that causes changes in the behaviour of costs. With an appropriate activity index, it is possible to classify the behaviour of costs in response to changes in activity levels into three categories: variable, fixed, or mixed.

VARIABLE COSTS

Variable costs are costs that vary **in total** directly and proportionally with changes in the activity level. If the level increases by 10%, total variable costs will increase by 10%. If the level of activity decreases by 25%, variable costs will decrease by 25%. Examples of variable costs include direct materials and direct labour for a manufacturer; cost of goods sold, sales commissions, and freight out for a merchandiser; and gasoline for an airline or trucking company. A variable cost may also be defined as a cost that **remains the same per unit at every level of activity**.

To illustrate the behaviour of a variable cost, assume that Damon Company manufactures tablet computers that contain a \$10 camera. The activity index is the number of tablets produced. As each tablet is manufactured, the total cost of the cameras increases by \$10. As shown in part (a) of Illustration 2-6, the total cost of the cameras will be \$20,000 if 2,000 tablets are produced, and \$100,000 if 10,000 tablets are produced. We can also see that the variable cost remains the same per unit as the level of activity changes. As shown in part (b) of Illustration 2-6, the unit cost of \$10 for the cameras is the same whether 2,000 or 10,000 tablets are produced.



► Illustration 2-6

Behaviour of total and unit variable costs

Companies that rely heavily on labour to manufacture a product, such as Nike or Reebok, or to provide a service, such as the public accounting firm KPMG, are likely to have many variable costs. In contrast, companies that use a lot of capital assets to generate revenue, such as BCE or Encana, may have few variable costs.

FIXED COSTS

Fixed costs are costs that **remain the same in total within the relevant range** regardless of changes in the activity level. Examples include property taxes, insurance, rent, supervisory salaries, and depreciation on buildings and equipment. Because total fixed costs remain constant as activity changes, it follows that **fixed costs per unit vary inversely with activity**. In other words, **as volume increases, unit cost declines, and vice versa**.

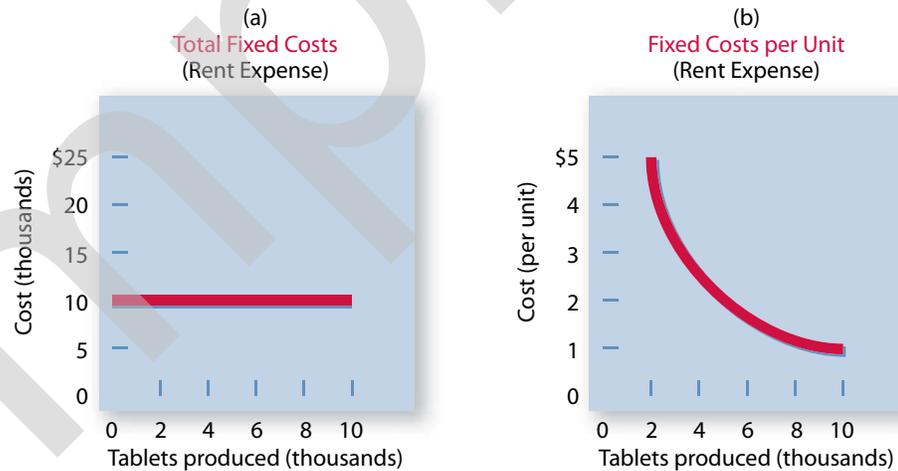
Helpful Hint

True or false: The variable cost per unit changes directly and proportionately with changes in activity. Answer: False. The cost per unit remains constant at all levels of activity.

To illustrate the behaviour of fixed costs, assume that Damon Company leases its production facilities at a cost of \$10,000 per month. The total fixed costs of the facilities will remain constant at every level of activity, as shown in part (a) of Illustration 2-7. But, on a per-unit basis, the cost of rent will decline as activity increases, as shown in part (b) of Illustration 2-7. At 2,000 units, the unit cost is \$5 ($\$10,000 \div 2,000$). When 10,000 tablets are produced, the unit cost is only \$1 ($\$10,000 \div 10,000$).

The trend for many manufacturers is to have more fixed costs and fewer variable costs. This trend is the result of an increased use of automation and less use of employee labour. As a result, depreciation and lease charges (fixed costs) increase, whereas direct labour costs (variable costs) decrease.

► Illustration 2-7
Behaviour of total and unit
fixed costs



BUSINESS INSIGHT

Keeping on Trucking

When New Brunswick pulp and paper mills started scaling back production during the recent economic crisis, that hurt business for Moncton-based Armour Transportation Systems, a privately owned trucking firm in Atlantic Canada. The number of customers didn't dwindle; the size of the shipments did. "Instead of having a 1,000-lb. shipment every week for a customer, you ended up with a 600-lb. shipment. So when the truck went out, it still had the same number of stops, except the truck was generating a lot less revenue because the shipments were smaller," said company president Wesley Armour. In other words, costs per shipment stayed the same (or even increased, as fuel prices and other costs fluctuated) but revenue per shipment decreased. With about 4,000 pieces of equipment, capital and operating costs are a significant factor for the firm. Armour looked for additional ways to cut costs, including taking the company profits and investing in equipment and buildings, paying them off in full to save financing costs. The company credits its upgraded equipment as one reason why customers have stuck with it, helping Armour emerge from the recession a stronger carrier.

Sources: The Canadian Press, "NB & NL: Armour Transport Buys Way's Transport of Newfoundland," Daily Business Buzz, June 18, 2013; Lou Smyrlis, "Shifting Gears: Is There a Better Way Forward with Rate Negotiations?," *Canadian Transportation & Logistics*, January/February 2013, pp. 14 to 20; Armour company website, www.armour.ca.

How could a trucking firm control costs if the size and number of shipments increased?

RELEVANT RANGE

In Illustration 2-6, a straight line was drawn throughout the entire range of the activity index for total variable costs. Basically, the assumption was that the costs were **linear**. If a relationship is linear (that is, straight-line), then changes in the activity index will result in a direct, proportional change in the variable cost. For example, if the activity level doubles, the cost doubles.

It is now necessary to ask: Is the straight-line relationship realistic? In most business situations, a straight-line relationship **does not exist** for variable costs throughout the entire range of possible

activity. At abnormally low levels of activity, it may be impossible to be cost-efficient. Small-scale operations may not allow the company to obtain quantity discounts for raw materials or to use specialized labour. In contrast, at abnormally high levels of activity, labour costs may increase sharply because of overtime pay. Also, at high activity levels, materials costs may jump significantly because of excess spoilage caused by worker fatigue. As a result, in the real world, the relationship between the behaviour of a variable cost and changes in the activity level is often **curvilinear**, as shown in part (a) of Illustration 2-8. In the curved sections of the line, a change in the activity index will not result in a direct, proportional change in the variable cost. That is, a doubling of the activity index will not result in an exact doubling of the variable cost. The variable cost may be more than double, or it may be less than double.

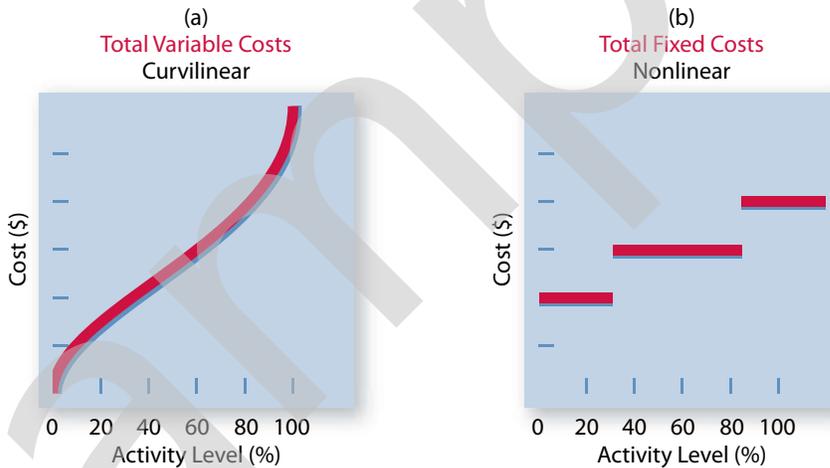


Illustration 2-8
Nonlinear behaviour of variable and fixed costs

Total fixed costs also do not have a straight-line relationship over the entire range of activity. Some fixed costs will not change. But it is possible for management to change other fixed costs. For example, a dance studio’s rent might start out variable and then become fixed at a certain amount. It could then increase to a new fixed amount when the size of the studio increases beyond a certain point. An example of the behaviour of total fixed costs through all potential levels of activity is shown in part (b) of Illustration 2-8.

Helpful Hint
Fixed costs that may be changeable include research, such as new product development, and management training programs.

For most companies, operating at almost zero or at 100% capacity is the exception rather than the rule. Instead, companies often operate over a narrower range, such as 40 to 80% of capacity. The range that a company expects to operate in during a year is called the **relevant range** of the activity index. Within the relevant range, as shown in both diagrams in Illustration 2-9, there is usually a straight-line relationship for both variable and fixed costs.

Alternative Terminology
The *relevant range* is also called the *normal* or *practical range*.

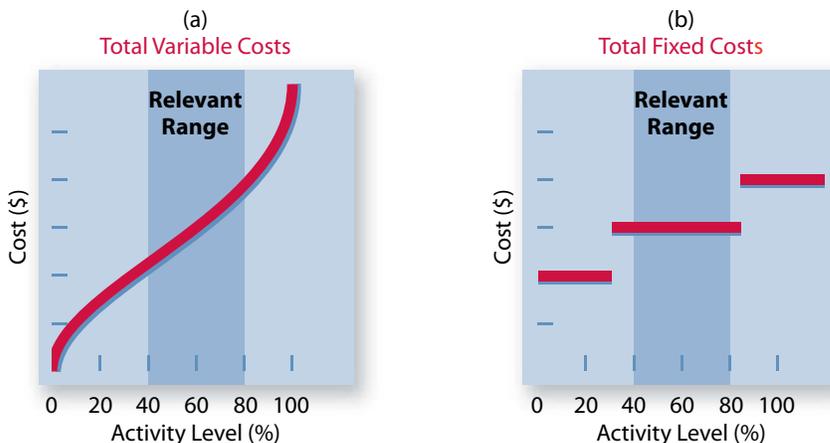


Illustration 2-9
Linear behaviour within relevant range

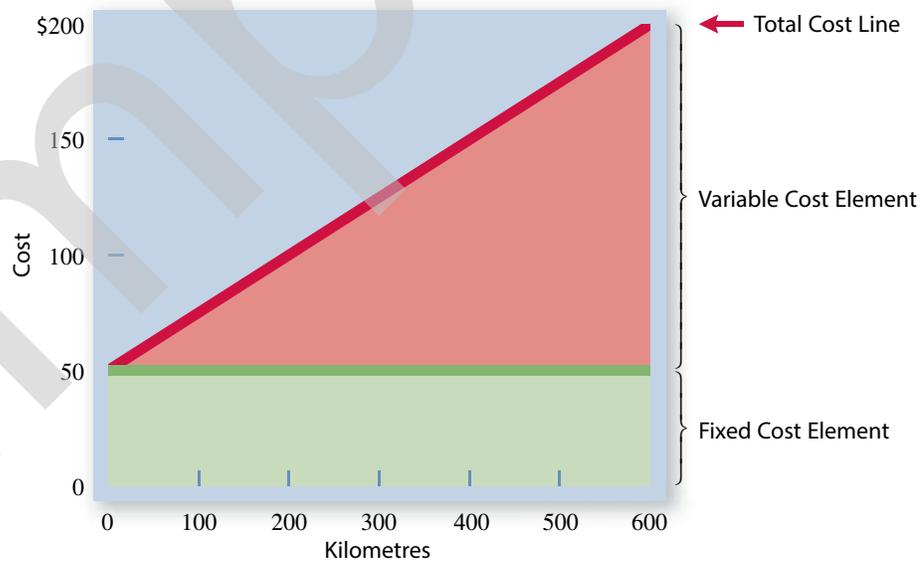
As you can see, although the linear (straight-line) relationship may not be completely realistic, **the linear assumption produces useful data for cost behaviour analysis as long as the level of activity stays in the relevant range.**

MIXED COSTS

Mixed costs are costs that have both a variable element and a fixed element. They are sometimes called semi-variable costs. **Mixed costs change in total but not proportionally with changes in the activity level.**

The rental of a U-Haul truck is a good example of a mixed cost. Assume that local rental terms for a five-metre truck, including insurance, are \$50 per day plus 25 cents per kilometre. When the cost of a one-day rental is being determined, the charge per day is a fixed cost (with respect to \$50 rent, including insurance), whereas the kilometre charge is a variable cost. Illustration 2-10 shows the rental cost for a one-day rental.

► **Illustration 2-10**
Behaviour of mixed costs



In this case, the fixed cost element is the cost of having the service available. The variable cost element is the cost of actually using the service. Another example of a mixed cost is utility costs (electricity, telephone, and so on), where there is a flat service fee plus a usage charge.

BEFORE YOU GO ON...

► Do It! Types of Costs

Helena Company reports the following total costs at two levels of production.

	10,000 Units	20,000 Units
Direct materials	\$20,000	\$40,000
Maintenance	8,000	10,000
Direct labour	17,000	34,000
Indirect materials	1,000	2,000
Depreciation	4,000	4,000
Utilities	3,000	5,000
Rent	6,000	6,000

Classify each cost as variable, fixed, or mixed.

Action Plan

- Recall that a variable cost varies in total directly and proportionately with each change in activity level.
- Recall that a fixed cost remains the same in total with each change in activity level.
- Recall that a mixed cost changes in total but not proportionately with each change in activity level.

Solution

Direct materials, direct labour, and indirect materials are variable costs.
 Depreciation and rent are fixed costs.
 Maintenance and utilities are mixed costs.

Related exercise material: **BE2-5, E2-23, E2-26, E2-28, and Do It! D2-15.**



CLASSIFYING COSTS

For cost behaviour analysis, **mixed costs must be classified into their fixed and variable elements.** How does management make the classification? One possibility is to determine the variable and fixed components each time a mixed cost is incurred. However, because of time and cost constraints, this approach is rarely used. Instead, the usual approach is to determine the variable and fixed cost components of the total cost **at the end of a period of time.** The company does this by using its past experience with the behaviour of the mixed cost at various levels of activity. Management may use any of several methods in making the determination. We will explain the **high-low method** here. Other methods include the scatter diagram method and least squares regression analysis. These other methods are explained in cost accounting courses.

High-Low Method

The **high-low method** uses the total costs incurred at the high and low levels of *activity*. The difference in costs between the high and low levels represents variable costs, since only the variable cost element can change as activity levels change. The steps in calculating fixed and variable costs under this method are as follows:

1. Determine the variable cost per unit by using the formula in Illustration 2-11.

$$\text{Change in Total Costs} \div \text{Change in Activity Levels} = \text{Variable Cost per Unit}$$

STUDY OBJECTIVE 3

Apply the high-low method to determine the components of mixed costs.

Illustration 2-11

Formula for variable cost per unit using the high-low method

To illustrate, assume that Metro Transit Company has the maintenance costs and kilometres driven data for its fleet of buses over a four-month period, as shown in Illustration 2-12:

Month	Kilometres Driven	Total Cost	Month	Kilometres Driven	Total Cost
January	40,000	\$30,000	March	70,000	\$49,000
February	80,000	48,000	April	100,000	63,000

Illustration 2-12

Assumed maintenance costs and kilometres driven data

The high and low levels of activity are 100,000 kilometres in April and 40,000 kilometres in January. The maintenance costs at these two levels are \$63,000 and \$30,000, respectively. The difference in maintenance costs is \$33,000 (\$63,000 – \$30,000) and the difference in kilometres is 60,000 (100,000 – 40,000). Therefore, for Metro Transit, the variable cost per unit is \$0.55, calculated as follows:

$$\$33,000 \div 60,000 = \$0.55$$

2. Determine the fixed cost by subtracting the total variable cost at either the high or the low activity level from the total cost at that activity level.

For Metro Transit, the calculations are shown in Illustration 2-13.

Illustration 2-13
Calculation of fixed costs using high-low method

	Activity Level	
	High	Low
Total cost	\$63,000	\$30,000
Less: Variable costs		
100,000 × \$0.55	55,000	
40,000 × \$0.55		22,000
Total fixed costs	<u>\$ 8,000</u>	<u>\$ 8,000</u>

Maintenance costs are therefore \$8,000 per month plus \$0.55 per kilometre. This is represented by the following formula:

$$\text{Maintenance costs} = 8,000 + \$0.55 (\text{kilometres driven})$$

For example, at 90,000 kilometres, estimated maintenance costs would be \$8,000 fixed and \$49,500 variable (90,000 × \$0.55) for a total of \$57,500.

The high-low method generally produces a reasonable estimate for analysis. However, it does not produce a precise measurement of the fixed and variable elements in a mixed cost, because other activity levels are ignored in the calculation.



BUSINESS INSIGHT

Oil Prices Affect Shipping Costs

Is globalization reversible? Until quite recently, this question wouldn't have been taken seriously. However, global energy costs have been increasing at an unprecedented rate. These rising energy costs come at a time when manufacturing activities have been relocated from the developed to the less developed world.

In a world where just-in-time practices have become widely accepted, there has been a pronounced trend to use container ships, and these ships have been increasingly designed to run faster. In fact the increase in ship speed over the past two decades has doubled fuel consumption per unit of freight. In 2000 when oil was \$20 per barrel, it cost \$3,000 to ship a 40-foot (12-metre) container from Shanghai to North America. In the first half of 2008, the same shipment would have cost \$8,000 and if the price of oil were to reach \$200 per barrel, then it would cost \$15,000 to transport the same amount to North America. However, some shipping companies have slowed down their ship speed to try to save on fuel costs, though that can jeopardize just-in-time delivery systems.

In industries that produce heavy, bulky products, these increased freight costs are shifting trade patterns. For example, Chinese exports of steel to North America were falling in 2008 and U.S. production of steel was increasing. U.S. steelworkers still make a lot more than their Chinese counterparts, but the shift in freight rates was enough to encourage purchasers of some steel products to shop at home.

Source: Jeff Rubin and Benjamin Tal, "Will Soaring Transport Costs Reverse Globalization?", Strategic Economics, CIBC World Markets, May 27, 2008; Jeff Rubin, "How Sustainable Is Growth with Triple-Digit Oil?", *Globe and Mail*, January 19, 2011; Alaric Nightingale and Kyunghye Park, "Container Ship Rates Rally as Fuel Prices Rise: Freight Markets," Bloomberg, January 19, 2011.

What happens to trade patterns when transport costs fall?

Importance of Identifying Variable and Fixed Costs

Why is it important to segregate mixed costs into variable and fixed elements? The answer may become clear if we look at the following four business decisions:

1. If Air Canada is to make a profit when it reduces all domestic fares by 30%, what reduction in costs or increase in passengers will be required? Answer: To make a profit when it cuts domestic

- fares by 30%, Air Canada will have to increase the number of passengers or cut its variable costs for those flights. Its fixed costs will not change.
- If Ford Motor Company of Canada meets the Canadian Auto Workers' demands for higher wages, what increase in sales revenue will be needed to maintain current profit levels? Answer: Higher wages to CAW members at Ford Motor Company will increase the variable costs of manufacturing automobiles. To keep present profit levels, Ford will have to cut other variable costs or increase the price of its automobiles.
 - If Dofasco's program to modernize plant facilities through significant equipment purchases reduces the workforce by 50%, what will the effect be on the cost of producing one tonne of steel? Answer: The modernizing of plant facilities changes the proportion of fixed and variable costs of producing one tonne of steel. Fixed costs increase because of higher depreciation charges, whereas variable costs decrease due to the reduction in the number of steelworkers.
 - What happens if Saputo Inc., Canada's largest dairy products producer, increases its advertising expenses but cannot increase prices because of competitive pressure? Answer: Its sales volume must increase to cover three items: (1) the increase in fixed advertising costs, (2) the variable cost of the increased sales volume, and (3) the desired additional net income.

BEFORE YOU GO ON...

▶ Do It! High-Low Method

Byrnes Company accumulates the following data concerning a mixed cost, using units produced as the activity level.

	Units Produced	Total Cost
March	9,800	\$14,740
April	8,500	13,250
May	7,000	11,100
June	7,600	12,000
July	8,100	12,460

- Calculate the variable and fixed cost elements using the high-low method.
- Estimate the total cost if the company produces 6,000 units.

Action Plan

- Determine the highest and lowest levels of activity.
- Calculate variable cost per unit as: $\text{Change in total costs} \div (\text{High} - \text{low activity level}) = \text{Variable cost per unit}$.
- Calculate fixed cost as: $\text{Total cost} - (\text{Variable cost per unit} \times \text{Units produced}) = \text{Fixed cost}$.

Solution

- Variable cost: $(\$14,740 - \$11,100) \div (9,800 - 7,000) = \1.30 per unit
 Fixed cost: $\$14,740 - (\$1.30 \times 9,800 \text{ units}) = \$2,000$ or $\$11,100 - (\$1.30 \times 7,000) = \$2,000$
 Fixed cost: $\$14,740 - \$12,740 = \$2,000$ or $\$11,100 - \$9,100 = \$2,000$
- Total estimated cost cannot be determined because 6,000 units are out of the relevant range (9,800 – 7,000) units.

Related exercise material: **BE2-7, BE2-8, E2-25, E2-27, and Do It! D2-16.**



Manufacturing Costs in Financial Statements

STUDY OBJECTIVE 4

Demonstrate how to calculate cost of goods manufactured and prepare financial statements for a manufacturer.

The financial statements of a manufacturer are very similar to those of a merchandiser. For example, you will find many of the same sections and same accounts in the financial statements of Procter & Gamble that you find in the financial statements of Reitmans (Canada) Limited. The principal differences between their financial statements occur in two places: the cost of goods sold section in the income statement and the current assets section in the balance sheet.

INCOME STATEMENT

Under a periodic inventory system, the income statements of a merchandiser and a manufacturer differ in the cost of goods sold section. For a merchandiser, the cost of goods sold is calculated by adding the beginning merchandise inventory to the **cost of goods purchased** and subtracting the ending merchandise inventory. For a manufacturer, the cost of goods sold is calculated by adding the beginning finished goods inventory to the **cost of goods manufactured** and subtracting the ending finished goods inventory, as shown in Illustration 2-14.

► Illustration 2-14
Cost of goods sold components

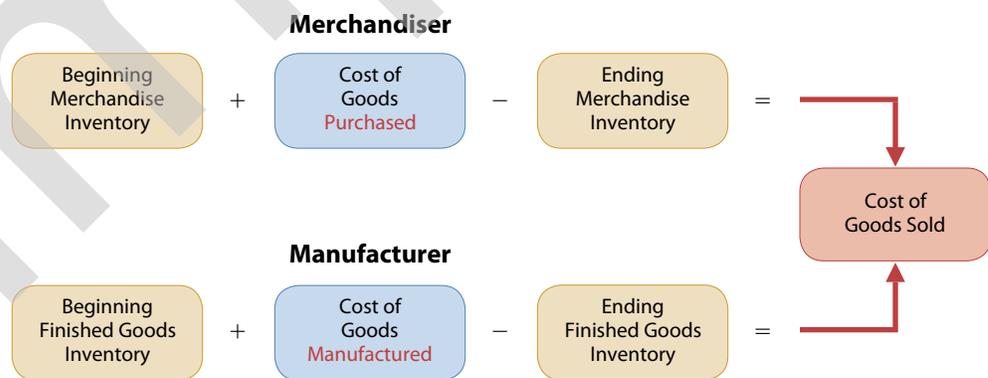


Illustration 2-15 shows the different presentations of the cost of goods sold sections for merchandising and manufacturing companies. The other sections of an income statement are similar for merchandisers and manufacturers.

► Illustration 2-15
Cost of goods sold sections of merchandising and manufacturing income statements

MERCHANDISING COMPANY Income Statement (partial) Year Ended December 31, 2016		MANUFACTURING COMPANY Income Statement (partial) Year Ended December 31, 2016	
Cost of goods sold		Cost of goods sold	
Merchandise inventory, January 1	\$ 70,000	Finished goods inventory, January 1	\$ 90,000
Cost of goods purchased	650,000	Cost of goods manufactured	
Cost of goods available for sale	720,000	(see Illustration 2-17)	370,000
Merchandise inventory, December 31	400,000	Cost of goods available for sale	460,000
Cost of goods sold	<u>\$320,000</u>	Finished goods inventory, December 31	80,000
		Cost of goods sold	<u>\$380,000</u>

Helpful Hint

A periodic inventory system is assumed here.

Several accounts are involved in determining the cost of goods manufactured. To eliminate excessive detail, income statements typically show only the total cost of goods manufactured. The details are presented in a cost of goods manufactured schedule. Illustration 2-17 shows the form and content of this schedule.

Determining the Cost of Goods Manufactured

An example may help show how the cost of goods manufactured is determined. Assume that ATI Technologies Inc. has graphics cards in various stages of production on January 1. In total, these partially completed units are called **beginning work in process inventory**.

The costs the company assigns to beginning work in process inventory are based on the **manufacturing costs incurred in the prior period**.

ATI Technologies Inc. uses the manufacturing costs incurred in the current year to complete the work in process on January 1. These costs then are used to start the production of other graphics cards. The sum of the direct materials costs, direct labour costs, and manufacturing overhead incurred in the current year is the **total manufacturing cost** for the current period.

We now have two cost amounts: (1) the cost of the beginning work in process and (2) the total manufacturing cost for the current period. The sum of these costs is the **total cost of work in process** for the year.

At the end of the year, some graphics cards may again be only partially completed. The costs of these units become the cost of the **ending work in process inventory**. To find the **cost of goods manufactured**, we subtract this cost from the total cost of work in process. Illustration 2-16 shows how to determine cost of goods manufactured.

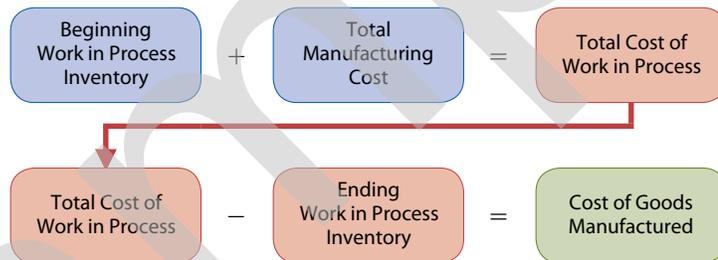


Illustration 2-16
Cost of goods manufactured formula

Helpful Hint

Does the amount of “total manufacturing costs for the current year” include the amount of “beginning work in process inventory”?
Answer: No.

Cost of Goods Manufactured Schedule

An internal report shows each of the cost elements described in Illustration 2-16. This report is called the **cost of goods manufactured schedule**. Illustration 2-17 shows the schedule for Olsen Manufacturing Company (using assumed data). Note that the schedule presents detailed data for direct materials and for manufacturing overhead.

Illustration 2-17
Cost of goods manufactured schedule

OLSEN MANUFACTURING COMPANY Cost of Goods Manufactured Schedule Year Ended December 31, 2016		
Work in process, January 1		\$ 18,400
Direct materials		
Raw materials inventory, January 1	\$ 16,700	
Raw materials purchased	<u>152,500</u>	
Total raw materials available for use	169,200	
Less: Raw materials inventory, December 31	<u>22,800</u>	
Direct materials used	\$146,400	
Direct labour	175,600	
Manufacturing overhead		
Indirect labour	14,300	
Factory repairs	12,600	
Factory utilities	10,100	
Factory depreciation	9,440	
Factory insurance	<u>8,360</u>	
Total manufacturing overhead	<u>54,800</u>	
Total manufacturing cost		<u>376,800</u>
Total cost of work in process		395,200
Less: Work in process, December 31		<u>25,200</u>
Cost of goods manufactured		<u>\$370,000</u>

Numbers or categories in the financial statements are often highlighted in **red type** to draw your attention to key information.

Review Illustration 2-16 and then examine the cost of goods manufactured schedule in Illustration 2-17. You should be able to distinguish between the total manufacturing cost and the cost of goods manufactured. The difference is the effect of the change in work in process during the period.

DECISION TOOLKIT



Decision Checkpoints

Is the company maintaining control over the costs of production?



Info Needed for Decision

Cost of material, labour, and overhead



Tools to Use for Decision

Cost of goods manufactured schedule



How to Evaluate Results

Compare the cost of goods manufactured with the revenue expected from product sales.

Each chapter presents useful information about how decision makers analyze and solve business problems. **Decision Toolkits** summarize the key features of a decision tool and review why and how to use it.

BALANCE SHEET

The balance sheet for a merchandising company shows just one category of inventory. In contrast, the balance sheet for a manufacturer may have three inventory accounts, which are shown in Illustration 2-18.

► Illustration 2-18
Inventory accounts for a manufacturer

Raw Materials Inventory



Shows the cost of raw materials on hand.

Work in Process Inventory



Shows the cost applicable to units that have gone into production but are only partially completed.

Finished Goods Inventory



Shows the cost of completed goods on hand.

Finished goods inventory is to a manufacturer what merchandise inventory is to a merchandiser. It represents the goods that are available for sale.

The current assets sections presented in Illustration 2-19 contrast the presentations of inventories for merchandising and manufacturing companies. Manufacturing inventories are generally listed in the order of their liquidity—the order in which they are expected to be realized in cash. Thus, finished goods inventory is listed first. The remainder of the balance sheet is similar for the two types of companies.

► Illustration 2-19
Current assets sections of merchandising and manufacturing balance sheets

MERCHANTISING COMPANY Balance Sheet December 31, 2016		MANUFACTURING COMPANY Balance Sheet December 31, 2016	
Current assets		Current assets	
Cash	\$100,000	Cash	\$180,000
Receivables (net)	210,000	Receivables (net)	210,000
Merchandise inventory	400,000	Inventories	
Prepaid expenses	22,000	Finished goods	\$80,000
Total current assets	<u>\$732,000</u>	Work in process	25,200
		Raw materials	<u>22,800</u> 128,000
		Prepaid expenses	18,000
		Total current assets	<u>\$536,000</u>

Each step in the accounting cycle for a merchandiser applies to a manufacturer. For example, before preparing financial statements, adjusting entries are required. The adjusting entries for a manufacturer are essentially the same as those of a merchandiser. The closing entries are also similar for manufacturers and merchandisers.

DECISION TOOLKIT



Decision Checkpoints

What is the composition of a manufacturing company's inventory?



Info Needed for Decision

Amount of raw materials, work in process, and finished goods inventories



Tools to Use for Decision

Balance sheet



How to Evaluate Results

Determine whether there is sufficient finished goods inventory, raw materials, and work in process to meet expected demand.

BEFORE YOU GO ON...

▶ Do It! Cost of Goods Manufactured

The following information is available for Keystone Manufacturing Company.

	March 1	March 31
Raw materials inventory	\$12,000	\$10,000
Work in process inventory	2,500	4,000
Materials purchased in March	\$ 90,000	
Direct labour in March	75,000	
Manufacturing overhead in March	220,000	

Prepare the cost of goods manufactured schedule for the month of March.

Action Plan

- Start with beginning work in process as the first item in the cost of goods manufactured schedule.
- Sum direct materials used, direct labour, and total manufacturing overhead to determine total manufacturing costs.
- Sum beginning work in process and total manufacturing costs to determine total cost of work in process.
- Cost of goods manufactured is the total cost of work in process less ending work in process.

Solution

KEYSTONE MANUFACTURING COMPANY		
Cost of Goods Manufactured Schedule		
For the Month Ended March 31		
Work in process, March 1		\$ 2,500
Direct materials		
Raw materials, March 1	\$ 12,000	
Raw material purchases	90,000	
Total raw materials available for use	102,000	
Less: Raw materials, March 31	10,000	
Direct materials used		\$ 92,000
Direct labour		75,000
Manufacturing overhead		220,000
Total manufacturing costs		387,000
Total cost of work in process		389,500
Less: Work in process, March 31		4,000
Cost of goods manufactured		\$385,500

Related exercise material: **BE2-12, BE2-13, E2-30, E2-31, E2-32, E2-33, E2-34, E2-35, E2-36, E2-37, E2-38, E2-39,** and **Do It! D2-17.**





ALL ABOUT YOU

Outsourcing and Offshoring

To reduce costs and remain competitive, many Canadian companies are turning to outsourcing—using an outside supplier to provide goods or services—and offshoring—purchasing foreign-produced goods or services. Both these practices raise concerns about Canadian job losses, particularly in manufacturing and in service industries, such as IT, engineering, and accounting. Between 2007 and 2009, about 1.9% of all Canadian companies and 5.2% of manufacturers offshored a business activity. In 2012, Canadian companies outsourced an estimated \$15 billion of IT services.

What Do You Think?

Suppose you are the managing partner in a public accounting firm with 30 full-time staff. You've heard that some of your competitors have begun to outsource basic tax return preparation work to India. Should you do the same? If you did, you estimate you would have to lay off six staff members.

YES—Indian accountants earn much less than Canadian accountants. You will not be able to compete unless you outsource.

NO—Many customers will be upset to learn that their tax return information is being sent around the world. Also, you are still responsible for the quality of the Indian accountants' work.

Sources: Dana Flavelle, "iGate: Offshore Firms Capture More IT Work, Study Shows," *Toronto Star*, April 10, 2013; Foreign Affairs, Trade and Development Canada, "Canada's State of Trade: Trade and Investment Update 2011"; Erica Alini, "The Future of Manufacturing in Canada," *Macleans*, September 21, 2011.

USING THE DECISION TOOLKIT

Gigantic Manufacturing Co. Ltd. specializes in manufacturing many different models of bicycles. Assume that a new model, the Jaguar, has been well accepted. As a result, the company has established a separate manufacturing facility to produce these bicycles. The company produces 1,000 bicycles per month. Gigantic's monthly manufacturing costs and other expense data related to these bicycles are as follows:

1. Rent on manufacturing equipment (lease cost)	\$2,000/month
2. Insurance on manufacturing building	\$750/month
3. Raw materials (frames, tires, etc.)	\$80/bicycle
4. Utility costs for manufacturing facility	\$1,000/month
5. Supplies for general office	\$800/month
6. Wages for assembly-line workers in manufacturing facility	\$30/bicycle
7. Depreciation on office equipment	\$650/month
8. Miscellaneous materials (lubricants, solders, etc.)	\$1.20/bicycle
9. Property taxes on manufacturing building	\$2,400/year
10. Manufacturing supervisor's salary	\$3,000/month
11. Advertising for bicycles	\$30,000/year
12. Sales commissions	\$10/bicycle
13. Depreciation on manufacturing building	\$1,500/month

Instructions

- (a) Prepare an answer sheet with the following column headings:

Cost Item	Product Costs			Period Costs
	Direct Materials	Direct Labour	Manufacturing Overhead	

Enter each cost item on your answer sheet, placing an "X" under the appropriate headings.

- (b) Calculate the total manufacturing cost for the month.

Solution

(a)

Cost Item	Product Costs			Period Costs
	Direct Materials	Direct Labour	Manufacturing Overhead	
1. Rent on manufacturing equipment (\$2,000/month)			X	
2. Insurance on manufacturing building (\$750/month)			X	
3. Raw materials (\$80/bicycle)	X			
4. Manufacturing utilities (\$1,000/month)			X	
5. Office supplies (\$800/month)				X
6. Wages for assembly-line workers (\$30/bicycle)		X		
7. Depreciation on office equipment (\$650/month)				X
8. Miscellaneous materials (\$1.20/bicycle)			X	
9. Property taxes on manufacturing building (\$2,400/year)			X	
10. Manufacturing supervisor's salary (\$3,000/month)			X	
11. Advertising costs (\$30,000/year)				X
12. Sales commissions (\$10/bicycle)				X
13. Depreciation on manufacturing building (\$1,500/month)			X	

(b)

Cost Item	Manufacturing Cost
Rent on manufacturing equipment	\$ 2,000
Insurance on manufacturing building	750
Raw materials ($\$80 \times 1,000$)	80,000
Manufacturing utilities	1,000
Labour ($\$30 \times 1,000$)	30,000
Miscellaneous materials ($\$1.20 \times 1,000$)	1,200
Property taxes on manufacturing building ($\$2,400 \div 12$)	200
Manufacturing supervisor's salary	3,000
Depreciation on building	1,500
Total manufacturing cost	\$119,650

The Using the Decision Toolkit exercises ask you to use business information and the decision tools presented in the chapter. We encourage you to think through the questions related to the decision before you study the Solution.



Summary of Study Objectives

1. **Define the three classes of manufacturing costs and differentiate between product costs and period costs.** Manufacturing costs are typically classified as either (1) direct materials, (2) direct labour, or (3) manufacturing overhead. Raw materials that can be physically and directly associated with the finished product during the manufacturing process are called direct materials. The work of factory employees that can be physically and directly associated with converting raw materials into finished goods is considered direct labour. Manufacturing overhead consists of costs that are indirectly associated with the manufacture of the finished product.

Product costs are costs that are a necessary and integral part of producing the finished product. Product costs are also called inventoriable costs. Under the matching principle, these costs do not become expenses until the inventory to which they attach is sold. Period costs are costs that are

identified with a specific time period rather than with a saleable product. These costs relate to non-manufacturing costs and therefore are not inventoriable costs. Prime costs and conversion costs are two other terms that manufacturing accounting systems use. Prime costs are the sum of all direct materials costs and direct labour costs. These are all direct manufacturing costs. Conversion costs are the sum of all direct manufacturing labour costs and the manufacturing overhead costs, which are the costs of converting raw materials into a final product in a manufacturing firm.

2. **Explain variable, fixed, and mixed costs and the relevant range.** Variable costs are costs that vary in total directly and proportionately with changes in the activity index. Fixed costs are costs that remain the same in total regardless of changes in the activity index.

The relevant range is the range of activity in which a company expects to operate during a year.

Mixed costs increase in total but not proportionately with changes in the activity level. One method that management may use is the high-low method.

3. **Apply the high-low method to determine the components of mixed costs.** Determine the variable costs per unit by dividing the change in total costs at the highest and lowest levels of activity by the difference in activity at those levels. Then, determine fixed costs by subtracting total variable costs from the amount of total costs at either the highest or lowest level of activity.
4. **Demonstrate how to calculate cost of goods manufactured and prepare financial statements for a manufacturer.** The cost of the beginning work in process is added to the total manufacturing costs for the current year to arrive at the total

cost of work in process for the year. The ending work in process is then subtracted from the total cost of work in process to arrive at the cost of goods manufactured.

The difference between merchandising and manufacturing income statements is in the cost of goods sold section. A manufacturing cost of goods sold section shows the beginning and ending finished goods inventories and the cost of goods manufactured.

The difference between merchandising and manufacturing balance sheets is in the current assets section. In the current assets section of a merchandising company's balance sheet, one merchandise inventory account is presented. However, in the current assets section of a manufacturing company's balance sheet, three inventory accounts are presented: finished goods inventory, work in process inventory, and raw materials inventory.



DECISION TOOLKIT – A SUMMARY



Decision Checkpoints



Info Needed for Decision



Tools to Use for Decision



How to Evaluate Results

Is the company maintaining control over the costs of production?

Cost of material, labour, and overhead

Cost of goods manufactured schedule

Compare the cost of goods manufactured with the revenue expected from product sales.

What is the composition of a manufacturing company's inventory?

Amount of raw materials, work in process, and finished goods inventories

Balance sheet

Determine whether there is sufficient finished goods inventory, raw materials, and work in process to meet expected demand.



The Decision Toolkit—A Summary reviews the contexts and techniques useful for decision-making that were covered in the chapter.

Glossary

Activity index The activity that causes changes in the behaviour of costs. (p. 33)

Conversion costs The sum of direct manufacturing labour costs and manufacturing overhead costs. (p. 29)

Cost An economic resource given up or foregone to accomplish a particular objective. (p. 28)

Cost behaviour analysis The study of how specific costs respond to changes in the level of business activity. (p. 32)

Cost object Anything for which cost information is measured and accumulated. (p. 28)

Cost of goods manufactured Total cost of work in process less the cost of the ending work in process inventory. (p. 40)

Cost of goods purchased The net cost of merchandise purchased (after deducting purchase returns, purchase allowances, and purchase discounts) plus the cost of freight-in. (p. 40)

Direct labour The work of factory employees that can be physically and directly associated with converting raw materials into finished goods. (p. 28)

Direct materials Raw materials that can be physically and directly associated with manufacturing the finished product. (p. 28)

Ending work in process inventory Units that were partially completed at the end of the accounting period. (p. 41)

Fixed costs Costs that remain the same in total regardless of changes in the activity level. (p. 33)

High-low method A mathematical method to separate mixed costs into their variable and fixed components that uses the total costs incurred at the high and low levels of activity. (p. 37)

Indirect labour Work of factory employees that has no physical association with the finished product, or for which it is impractical to trace the costs to the goods produced. (p. 28)

Indirect materials Raw materials that do not physically become part of the finished product or cannot be traced because their physical association with the finished product is insignificant. (p. 28)

Manufacturing overhead Manufacturing costs that are indirectly associated with the manufacture of the finished product. (p. 29)

Mixed costs Costs that contain both a variable and a fixed cost element. They change in total but not proportionately with changes in the activity level. (p. 36)

Period costs Costs that are matched with the revenue of a specific time period and charged to expenses as incurred. (p. 29)

Prime costs The sum of direct materials costs and direct manufacturing labour costs. (p. 29)

Product costs Costs that are a necessary and integral part of producing the finished product. (p. 29)

Relevant range The range of the activity index over which the company expects to operate during the year. (p. 35)

Total cost of work in process Cost of the beginning work in process plus the total manufacturing costs for the current period. (p. 41)

Total manufacturing cost The sum of direct materials, direct labour, and manufacturing overhead incurred in the current period. (p. 41)

Variable costs Costs that vary in total directly and proportionately with changes in the activity level. (p. 33)

Comprehensive Do It! exercises are a final review before you begin homework. Action Plans that appear in the margins give you tips on how to approach the problem, and the Solution provided demonstrates both the form and content of complete answers.

Comprehensive Do It!

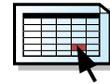
Superior Manufacturing Company has the following cost and expense data for the year ending December 31, 2016:

Raw materials, January 1	\$ 30,000	Insurance—factory	\$ 14,000
Raw materials, December 31	20,000	Property taxes—factory building	6,000
Raw materials purchased	205,000	Sales (net)	1,500,000
Indirect materials	15,000	Delivery expenses	100,000
Work in process, January 1	80,000	Sales commissions	150,000
Work in process, December 31	50,000	Indirect labour	90,000
Finished goods, January 1	110,000	Factory machinery rent	40,000
Finished goods, December 31	120,000	Factory utilities	65,000
Direct labour	350,000	Depreciation—factory building	24,000
Factory manager's salary	35,000	Administrative expenses	300,000

Instructions

- Prepare a cost of goods manufactured schedule for Superior Manufacturing Company for 2016.
- Prepare an income statement for Superior Manufacturing Company for 2016.
- Assume that Superior Manufacturing Company's ledgers show the following balances in its current asset accounts: Cash \$17,000, Accounts Receivable (net) \$120,000, Prepaid Expenses \$13,000, and Short-Term Investments \$26,000. Prepare the current assets section of the balance sheet for Superior Manufacturing Company as at December 31, 2016.

(continued)



The Excel icon indicates there is an Excel spreadsheet template for this problem on the text companion website.

Action Plan

- Start with beginning work in process as the first item in the cost of goods manufactured schedule.
- Sum the direct materials used, direct labour, and total manufacturing overhead to determine the total current manufacturing cost.
- Sum the beginning work in process and total current manufacturing cost to determine the total cost of work in process.
- The cost of goods manufactured is the total cost of work in process less the ending work in process.
- In the cost of goods sold section of the income statement, show the beginning and ending finished goods inventory and cost of goods manufactured.
- In the balance sheet, list manufacturing inventories in the order of their expected realization in cash, with finished goods first.

*(continued)***Solution to Comprehensive Do It!**

(a)

SUPERIOR MANUFACTURING COMPANY			
Cost of Goods Manufactured Schedule			
Year Ended December 31, 2016			
Work in process, January 1			\$ 80,000
Direct materials			
Raw materials inventory, January 1	\$ 30,000		
Raw materials purchased	<u>205,000</u>		
Total raw materials available for use	235,000		
Less: Raw materials inventory, December 31	<u>20,000</u>		
Direct materials used		\$215,000	
Direct labour		350,000	
Manufacturing overhead			
Indirect labour	90,000		
Factory utilities	65,000		
Factory machinery rent	40,000		
Factory manager's salary	35,000		
Depreciation on building	24,000		
Indirect materials	15,000		
Factory insurance	14,000		
Property taxes	<u>6,000</u>		
Total manufacturing overhead		<u>289,000</u>	
Total manufacturing cost			<u>854,000</u>
Total cost of work in process			934,000
Less: Work in process, December 31			<u>50,000</u>
Cost of goods manufactured			<u><u>\$884,000</u></u>

(b)

SUPERIOR MANUFACTURING COMPANY			
Income Statement			
Year Ended December 31, 2016			
Sales (net)			\$1,500,000
Cost of goods sold			
Finished goods inventory, January 1	\$110,000		
Cost of goods manufactured	<u>884,000</u>		
Cost of goods available for sale	994,000		
Less: Finished goods inventory, December 31	<u>120,000</u>		
Cost of goods sold		<u>874,000</u>	
Gross profit			626,000
Operating expenses			
Administrative expenses	300,000		
Sales commissions	150,000		
Delivery expenses	<u>100,000</u>		
Total operating expenses			<u>550,000</u>
Net income			<u><u>\$ 76,000</u></u>

(c)

SUPERIOR MANUFACTURING COMPANY
Balance Sheet (partial)
As at December 31, 2016

Current assets		
Cash		\$ 17,000
Short-term investments		26,000
Accounts receivable (net)		120,000
Inventories		
Finished goods	\$120,000	
Work in process	50,000	
Raw materials	<u>20,000</u>	190,000
Prepaid expenses		<u>13,000</u>
Total current assets		<u>\$366,000</u>



WileyPLUS

Self-Test, Brief Exercises, Exercises, Problems—Set A, and many more components are available for practice in WileyPLUS.

Self-Study Questions

Answers are at the end of the chapter.

- (SO 2) 1. Variable costs are costs that
- vary in total directly and proportionately with changes in the activity level.
 - remain the same per unit at every activity level.
 - Neither of the above
 - Both (a) and (b) above
- (SO 2) 2. The relevant range is
- the range of activity in which variable costs will be curvilinear.
 - the range of activity in which fixed costs will be curvilinear.
 - the range that the company expects to operate in during a year.
 - usually from zero to 100% of operating capacity.
- (SO 3) 3. Mixed costs consist of
- a variable cost element and a fixed cost element.
 - a fixed cost element and a controllable cost element.
 - a relevant cost element and a controllable cost element.
 - a variable cost element and a relevant cost element.

- (SO 3) 4. Kendra Corporation's total utility costs during the past year were \$1,200 during its highest month and \$600 during its lowest month. These costs corresponded to 10,000 units of production during the high month and 2,000 units during the low month. What are the fixed and variable components of its utility costs using the high-low method?
- \$0.075 variable and \$450 fixed
 - \$0.120 variable and \$0 fixed
 - \$0.300 variable and \$0 fixed
 - \$0.060 variable and \$600 fixed

- (SO 1) 5. Direct materials are a

	Product Cost	Manufacturing Overhead	Period Cost
(a)	Yes	Yes	No
(b)	Yes	No	No
(c)	Yes	Yes	Yes
(d)	No	No	No

- (SO 1) 6. Indirect labour is a
- non-manufacturing cost.
 - raw materials cost.
 - product cost.
 - period cost.

BE2-8 Westerville Corp. has collected the following data concerning its maintenance costs for the past six months:

(SO 3)
Determine variable and fixed cost elements using the high-low method.

	<u>Units Produced</u>	<u>Total Cost</u>
July	18,000	\$32,000
August	32,000	\$48,000
September	36,000	\$55,000
October	22,000	\$38,000
November	40,000	\$65,000
December	38,000	\$62,000

Calculate the variable and fixed cost elements using the high-low method.

BE2-9 Presented below are Lang Company's monthly manufacturing cost data related to its personal computer products.

(SO 1)
Classify manufacturing costs.

- (a) Utilities for manufacturing equipment, \$116,000
- (b) Raw material (CPU, chips, etc.), \$85,000
- (c) Depreciation on manufacturing building, \$880,000
- (d) Wages for production workers, \$191,000

Enter each cost item in the following table, placing an "X" under the appropriate headings.

	<u>Product Costs</u>		
	<u>Direct Materials</u>	<u>Direct Labour</u>	<u>Factory Overhead</u>
(a)			
(b)			
(c)			
(d)			

BE2-10 Presented in alphabetical order below are current asset items for Dieker Company's balance sheet at December 31, 2016. Prepare the current assets section (including a complete heading).

(SO 4)
Prepare current assets section.

Accounts receivable	\$200,000
Cash	62,000
Finished goods	71,000
Prepaid expenses	38,000
Raw materials	73,000
Work in process	87,000

BE2-11 Marvel Manufacturing Inc. provides you with the following data for the month of June:

(SO 1)
Calculate production and period costs, manufacturing overhead, and the cost of material and labour.

Prime costs were \$195,000, conversion costs were \$140,000, and total manufacturing costs incurred were \$270,000. Beginning and ending work in process inventories were equal. Selling and administrative costs were \$200,000.

Calculate the following:

- (a) What were the total costs of direct material used, direct labour, and manufacturing overhead?
- (b) What were the total costs of production?
- (c) What were the total period costs?

BE2-12 Presented below are incomplete manufacturing cost data. Determine the missing amounts for three different situations.

(SO 4)
Determine missing amounts in calculating total manufacturing costs.

	<u>Direct Materials Used</u>	<u>Direct Labour Used</u>	<u>Factory Overhead</u>	<u>Total Manufacturing Costs</u>
1.	\$25,000	\$61,000	\$ 50,000	?
2.	?	\$75,000	\$140,000	\$296,000
3.	\$55,000	?	\$111,000	\$310,000

BE2-13 Use the same data from BE2-12 above and the data below to determine the missing amounts.

(SO 4)
Determine missing amounts in calculating cost of goods manufactured.

	<u>Total Manufacturing Costs</u>	<u>Work in Process (1/1)</u>	<u>Work in Process (12/31)</u>	<u>Cost of Goods Manufactured</u>
1.	?	\$120,000	\$82,000	?
2.	\$296,000	?	\$98,000	\$321,000
3.	\$310,000	\$463,000	?	\$715,000

Do It! Review

(SO 1)
Distinguish between product and period costs.

D2-14 A music company has these costs:

Advertising	Paper inserts for CD cases
Blank CDs	CD plastic cases
Depreciation of CD image burner	Salaries of sales representatives
Salary of factory manager	Salaries of factory maintenance employees
Factory supplies used	Salaries of employees who burn music onto CDs

Classify each cost as a period or a product cost. Within the product cost category, indicate if the cost is part of direct materials (DM), direct labour (DL), or manufacturing overhead (MO).

(SO 2)
Classify types of costs.

D2-15 Montana Company reports the following total costs at two levels of production.

	<u>5,000 Units</u>	<u>10,000 Units</u>
Indirect labour	\$ 3,000	\$ 6,000
Property taxes	7,000	7,000
Direct labour	27,000	54,000
Direct materials	22,000	44,000
Depreciation	4,000	4,000
Utilities	3,000	5,000
Maintenance	9,000	11,000

Classify each cost as variable, fixed, or mixed.

(SO 3)
Calculate costs using high-low method and estimate total cost.

D2-16 Amanda Company accumulates the following data concerning a mixed cost, using units produced as the activity level.

	<u>Units Produced</u>	<u>Total Cost</u>
March	10,000	\$18,000
April	9,000	16,650
May	10,500	18,750
June	8,800	16,200
July	9,500	17,100

- (a) Calculate the variable and fixed cost elements using the high-low method.
(b) Estimate the total cost if the company produces 8,500 units.

(SO 4)
Prepare cost of goods manufactured schedule.

D2-17 The following information is available for Rolen Manufacturing Company.

	<u>April 1</u>	<u>April 30</u>
Raw materials inventory	\$10,000	\$14,000
Work in process inventory	5,000	3,500
Materials purchased in April	\$ 98,000	
Direct labour in April	60,000	
Manufacturing overhead in April	180,000	

Prepare the cost of goods manufactured schedule for the month of April.

Exercises

(SO 1)
Classify costs into three classes of manufacturing costs.

E2-18 Presented below is a list of costs and expenses usually incurred by Burrard Corporation, a manufacturer of furniture, in its factory:

- _____ Salaries for assembly-line inspectors
- _____ Insurance on factory machines
- _____ Property taxes on the factory building
- _____ Factory repairs
- _____ Upholstery used in manufacturing furniture
- _____ Wages paid to assembly-line workers
- _____ Factory machinery depreciation
- _____ Glue, nails, paint, and other small parts used in production
- _____ Factory supervisors' salaries
- _____ Wood used in manufacturing furniture

Instructions

Classify the above items into the following categories: (a) direct materials, (b) direct labour, and (c) manufacturing overhead.

E2-19 Wu-Li Corporation incurred the following costs while manufacturing its product:

Materials used in product	\$100,000	Advertising expense	\$45,000
Depreciation on plant	60,000	Property taxes on plant	14,000
Property taxes on store	7,500	Delivery expense	21,000
Labour costs of assembly-line workers	110,000	Sales commissions	35,000
Factory supplies used	13,000	Salaries paid to sales clerks	50,000

(SO 1)

Identify types of cost and explain their accounting.

Instructions

- (a) Identify each of the above costs as direct materials, direct labour, manufacturing overhead, or period costs.
 (b) Explain the basic difference in accounting for product costs and period costs.

E2-20 Caroline Company reported the following costs and expenses in May:

Factory utilities	\$ 15,500	Direct labour	\$69,100
Depreciation on factory equipment	12,650	Sales salaries	46,400
Depreciation on delivery trucks	3,800	Property taxes on factory building	2,500
Indirect factory labour	48,900	Repairs to office equipment	1,300
Indirect materials	80,800	Factory repairs	2,000
Direct materials used	137,600	Advertising	15,000
Factory manager's salary	8,000	Office supplies used	2,640

(SO 1)

Determine the total amount of various types of costs.

**Instructions**

From the information above, determine the total amount of

- (a) manufacturing overhead.
 (b) product costs.
 (c) period costs.

E2-21 Sota Company is a manufacturer of personal computers. Various costs and expenses associated with its operations are as follows:

(SO 1)

Classify various costs into different cost categories.

- Property taxes on the factory building
- Production superintendents' salaries
- Memory boards and chips used in assembling computers
- Depreciation on the factory equipment
- Salaries for assembly-line quality control inspectors
- Sales commissions paid to sell personal computers
- Electrical components used in assembling computers
- Wages of workers assembling personal computers
- Soldering materials used on factory assembly lines
- Salaries for the night security guards for the factory building

The company intends to classify these costs and expenses into the following categories: (a) direct materials, (b) direct labour, (c) manufacturing overhead, and (d) period costs.

Instructions

List the items (1) through (10). For each item, indicate its cost category.

E2-22 The administrators of the local hospital are interested in identifying the various costs and expenses that are incurred in producing a patient's X-ray. A list of such costs and expenses is presented below:

(SO 1)

Classify various costs into different cost categories.

- Salaries for the X-ray machine technicians
- Wages for the hospital janitorial personnel
- Film costs for the X-ray machines
- Property taxes on the hospital building
- The salary of the X-ray technicians' supervisor
- Electricity costs for the X-ray department
- Maintenance and repairs on the X-ray machines
- X-ray department supplies
- Depreciation on the X-ray department equipment
- Depreciation on the hospital building



The administrators want these costs and expenses classified as (a) direct materials, (b) direct labour, or (c) service overhead.

Instructions

List the items (1) through (10). For each item, indicate its cost category.

(SO 2)
Determine fixed, variable, and mixed costs.

E2-23 Dye Company manufactures a single product. Annual production costs incurred in the manufacturing process are shown below for two levels of production:

Production in Units Production Costs	Costs Incurred			
	5,000		10,000	
	Total Cost	Cost/Unit	Total Cost	Cost/Unit
Direct materials	\$8,250	\$1.65	\$16,500	\$1.65
Direct labour	9,500	1.90	19,000	1.90
Utilities	1,500	0.30	2,500	0.25
Rent	4,000	0.80	4,000	0.40
Maintenance	800	0.16	1,100	0.11
Supervisory salaries	1,000	0.20	1,000	0.10

Instructions

- (a) Define the terms *variable costs*, *fixed costs*, and *mixed costs*.
- (b) Classify each cost above as either variable, fixed, or mixed.

(SO 2)
Diagram cost behaviour to determine relevant range and classify costs.

E2-24 Kozy Enterprises is considering manufacturing a new product. It projects the cost of direct materials and rent for a range of output as shown below:

Output in Units	Rent Expense	Direct Materials
1,000	\$ 5,000	\$ 4,000
2,000	5,000	6,000
3,000	5,000	7,800
4,000	7,000	8,000
5,000	7,000	10,000
6,000	7,000	12,000
7,000	7,000	14,000
8,000	7,000	16,000
9,000	7,000	18,000
10,000	10,000	23,000
11,000	10,000	28,000
12,000	10,000	36,000

Instructions

- (a) Diagram the behaviour of each cost for output ranging from 1,000 to 12,000 units.
- (b) Determine the relevant range of activity for this product.
- (c) Calculate the variable cost per unit within the relevant range.
- (d) Indicate the fixed cost within the relevant range.

(SO 3)
Determine fixed and variable costs using the high-low method and prepare graph.

E2-25 The controller of Furguee Industries has collected the following monthly expense data for use in analyzing the cost behaviour of maintenance costs.

Month	Total Maintenance Costs	Total Machine Hours
January	\$2,500	300
February	3,000	350
March	3,600	500
April	4,500	690
May	3,200	400
June	4,900	700

Instructions

- (a) Determine the fixed- and variable-cost components using the high-low method.
- (b) Prepare a graph showing the behavior of maintenance costs, and identify the fixed- and variable-cost elements. Use 100-hour increments and \$1,000 cost increments.

(SO 2)
Classify variable, fixed, and mixed costs.

E2-26 Black Brothers Furniture Corporation incurred the following costs:

1. Wood used in the production of furniture
2. Fuel used in delivery trucks
3. Straight-line depreciation on factory building
4. Screws used in the production of furniture
5. Sales staff salaries
6. Sales commissions

7. Property taxes
8. Insurance on buildings
9. Hourly wages of furniture craftspeople
10. Salaries of factory supervisors
11. Utilities expense
12. Telephone bill

Instructions

Identify the costs above as variable, fixed, or mixed.

E2-27 The controller of Gutierrez Industries has collected the following monthly expense data for use in analyzing the cost behaviour of maintenance costs:

<u>Month</u>	<u>Total Maintenance Costs</u>	<u>Total Machine Hours</u>
January	\$2,750	3,500
February	3,000	4,000
March	3,600	6,000
April	4,500	7,900
May	3,200	5,000
June	5,000	8,000

(SO 3)

Determine fixed and variable costs and calculate overheads.

Instructions

- (a) Determine the fixed and variable cost components using the high-low method.
- (b) Prepare a graph showing the behaviour of maintenance costs, and identify the fixed and variable cost elements. Use 2,000-hour increments and \$1,000 cost increments.

E2-28 Mozena Corporation manufactures a single product. Monthly production costs incurred in the manufacturing process are shown below for the production of 3,000 units. The utilities and maintenance costs are mixed costs. The fixed portions of these costs are \$300 and \$200, respectively.

(SO 2)

Define and classify variable, fixed, and mixed costs.

<u>Production in Units</u>	3,000
<u>Production Costs</u>	
Direct materials	\$ 7,500
Direct labour	15,000
Utilities	1,800
Property taxes	1,000
Indirect labour	4,500
Supervisory salaries	1,800
Maintenance	1,100
Depreciation	2,400

Instructions

- (a) Identify the above costs as variable, fixed, or mixed.
- (b) Calculate the expected costs when production is 5,000 units.

E2-29 Rapid Delivery Service reports the following costs and expenses in June 2016:

Indirect materials	\$ 8,400	Drivers' salaries	\$15,000
Depreciation on delivery equipment	11,200	Advertising	1,600
Dispatcher's salary	7,000	Delivery equipment repairs	300
Property taxes on office building	2,870	Office supplies	650
CEO's salary	22,000	Office utilities	990
Gas and oil for delivery trucks	2,200	Repairs on office equipment	680

(SO 1)

Classify various costs into different cost categories.

**Instructions**

Determine the total amount of (a) delivery service (product) costs and (b) period costs.

E2-30 Sinjay Corporation incurred the following costs while manufacturing its product:

(SO 4)

Calculate cost of goods manufactured and sold.

Materials used in product	\$120,000	Advertising expense	\$45,000
Depreciation on plant	60,000	Property taxes on plant	19,000
Property taxes on warehouse	7,500	Delivery expense	21,000
Labour costs of assembly-line workers	110,000	Sales commissions	35,000
Factory supplies used	25,000	Salaries paid to sales clerks	50,000

Work in process inventory was \$10,000 at January 1 and \$14,000 at December 31. Finished goods inventory was \$60,000 at January 1 and \$50,600 at December 31.

Instructions

- (a) Calculate cost of goods manufactured.
- (b) Calculate cost of goods sold.

(SO 4)
Determine missing amounts in cost of goods manufactured schedule.

E2-31 An incomplete cost of goods manufactured schedule is presented below for Cepeda Manufacturing Company for the year ended December 2016:

Work in process (1/1)			\$210,000
Direct materials			
Raw materials inventory (1/1)	?		
Add: Raw materials purchases	\$165,000		
Total raw materials available for use	?		
Less: Raw materials inventory (12/31)	17,500		
Direct materials used		\$190,000	
Direct labour		?	
Manufacturing overhead			
Indirect labour	15,000		
Factory depreciation	36,000		
Factory utilities	68,000		
Total overhead		119,000	
Total manufacturing costs			?
Total cost of work in process			?
Less: Work in process (12/31)			80,000
Cost of goods manufactured			\$550,000

Instructions

Complete the cost of goods manufactured schedule for Cepeda Manufacturing Company.

(SO 4)
Determine the missing amount of different cost items.

E2-32 Manufacturing cost data for Criqui Company are presented below:

	Case A	Case B	Case C
Direct materials used	(a)	\$68,400	\$130,000
Direct labour	\$ 57,400	86,500	(g)
Manufacturing overhead	46,500	81,600	102,000
Total manufacturing costs	175,650	(d)	273,700
Work in process (1/1/16)	(b)	15,600	(h)
Total cost of work in process	221,500	(e)	335,000
Work in process (12/31/16)	(c)	11,000	90,000
Cost of goods manufactured	180,725	(f)	(i)

Instructions

Provide the missing amount for each letter (a) through (i).

(SO 4)
Determine the missing amount of different cost items, and prepare a condensed cost of goods manufactured schedule.

E2-33 Incomplete manufacturing cost data for Ikerd Company for 2016 are presented as follows for four different situations:

	Direct Materials Used	Labour Used	Manufacturing Overhead	Total Manufacturing Costs	Work in Process (1/1)	Work in Process (12/31)	Cost of Goods Manufactured
1.	\$127,000	\$140,000	\$ 89,000	(a)	\$33,000	(b)	\$360,000
2.	(c)	200,000	123,000	\$430,000	(d)	\$40,000	470,000
3.	80,000	100,000	(e)	257,000	60,000	80,000	(f)
4.	67,000	(g)	75,000	308,000	45,000	(h)	270,000

Instructions

- (a) Indicate the missing amount for each letter.
- (b) Prepare a condensed cost of goods manufactured schedule for situation (1) for the year ended December 31, 2016.

E2-34 Aikman Corporation has the following cost records for June 2016:

Indirect factory labour	\$ 4,500	Factory utilities	\$ 400
Direct materials used	25,000	Depreciation, factory equipment	1,400
Work in process (6/1/16)	3,000	Direct labour	30,000
Work in process (6/30/16)	2,800	Maintenance, factory equipment	1,800
Finished goods (6/1/16)	5,000	Indirect materials	2,200
Finished goods (6/30/16)	9,500	Factory manager's salary	3,000

(SO 4)

Prepare a cost of goods manufactured schedule and a partial income statement.



Instructions

- Prepare a cost of goods manufactured schedule for June 2016.
- Prepare an income statement through gross profit for June 2016, assuming net sales are \$87,100.

E2-35 Suraya Collier, the bookkeeper for Danner, Letourneau, and Majewski, a political consulting firm, has recently completed a managerial accounting course at her local community college. One of the topics covered in the course was the cost of goods manufactured schedule. Suraya wondered if such a schedule could be prepared for her firm. She realized that, as a service-oriented company, it would have no work in process inventory to consider.

(SO 1, 4)

Classify various costs into different categories and prepare cost of services provided schedule.

Listed below are the costs her firm incurred for the month ended August 31, 2016:

Supplies used on consulting contracts	\$ 2,500
Supplies used in the administrative offices	1,500
Depreciation on equipment used for contract work	900
Depreciation used on administrative office equipment	1,050
Salaries of professionals working on contracts	15,600
Salaries of administrative office personnel	7,700
Janitorial services for professional offices	300
Janitorial services for administrative offices	500
Insurance on contract operations	800
Insurance on administrative operations	900
Utilities for contract operations	1,900
Utilities for administrative offices	1,300



Instructions

- Prepare a cost of contract services provided schedule (similar to a cost of goods manufactured schedule) for the month.
- For those costs not included in part (a), explain how they would be classified and reported in the financial statements.

E2-36 The following information is available for Sassafras Company:

(SO 4)

Prepare a cost of goods manufactured schedule and a partial income statement.

	January 1, 2016	2016	December 31, 2016
Raw materials inventory	\$21,000		\$30,000
Work in process inventory	13,500		17,200
Finished goods inventory	27,000		21,000
Materials purchased		\$150,000	
Direct labour		220,000	
Manufacturing overhead		180,000	
Sales		910,000	

Instructions

- Calculate cost of goods manufactured.
- Prepare an income statement through gross profit.
- Show the presentation of the ending inventories on the December 31, 2016, balance sheet.
- How would the income statement and balance sheet of a merchandising company be different from Sassafras's financial statements?

E2-37 Corbin Manufacturing Company produces blankets. From its accounting records it prepares the following schedule and financial statements on a yearly basis:

(SO 4)

Indicate in which schedule or financial statement(s) different cost items will appear.

- Cost of goods manufactured schedule.
- Income statement.
- Balance sheet.

The following items are found in its ledger and accompanying data:

- | | |
|--------------------------------------|---|
| 1. Direct labour | 9. Factory maintenance salaries |
| 2. Raw materials inventory (1/1) | 10. Cost of goods manufactured |
| 3. Work in process inventory (12/31) | 11. Depreciation on delivery equipment |
| 4. Finished goods inventory (1/1) | 12. Cost of goods available for sale |
| 5. Indirect labour | 13. Direct materials used |
| 6. Depreciation on factory machinery | 14. Heat and electricity for factory |
| 7. Work in process (1/1) | 15. Repairs to roof of factory building |
| 8. Finished goods inventory (12/31) | 16. Cost of raw materials purchases |

Instructions

List the items (1) through (16). For each item, indicate by using the appropriate letter or letters (a, b, or c), the schedule and/or financial statement(s) in which the item will appear.

(SO 4)
Prepare a cost of goods manufactured schedule, and present the ending inventories of the balance sheet.



E2-38 An analysis of the accounts of Kananaskis Manufacturing reveals the following manufacturing cost data for the month ended June 30, 2016:

Inventories	Beginning	Ending
Raw materials	\$10,000	\$13,100
Work in process	5,000	13,000
Finished goods	10,000	6,000

Costs incurred: Raw materials purchases \$64,000, direct labour \$57,000, manufacturing overhead \$22,900. The specific overhead costs were as follows: indirect labour \$7,500, factory insurance \$4,000, machinery depreciation \$5,000, machinery repairs \$1,800, factory utilities \$3,100, miscellaneous factory costs \$1,500. Assume that all raw materials used were direct materials.

Instructions

- (a) Prepare the cost of goods manufactured schedule for the month ended June 30, 2016.
- (b) Show the presentation of the ending inventories on the June 30, 2016, balance sheet.

(SO 4)
Determine the amount of cost to appear in various accounts, and indicate in which financial statements these accounts would appear.

E2-39 Todd Motor Company manufactures automobiles. During September 2016, the company purchased 5,000 head lamps at a cost of \$8 per lamp. There was no beginning inventory of lamps. Todd withdrew 4,650 lamps from the warehouse during the month of September. Fifty of these lamps were used to replace the head lamps in automobiles used by travelling sales staff. The remaining 4,600 lamps were put in automobiles manufactured during the month.

Of the autos put into production during September 2016, 90% were completed and transferred to the company's storage lot. Of the cars completed during the month, 75% were sold by September 30.

Instructions

- (a) Determine the cost of head lamps that would appear in each of the following accounts at September 30, 2016: Raw Materials, Work in Process, Finished Goods, Cost of Goods Sold, and Selling Expenses.
- (b) Write a short memo to the chief accountant, indicating whether and where each of the accounts in part (a) would appear on the income statement or on the balance sheet at September 30, 2016.

Problems: Set A

(SO 1)
Classify manufacturing costs into different categories and calculate the unit cost.

P2-40A Mina Company specializes in manufacturing motorcycle helmets. The company has enough orders to keep the factory production at 1,000 motorcycle helmets per month. Mina's monthly manufacturing cost and other expense data are as follows.

Maintenance costs on factory building	\$ 1,300
Factory manager's salary	4,000
Advertising for helmets	8,000
Sales commissions	5,000
Depreciation on factory building	700
Rent on factory equipment	6,000
Insurance on factory building	3,000
Raw materials (plastic, polystyrene, etc.)	20,000
Utility costs for factory	800
Supplies for general office	200
Wages for assembly-line workers	55,000
Depreciation on office equipment	500
Miscellaneous materials (glue, thread, etc.)	2,000

Instructions

(a) Prepare an answer sheet with the following column headings.

Product Costs				
Cost Item	Direct Materials	Direct Labour	Manufacturing Overhead	Period Costs

Enter each cost item on your answer sheet, placing the dollar amount under the appropriate heading. Total the dollar amounts in each of the columns.

(b) Calculate the cost to produce one helmet.

- (a) DM \$20,000
- DL \$55,000
- MO \$17,800
- PC \$13,700

Marginal check figures for some problems provide key numbers to confirm your calculations.

P2-41A Par Play Company, a manufacturer of driver golf clubs, started production in November 2016. For the preceding five years, Par Play had been a retailer of sports equipment. After a thorough survey of driver golf club markets, Par Play decided to turn its retail store into a driver golf club factory.

Raw materials costs for a driver will total \$24 per driver. Workers on the production lines are paid on average \$13 per hour. A driver usually takes two hours to complete. In addition, the rent on the equipment used to produce drivers amounts to \$1,500 per month. Indirect materials cost \$3 per driver. A supervisor was hired to oversee production; her monthly salary is \$3,500.

Janitorial costs are \$1,400 monthly. Advertising costs for the drivers will be \$6,000 per month. The factory building depreciation expense is \$9,600 per year. Property taxes on the factory building will be \$7,200 per year.

Instructions

Prepare an answer sheet with the following column headings.

Product Costs				
Cost Item	Direct Materials	Direct Labour	Manufacturing Overhead	Period Costs

(a) Assuming that Par Play manufactures, on average, 2,500 drivers per month, enter each cost item on your answer sheet, placing the dollar amount per month under the appropriate headings. Total the dollar amounts in each of the columns.

(b) Calculate the cost to produce one driver.

- (a) DM \$60,000
- DL \$65,000
- MO \$15,300
- PC \$ 6,000

P2-42A Incomplete manufacturing costs, expenses, and selling data for two different cases are as follows:

	Case	
	1	2
Direct Materials Used	\$ 6,300	\$ (g)
Direct Labour	3,000	8,000
Manufacturing Overhead	6,000	4,000
Total Manufacturing Costs	(a)	18,000
Beginning Work in Process Inventory	1,000	(h)
Ending Work in Process Inventory	(b)	3,000
Sales	22,500	(i)
Sales Discounts	1,500	1,400
Cost of Goods Manufactured	14,600	22,000
Beginning Finished Goods Inventory	(c)	3,300
Goods Available for Sale	18,300	(j)
Cost of Goods Sold	(d)	(k)
Ending Finished Goods Inventory	1,500	2,500
Gross Profit	(e)	6,000
Operating Expenses	2,700	(l)
Net Income	(f)	2,200

Instructions

- (a) Indicate the missing amount for each letter.
- (b) Prepare a condensed cost of goods manufactured schedule for Case 1.
- (c) Prepare an income statement and the current assets section of the balance sheet for Case 1.

Assume that in Case 1 the other items in the current assets section are as follows: cash \$3,000, receivables (net) \$10,000, raw materials \$700, and prepaid expenses \$200.

(SO 4) Indicate the missing amount of different cost items, and prepare a condensed cost of goods manufactured schedule, an income statement, and a partial balance sheet.

- (c) Current assets \$17,100

(SO 4) Prepare a cost of goods manufactured schedule, a partial income statement, and a partial balance sheet.



P2-43A The following data were taken from the records of Stellar Manufacturing Company for the fiscal year ended December 31, 2016:

Raw Materials Inventory (1/1/16)	\$ 47,000	Factory Machinery Depreciation	\$ 7,700
Raw Materials Inventory (12/31/16)	44,800	Factory Utilities	12,900
Finished Goods Inventory (1/1/16)	85,000	Office Utilities Expense	8,600
Finished Goods Inventory (12/31/16)	77,800	Sales	465,000
Work in Process Inventory (1/1/16)	9,500	Sales Discounts	2,500
Work in Process Inventory (12/31/16)	7,500	Plant Manager's Salary	40,000
Direct Labour	145,100	Factory Property Taxes	6,900
Indirect Labour	18,100	Factory Repairs	800
Accounts Receivable	27,000	Raw Materials Purchases	62,500
Factory Insurance	7,400	Cash	28,000

- (a) CGM \$305,600
- (b) Gross profit \$149,700
- (c) Current assets \$185,100

Instructions

- (a) Prepare a cost of goods manufactured schedule. (Assume all raw materials used were direct materials.)
- (b) Prepare an income statement through gross profit.
- (c) Prepare the current assets section of the balance sheet at December 31, 2016.

(SO 4) Prepare a cost of goods manufactured schedule and a correct income statement.

P2-44A Tombert Company is a manufacturer of computers. Its controller resigned in October 2016. An inexperienced assistant accountant has prepared the following income statement for the month of October 2016.

TOMBERT COMPANY		
Income Statement		
For the Month Ended October 31, 2016		
Sales (net)		\$780,000
Less: Operating expenses		
Raw materials purchases	\$264,000	
Direct labour cost	190,000	
Advertising expense	90,000	
Selling and administrative salaries	75,000	
Rent on factory facilities	60,000	
Depreciation on sales equipment	45,000	
Depreciation on factory equipment	31,000	
Indirect labour cost	28,000	
Utilities expense	12,000	
Insurance expense	8,000	<u>803,000</u>
Net loss		<u><u>\$ (23,000)</u></u>

Prior to October 2016, the company had been profitable every month. The company's president is concerned about the accuracy of the income statement. As his friend, he has asked you to review the income statement and make necessary corrections. After examining other manufacturing cost data, you have acquired the following additional information.

- 1. Inventory balances at the beginning and end of October were as follows:

	<u>October 1</u>	<u>October 31</u>
Raw materials	\$18,000	\$29,000
Work in process	16,000	14,000
Finished goods	30,000	45,000

- 2. Only 75% of the utilities expense and 60% of the insurance expense apply to factory operations. The remaining amounts should be charged to selling and administrative activities.

Instructions

Calculate the following:

- (a) CGM \$577,800
- (b) NI \$1,000

- (a) Prepare a schedule of the cost of goods manufactured for October 2016.
- (b) Prepare a correct income statement for October 2016.

P2-45A Nova Chemicals Corp. incurred the following manufacturing costs for the year 2016:

Raw materials used in production	\$ 28,000	Inventories:	
Total manufacturing cost added	160,000	Raw materials, January 1	\$ 9,600
Factory overhead	66,000	Raw materials, December 31	10,400
Selling and administration expenses	43,000	Work in process, January 1	14,600
		Work in process, December 31	13,000
		Finished goods, January 1	9,600
		Finished goods, December 31	9,200

(SO 1, 4)

Calculate raw materials purchased, cost of goods manufactured, and cost of goods sold.

Instructions

Calculate the following:

- For 2016, what was the cost of raw materials purchased?
- For 2016, what was the cost of goods manufactured?
- For 2016, what was the cost of goods sold?

(a) \$28,800

(b) \$161,600

P2-46A The following information is for Montreal Gloves Inc. for the year 2016:

Manufacturing costs	\$3,000,000
Number of gloves manufactured	300,000 pairs
Beginning inventory	0 pairs

(SO 4)

Calculate cost of goods manufactured, and cost of goods sold.

Sales in 2016 were 298,500 pairs of gloves for \$18 per pair.

Instructions

Calculate the following:

- What is the cost of goods sold for 2016?
- What is the amount of the gross profit for 2016?
- What is the cost of the finished goods ending inventory for 2016?

(b) \$2,388,000

P2-47A Rexfield Company recorded the following transactions for the month of February:

	<u>Materials</u>	<u>Work in Process</u>	<u>Finished Goods</u>
Purchases	\$100,000		
Beginning Inventory	18,000	\$ 8,000	(e)
Ending Inventory	(a)	20,000	\$20,000
Direct Materials Used		90,000	
Direct Labour		(b)	
Manufacturing Overhead (including indirect materials of \$10,000)		115,000	
Transferred to Finished Goods		(c)	
Cost of Goods Sold			(d)

(SO 2)

Determine missing amounts in the cost of goods manufactured and sold schedule and compare fixed and variable costs.

Sales were \$420,000 for the month. Sales prices are determined by a markup on manufacturing cost of 40%. The costs of new inputs to the manufacturing process during the month were \$285,000.

Instructions

- Calculate the missing values in the above schedule.
- Compare and contrast the behaviour of fixed and variable costs in total and per unit.

(1) (a) 18,000

(e) 43,000

P2-48A Last night, the sprinkler system at Plant A was accidentally set off. The ensuing deluge destroyed most of the cost records in Plant A for the month just completed (May). The plant manager has come to you in a panic—he has to complete his report for head office by the end of today. He wants you to give him the numbers he needs for his report. He can provide you with some fragments of information he has been able to salvage:

(SO 1, 4)

Determine missing amounts and calculate selected costs for schedules of cost of goods manufactured and sold.

Raw materials:	Beginning	\$ 25,000
	Ending	55,000
Work in process:	Beginning	15,000
Finished goods:	sold in May	400,000
	Ending	50,000
Manufacturing overhead:	Beginning	0
Accrued wages payable:	Beginning	10,000
	Ending	20,000

Other information:

1. Total direct materials requisitions for the month were \$180,000.
2. A total of 10,000 direct labour hours were worked during the month at an average wage of \$15/hour.
3. Manufacturing overheads of \$100,000 were incurred during the period.
4. On May 31, the ending inventory of work in process is \$4,500.

Instructions

Calculate the following:

- (a) \$210,000
- (a) The material purchased during May
- (b) The amount paid to the labour force in May
- (c) \$440,500
- (c) The cost of goods transferred from work in process inventory to finished goods inventory in May
- (d) The cost of finished goods inventory at the beginning of May

(adapted from CGA-Canada materials, now CPA Canada)

Problems: Set B

(SO 1)
Classify manufacturing costs into different categories and calculate the unit cost.

P2-49B Hite Company specializes in manufacturing motorcycle helmets. The company has enough orders to keep the factory production at 1,000 motorcycle helmets per month. Hite's monthly manufacturing cost and other expense data are as follows:

Maintenance costs on factory building	\$ 1,500
Factory manager's salary	4,000
Advertising for helmets	8,000
Sales commissions	5,000
Depreciation on factory building	700
Rent on factory equipment	6,000
Insurance on factory building	3,000
Raw materials (plastic, polystyrene, etc.)	20,000
Utility costs for factory	800
Supplies for general office	200
Wages for assembly-line workers	54,000
Depreciation on office equipment	500
Miscellaneous materials (glue, thread, etc.)	2,000

Instructions

- (a) DM \$20,000
- DL \$54,000
- MO \$18,000
- PC \$13,700
- (a) Prepare an answer sheet with the following column headings.

<u>Product Costs</u>				
<u>Cost Item</u>	<u>Direct Materials</u>	<u>Direct Labour</u>	<u>Manufacturing Overhead</u>	<u>Period Costs</u>

- (b) Enter each cost item on your answer sheet, placing the dollar amount under the appropriate headings. Total the dollar amounts in each of the columns.
- (c) Calculate the cost to produce one motorcycle helmet.

(SO 1)
Classify manufacturing costs into different categories and calculate the unit cost.

P2-50B Ladoca Company, a manufacturer of tennis racquets, started production in November 2016. For the preceding five years Ladoca had been a retailer of sports equipment. After a thorough survey of tennis racquet markets, Ladoca decided to turn its retail store into a tennis racquet factory.

Raw materials cost for a tennis racquet will total \$23 per racquet. Workers on the production lines are paid on average \$13 per hour. A racquet usually takes two hours to complete. In addition, the rent on the equipment used to produce racquets amounts to \$1,300 per month. Indirect materials cost \$3 per racquet. A supervisor was hired to oversee production; her monthly salary is \$3,500.

Factory janitorial costs are \$1,400 monthly. Advertising costs for the racquets will be \$6,000 per month. The factory building depreciation expense is \$8,400 per year. Property taxes on the factory building will be \$7,200 per year.

Instructions

- (a) DM \$57,500
- DL \$65,000
- MO \$15,000
- PC \$6,000
- (a) Prepare an answer sheet with the following column headings.

<u>Product Costs</u>				
<u>Cost Item</u>	<u>Direct Materials</u>	<u>Direct Labour</u>	<u>Manufacturing Overhead</u>	<u>Period Costs</u>

Assuming that Ladoca manufactures, on average, 2,500 tennis racquets per month, enter each cost item on your answer sheet, placing the dollar amount per month under the appropriate headings. Total the dollar amounts in each of the columns.

(b) Calculate the cost to produce one racquet.

P2-51B Incomplete manufacturing costs, expenses, and selling data for two different cases are as follows:

	Case	
	1	2
Direct Materials Used	\$ 6,300	\$ (g)
Direct Labour	3,000	4,000
Manufacturing Overhead	6,000	5,000
Total Manufacturing Costs	(a)	16,000
Beginning Work in Process Inventory	1,000	(h)
Ending Work in Process Inventory	(b)	2,000
Sales	22,500	(i)
Sales Discounts	1,500	1,200
Cost of Goods Manufactured	15,800	20,000
Beginning Finished Goods Inventory	(c)	5,000
Goods Available for Sale	18,300	(j)
Cost of Goods Sold	(d)	(k)
Ending Finished Goods Inventory	1,200	2,500
Gross Profit	(e)	6,000
Operating Expenses	2,700	(l)
Net Income	(f)	2,200

(SO 4)

Indicate the missing amount of different cost items, and prepare a condensed cost of goods manufactured schedule, an income statement, and a partial balance sheet.

Instructions

- Indicate the missing amount for each letter.
- Prepare a condensed cost of goods manufactured schedule for Case 1.
- Prepare an income statement and the current assets section of the balance sheet for Case 1.

(c) Current assets
\$15,600

Assume that in Case 1 the other items in the current assets section are as follows: cash \$3,000, receivables (net) \$10,000, raw materials \$700, and prepaid expenses \$200.

P2-52B The following data were taken from the records of Ruiz Manufacturing Company for the year ended December 31, 2016:

Raw Materials Inventory (1/1/16)	\$ 47,000	Factory Machinery Depreciation	\$ 7,700
Raw Materials Inventory (12/31/16)	44,200	Factory Utilities	12,900
Finished Goods Inventory (1/1/16)	85,000	Office Utilities Expense	8,600
Finished Goods Inventory (12/31/16)	67,800	Sales	465,000
Work in Process Inventory (1/1/16)	9,500	Sales Discounts	2,500
Work in Process Inventory (12/31/16)	8,000	Plant Manager's Salary	40,000
Direct Labour	145,100	Factory Property Taxes	6,100
Indirect Labour	18,100	Factory Repairs	800
Accounts Receivable	27,000	Raw Materials Purchases	62,500
Factory Insurance	7,400	Cash	28,000

(SO 4)

Prepare a cost of goods manufactured schedule, a partial income statement, and a partial balance sheet.

Instructions

- Prepare a cost of goods manufactured schedule. (Assume all raw materials used were direct materials.)
- Prepare an income statement through gross profit.
- Prepare the current assets section of the balance sheet at December 31.

(a) CGM \$304,900
(b) Gross profit
\$140,400
(c) Current assets
\$175,000

P2-53B The following incomplete data are for Atlantic Pride Manufacturing:

	January 1, 2016	December 31, 2016
Direct materials	\$40,000	\$60,000
Work in process	80,000	50,000
Finished goods	56,000	70,000

(SO 1, 4)

Calculate prime cost, conversion cost, and cost of goods manufactured.

Additional information for 2016:

Direct materials	\$200,000
Direct manufacturing labour payroll	160,000
Direct manufacturing labour rate per hour	10
Factory overhead rate per direct manufacturing labour hour	8

(c) \$518,000 **Instructions** Calculate the following manufacturing costs for 2016: (a) prime cost, (b) conversion cost, and (c) cost of goods manufactured.

(SO 4) **P2-54B** The following incomplete income statement information is available for Sawchule Ltd. for 2016:

Prepare income statement schedules for cost of goods sold and cost of goods manufactured.

Sales	\$560,000
Beginning inventory of finished goods	270,000
Cost of goods manufactured	260,000
Net income	50,000
Non-manufacturing costs	170,000

The beginning inventory of work in process was \$110,000 and there was no ending inventory of work in process.

Instructions

- (b) \$340,000
(c) \$190,000
- Calculate the gross profit in 2016.
 - Calculate the cost of goods sold in 2016.
 - Calculate the cost of the ending inventory of finished goods in 2016.
 - Calculate the total manufacturing cost in 2016.

(SO 2) **P2-55B** Incomplete manufacturing costs for the month of June are as follows:

Determine missing amounts in the cost of goods manufactured and sold schedule and compare fixed and variable costs.

	<u>Materials</u>	<u>Work in Process</u>	<u>Finished Goods</u>
Purchases	\$150,000		
Beginning Inventory	28,000	\$ 38,000	(e)
Ending Inventory	(a)	30,000	\$25,000
Direct Materials Used		125,000	
Direct Labour		(b)	
Manufacturing Overhead (including indirect materials of \$20,000)		145,000	
Transferred to Finished Goods		(c)	
Cost of Goods Sold		(d)	

Sales were \$780,000 for the month. Sales prices are determined by a markup on manufacturing cost of 30%. The costs of new inputs to the manufacturing process during the month were \$498,000.

Instructions

- (1) (b) \$228,000
(d) \$600,000
- Calculate the missing values in the above schedule.
 - Compare and contrast the behaviour of fixed and variable costs in total and per unit.

(SO 4) **P2-56B** Agler Company is a manufacturer of toys. Its controller, Joyce Rotzen, resigned in August 2016. An inexperienced assistant accountant has prepared the following income statement for the month of August 2016.

Prepare a cost of goods manufactured schedule and a correct income statement.

AGLER COMPANY		
Income Statement		
For the Month Ended August 31, 2016		
Sales (net)		\$675,000
Less:	Operating expenses	
	Raw materials purchases	\$200,000
	Direct labour cost	160,000
	Advertising expense	75,000
	Selling and administrative salaries	70,000
	Rent on factory facilities	60,000
	Depreciation on sales equipment	50,000
	Depreciation on factory equipment	35,000
	Indirect labour cost	20,000
	Utilities expense	10,000
	Insurance expense	5,000
		685,000
Net loss		\$ (10,000)

Prior to August 2016, the company had been profitable every month. The company's president is concerned about the accuracy of the income statement. As her friend, she has asked you to review the income statement and make necessary corrections. After examining other manufacturing cost data, you have acquired the following additional information.

1. Inventory balances at the beginning and end of August were as follows:

	<u>August 1</u>	<u>August 31</u>
Raw materials	\$19,500	\$30,000
Work in process	25,000	21,000
Finished goods	40,000	59,000

2. Only 50% of the utilities expense and 70% of the insurance expense apply to factory operations; the remaining amounts should be charged to selling and administrative activities.

Instructions

- (a) Prepare a cost of goods manufactured schedule for August 2016.
 (b) Prepare a correct income statement for August 2016.

(a) CGM \$477,000
 (b) NL \$15,500

- P2-57B** The following data are given for X Firm (in millions of dollars):

(SO 4)
 Calculate selected costs for the income statement and schedules of cost of goods manufactured and sold.

Beginning and ending inventories	0
Sales	\$390
Direct materials used	80
Direct labour cost	180
Factory overhead	?
Selling and administrative expenses	?
Gross profit	70
Net income (no income taxes)	22

Instructions

Calculate the following amounts:

- (a) Cost of goods sold
 (b) Total factory overhead cost
 (c) Selling and administrative expenses
 (d) Total product costs
 (e) Total period costs
 (f) Prime cost
 (g) Conversion cost
 (h) Cost of goods manufactured

(a) \$320 million
 (d) \$320 million
 (h) \$320 million

- P2-58B** On January 31, 2016, the manufacturing facility of a medium-sized company was severely damaged by an accidental fire. As a result, the company's direct materials, work in process, and finished goods inventories were destroyed. The company did have access to certain incomplete accounting records, which revealed the following:

(SO 4)
 Determine missing amounts, prepare cost of goods manufactured, and calculate inventory values.

1. Beginning inventories, January 1, 2016:

Direct materials	\$32,000
Finished goods	\$30,000
Work in process	\$68,000

2. Key ratios for the month of January 2016:

Gross profit = 20% of sales
 Prime costs = 70% of manufacturing costs
 Factory overhead = 40% of conversion costs
 Ending work in process is always 10% of the monthly manufacturing costs.

3. All costs are incurred evenly in the manufacturing process.
 4. Actual operations data for the month of January 2016:

Sales	\$900,000
Direct labour incurred	\$360,000
Direct materials purchases	\$320,000

Instructions

- (a) From the above data, reconstruct a cost of goods manufactured schedule.
 (b) Calculate the total cost of inventory lost, and identify each category where possible (direct materials, work in process, and finished goods), at January 31, 2016.

(a) COGM \$788,000
 (b) Total \$330,000

(adapted from CMA Canada, now CPA Canada)

Cases

C2-59 A fire on the premises of Bydo Inc. destroyed most of its records. Below is an incomplete set of data for operations in 2016:

Sales	?
Raw materials, beginning inventory	\$13,000
Purchases	13,000
Raw materials, ending inventory	?
Direct materials	20,000
Direct labour	25,000
Factory overhead	8,000
Manufacturing costs added during the year	?
Work in process, beginning inventory	8,000
Work in process, ending inventory	7,000

Cost of goods manufactured	?
Finished goods, beginning inventory	\$ 6,000
Finished goods, ending inventory	?
Cost of goods sold	55,000
Gross profit	9,000
Operating expenses	?
Operating income (loss)	(4,000)

Instructions

Prepare an income statement for 2016. Include separate schedules for the cost of goods sold and cost of goods manufactured.

(adapted from CGA-Canada, now CPA Canada)

C2-60 On January 31, a snowstorm damaged the office of a small business, and some of the accounting information stored in the computer's memory was lost. The following information pertaining to January activities was retrieved from other sources:

Direct materials purchased	\$18,000
Work in process—beginning inventory	2,000
Direct materials—beginning inventory	6,000
Direct materials—ending inventory	10,000
Finished goods—beginning inventory	12,000
Finished goods—ending inventory	2,500
Sales	60,000
Manufacturing overhead and direct labour incurred	22,000
Gross profit percentage based on net sales	40%

Instructions

Calculate the following:

- What was the cost of direct materials used in January?
- What amount of work in process inventory was transferred out to finished goods during January?
- Assume that \$20,000 of direct materials was used in January and that the cost of goods available for sale in January amounted to \$40,000. What did the ending work in process inventory amount to?

C2-61 In January 2016, Sayers Manufacturing incurred the following costs in manufacturing Detecto, its only product:

Direct materials purchased	\$900,000
Direct labour incurred	710,000
Benefits	75,000
Overtime premium	50,000
Supervisory salaries	125,000
Utility expenses	92,500
Depreciation (equipment)	2,800
Supplies (factory)	10,000
Factory rent	31,300

An analysis of the accounting records showed the following balances in the inventory accounts at the beginning and end of January:

	January 1	January 31
Direct materials	\$ 80,000	\$ 90,000
Work in process	110,000	74,600
Finished goods	95,000	108,000

Sayers treats overtime premiums and benefits as indirect costs.

Instructions

- Determine the cost of goods manufactured for January 2016.
 - Calculate the cost of goods sold for January 2016.
- (adapted from CMA Canada, now CPA Canada)

C2-62 XYZ Company reports the following inventory data for the month of June:

	June 1	June 30
Direct materials	\$ 50	\$ 80
Work in process	140	180
Finished goods	240	250

Instructions

Calculate the following:

- What were the total costs of production?
- What was the cost of materials used?
- What was the cost of direct labour?
- What was the cost of variable overhead?
- What was fixed manufacturing overhead?
- What was the cost of goods manufactured?
- What was the cost of goods sold?
- What were the conversion costs?
- What were the prime costs?
- What were the period costs?

- Direct materials purchases were \$140.
- Direct costs of production were \$220.
- Variable costs of production were \$280.
- Indirect costs of production were \$180.
- Selling and administrative costs were \$210.

C2-63 Match Manufacturing Company specializes in producing fashion outfits. On July 31, 2016, a tornado touched down at its factory and general office. The inventories in the warehouse and the factory were completely destroyed, as was the general office nearby. However, the next morning, through a careful search of the disaster site, Ross Siggurson, the company’s controller, and Catherine Longboat, the cost accountant, were able to recover a small amount of manufacturing cost data for the current month.

“What a horrible experience,” sighed Ross. “And the worst part is that we may not have enough records to use in filing an insurance claim.”

“It was terrible,” replied Catherine. “However, I managed to recover some of the manufacturing cost data that I was working on yesterday afternoon. The data indicate that our direct labour cost in July totalled \$240,000 and that we had purchased \$345,000 of raw materials. Also, I recall that the amount of raw materials used for July was \$350,000. But I’m not sure this information will help. The rest of our records were blown away.”

“Well, not exactly,” said Ross. “I was working on the year-to-date income statement when the tornado warning was announced. My

recollection is that our sales in July were \$1.26 million and our gross profit ratio has been 40% of sales. Also, I can remember that our cost of goods available for sale was \$770,000 for July.”

“Maybe we can work something out from this information!” exclaimed Catherine. “My experience tells me that our manufacturing overhead is usually 60% of direct labour.”

“Hey, look what I just found,” cried Ross. “It’s a copy of this June’s balance sheet, and it shows that our inventories as at June 30 were finished goods \$38,000, work in process \$25,000, and raw materials \$19,000.”

“Super!” yelled Catherine. “Let’s go work something out.”

In order to file an insurance claim, Match Manufacturing must determine the amount of its inventories as at July 31, 2016, the date of the tornado touchdown.

Instructions

With the class divided into groups, determine the amount of costs in the Raw Materials, Work in Process, and Finished Goods inventory accounts as at the date of the tornado.



C2-64 Wayne Terrago, controller for Robbin Industries, was reviewing production cost reports for the year. One amount in these reports continued to bother him—advertising. During the year, the company had instituted an expensive advertising campaign to sell some of its slower-moving products. It was still too early to tell whether the advertising campaign was successful.

There had been much internal debate about how to report the advertising cost. The vice-president of finance argued that advertising costs should be reported as a cost of production, just like direct materials and direct labour. He therefore recommended that this cost be identified as manufacturing overhead and reported as part of inventory costs until sold. Others disagreed. Terrago believed that this cost should be reported as an expense of the current period, based on the conservatism principle. Others argued that it should be reported as prepaid advertising and reported as a current asset.

The president finally had to decide the issue. He argued that these costs should be reported as inventory. His arguments were practical ones. He noted that the company was experiencing financial difficulty and expensing this amount in the current period might jeopardize a planned bond offering. Also, reporting the advertising costs as inventory rather than as prepaid advertising would attract less attention from the financial community.

Instructions

Answer the following questions:

- (a) Who are the stakeholders in this situation?
- (b) What are the ethical issues involved in this situation?
- (c) What would you do if you were Wayne Terrago?

“All About You” Activity



C2-65 You work for the controller at Green Partxs Inc., a small specialized supplier to the auto parts industry. Currently, it produces 20,000 units per month, using two shifts, with each shift producing 10,000 units. However, the bankruptcy of one of its major customers means that production must be cut to 11,000 units within the next six months. The company does not expect to regain the lost business for at least another two years, but it is confident that it can still make a profit at this lower production level.

Instructions

- (a) Determine the impact on variable costs of the reduction in production.
- (b) Determine the impact on fixed costs of the reduction in production and how the Green Partxs management might reduce them.
- (c) What else could the company do to increase profits and offset the impact of the reduced production level?



Decision-Making at Current Designs

DM2-1 Diane Buswell, controller for Current Designs, reviewed the accounting records for a recent period, she noted the following items.

Instructions

Classify each item as a product cost or a period cost. If an item is a product cost, note if it is a direct materials, direct labour, or manufacturing overhead item.

Payee	Purpose	Product Costs			Period Costs
		Direct Materials	Direct Labour	Manufacturing Overhead	
Winona Agency	Property insurance for the manufacturing plant				
Bill Johnson (sales manager)	Payroll cheque—payment to sales manager				
Xcel Energy	Electricity for manufacturing plant				
Winona Printing	Price lists for salespeople				
Jim Kaiser (sales representative)	Sales commissions				
Dave Thill (plant manager)	Payroll cheque—payment to plant manager				
Dana Schultz (kayak assembler)	Payroll cheque—payment to kayak assembler				
Composite One	Bagging film used when kayaks are assembled; it is discarded after use				
Fastenal	Shop supplies—brooms, paper towels, etc.				
Ravago	Polyethylene powder, which is the main ingredient for the rotational moulded kayaks				
Winona County	Property taxes on manufacturing plant				
North American Composites	Kevlar [®] fabric for composite kayaks				
Waste Management	Garbage disposal for the company office building				
None	Journal entry to record depreciation of manufacturing equipment				

Waterways Continuing Problem

(This is a continuation of the Waterways Problem from Chapter 1.)

WCP-2 Recently Ryan Smith, the plant manager of the manufacturing division of Waterways Corporation, has been focusing on changes to overhead costs. He realizes that Ben Clark's new designs call for more automation in the plant, but he is also investigating if there are any opportunities for cost savings.

Ryan thought it might be helpful to his cost-cutting measures if he could predict what manufacturing overhead would be in the following months. But first he needed to determine the appropriate activity base. He thought there could be two possibilities: direct labour or the number of hours of operation.

From historical data he retrieved the following information:

	Direct Labour	Hours of Operation	Manufacturing Overhead
January	\$25,000	500	\$145,000
February	24,000	520	148,000
March	30,000	700	170,000
April	32,000	690	176,000
May	27,000	575	150,000
June	25,000	550	140,000

Ryan then asked CFO Jordan Leigh for information available to determine the cost of goods manufactured. Ryan was provided with the following information.

1. The balances in the applicable inventory accounts at the beginning of the month were: Raw materials inventory \$35,000; Work in process inventory \$52,000.
2. Raw material purchases for the month were \$191,000.
3. Of the raw materials used in production, 75% could be traced to the actual production, and the rest was indirect materials.
4. Ending raw materials inventory was \$50,000.
5. Actual costs for wages and salaries were \$70,000. 60% was considered overhead; the balance was direct labour.
6. Hours of operation for the month were 600.
7. Total manufacturing costs for the month were \$315,000.
8. Costs transferred into finished goods inventory for the month were \$325,000.

Instructions

- (a) Using the high-low method, and based on the historical data provided, determine two possible cost formulas for manufacturing overhead.
- (b) Using the cost formulas developed in (a), determine which activity base would be better for predicting manufacturing overhead.
- (c) Prepare a condensed cost of goods manufactured schedule.

Answers to Self-Study Questions

1. d 2. c 3. a 4. a 5. b 6. c 7. d 8. a 9. c 10. a

Remember to go back to the beginning of the chapter to check off your completed work!



Job-Order Cost Accounting

The Navigator

Chapter 3

- Scan *Study Objectives*
- Read *Feature Story*
- Read *Chapter Preview*
- Read text and answer *Before You Go On* p. 74, p. 76, p. 81, p. 84, p. 89, p. 92
- Work *Using the Decision Toolkit*
- Review *Summary of Study Objectives*
- Review *Decision Toolkit—A Summary*
- Work *Comprehensive Do It!*
- Answer *Self-Study Questions*
- Complete assignments



study objectives

After studying this chapter, you should be able to do the following:

1. Explain the characteristics and purposes of cost accounting.
2. Describe the flow of costs in a job-order cost accounting system.
3. Use a job cost sheet to assign costs to work in process.
4. Demonstrate how to determine and use the predetermined overhead rate.
5. Prepare entries for manufacturing and service jobs completed and sold.
6. Distinguish between under- and over-applied manufacturing overhead.



A PRESSING NEED TO CALCULATE COSTS

You might think that the cost to print a magazine or store flyer would be constant as it's a mass-produced item. But the amount of labour and materials that go into each print job can vary substantially. That's why printing companies use job-order costing; they calculate the cost of each job and charge the customer accordingly.

The printing division of Transcontinental Inc., a corporation with more than 9,000 employees across Canada and the United States and revenues of \$2.1 billion in 2013, is Canada's largest printer. It prints flyers for retailers like Best Buy and Future Shop, newspapers such as *The Globe and Mail* and *Vancouver Sun*, and more than 450 magazines, such as *Canadian Living* and *Elle Canada*. It has 27 printing presses across Canada and the United States, equipped with the latest digital, web, sheetfed, coldset, and heatset presses.

Transcontinental has to estimate and invoice for each particular job. Specifications can vary based on page size, paper type, the amount of colour, and what press will be used. Transcontinental can handle special projects such as book covers with a 3D effect and magazine covers that fold out.

Printers such as Transcontinental have to track the cost of every stage of production, from prepress, printing, laminating, binding and finishing, to mailing and distribution. Typically, printers will assign each job a code. Employees enter the job code into the machines and punch it into their time clock, so that labour and machine time is then charged to that job. The accounting department will

also factor general overhead and administration costs into the standard rates.

The same happens when purchasing materials. When a printer buys material, such as paper, for a specific job, the purchasing department will code it accordingly, linking it to that job. If an employee takes material out of inventory, they are responsible for charging it to the job.

Print products are increasingly competing with digital media, so printers are trying to reduce their costs. "The printers who will be able to profit from this evolving market are those who use state-of-the-art technology to lower their production costs," Transcontinental said in its 2013 annual report. For example, the company recently bought an inkjet web press that shaves several weeks off the printing time for promotional materials.

Many printing contracts are awarded competitively, based mainly on price. Printers need to have an accurate estimate of each project's cost so they can make a reasonable profit if they win the bid. Companies like Transcontinental can print many things, but money isn't one of them.

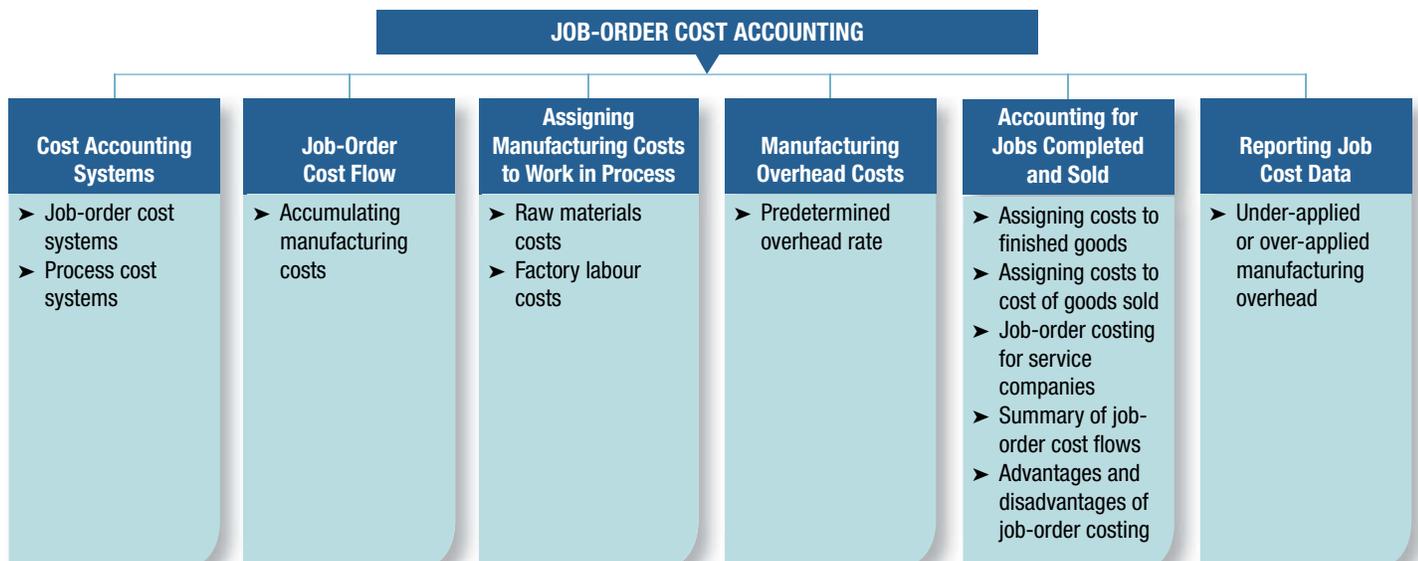
Sources: The Canadian Press, "Transcontinental Profit, Dividend Up," MSN Money, March 11, 2014; "TC Transcontinental Printing Accelerates Speed to Market with HP T400 Inkjet Web Press," Hewlett-Packard news release, January 30, 2014; Transcontinental Inc. 2013 Annual Report; "Growth by Developing Retailers' Value Chain," Transcontinental investor presentation, September 18, 2013; Transcontinental website, www.tctranscontinental.com/en/home.



Preview of Chapter 3

The feature story about the printing division of Transcontinental Inc. described the job-order costing system used in printing a variety of jobs. It demonstrated that accurate costing is critical to the company's success. For example, in order to submit accurate bids on new jobs and to know whether it profited from past jobs, the company needs a good costing system. This chapter shows how these printing costs would be assigned to specific jobs, such as the printing of an individual magazine. We begin the discussion in this chapter with an overview of the flow of costs in a job-order cost accounting system. We then use a case study to explain and illustrate the documents, entries, and accounts in this type of cost accounting system.

This chapter is organized as follows:



Cost Accounting Systems

STUDY OBJECTIVE 1

Explain the characteristics and purposes of cost accounting.

Cost accounting involves the measuring, recording, and reporting of product costs. From the data that are collected, companies determine both the total cost and the unit cost of each product. The accuracy of the product cost information produced by the cost accounting system is critical to the company's success. Companies use this information to determine which products to produce, what price to charge, and the amounts to produce. Accurate product cost information is also vital for effective evaluation of employee performance.

A **cost accounting system** consists of accounts for the various manufacturing costs. These accounts are fully integrated into the general ledger of a company. An important feature of a cost accounting system is the use of a **perpetual inventory system**. Such a system provides immediate, up-to-date information on the cost of a product.

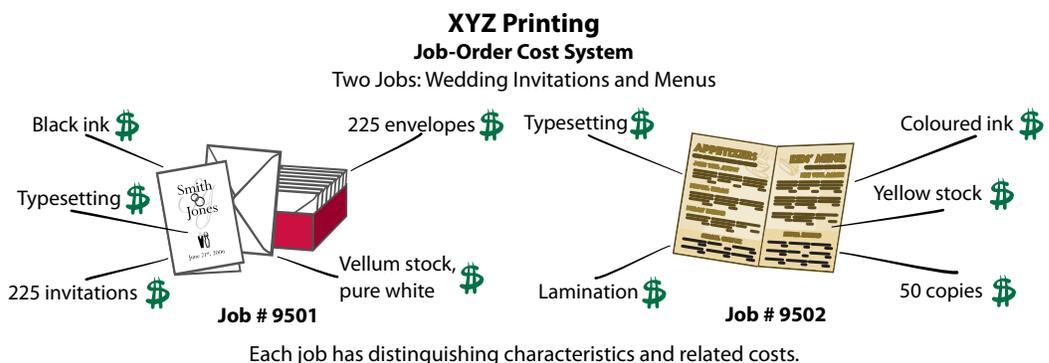
There are two basic types of cost accounting systems: (1) a job-order cost system and (2) a process cost system. Although cost accounting systems differ greatly from company to company, most of them are based on one of these two traditional product costing systems.

JOB-ORDER COST SYSTEMS

Under a **job-order cost system**, the company assigns costs to each job or to each batch of goods. Examples of a job would be the manufacture of a private aircraft by Bombardier or the production of a movie by the Canadian Broadcasting Corporation. An example of a batch would be the printing of 225 wedding invitations by a local print shop, or the printing of a weekly issue of *Maclean's* magazine by a high-tech printer. Jobs or batches may be completed to fill a specific customer order or to replenish inventory.

An important feature of job-order costing is that each job (or batch) has its own distinguishing characteristics. For example, each house is custom-built, each consulting engagement is unique, and each printing job is different. The objective is to calculate the cost per job. At each point in the manufacture of a product or the provision of a service, the job and its associated costs can be identified. A job-order cost system measures costs for each completed job, rather than for set time periods. Illustration 3-1 shows the recording of costs in a job-order cost system.

► **Illustration 3-1**
Job-order cost system



PROCESS COST SYSTEMS

A company uses a **process cost system** when it manufactures a large volume of similar products. Production is continuous to ensure that adequate inventories of the finished product(s) are available. A process cost system is used in the manufacture of dairy products by Saputo, the refining of petroleum by Petro-Canada, and the production of automobiles by General Motors of Canada Ltd. Process costing accumulates product-related costs for a period of time (such as a week or a month) instead of assigning costs to specific products or job orders. In process costing, the costs are assigned to departments or processes for a set (predetermined) period of time. Illustration 3-2 shows the recording of costs in a process cost system.