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CHAPTER 2

Cost Concepts

CHAPER LEARNING OBJECTIVES AND COMPETENCIES

LO1 UNDERSTAND COST CLASSIFICATION BY BEHAVIOUR.

CC1 Define variable and fixed costs, and give examples.

LO2 UNDERSTAND COST CLASSIFICATION BY TRACEABILITY.

CC2 Define direct and indirect costs, and give examples.

LO3 UNDERSTAND COST CLASSIFICATION BY RELEVANCE.

CC3 Define differential costs, opportunity costs, and sunk costs, and give examples.

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LO4 UNDERSTAND COST CLASSIFICATION BY FUNCTION.

CC4 Distinguish between manufacturing and nonmanufacturing costs.

CC5 Identify and give examples of direct materials, direct labour, and manufacturing overhead costs.

CC6 Identify and give examples of marketing or selling and administrative costs.

CC7 Distinguish between product and period costs, and give examples.

CC8 Explain how costs are classified in financial statements of merchandising and manufacturing companies.

LO5 PREPARE FINANCIAL REPORTS.

CC9 Prepare an income statement.

CC10 Prepare a schedule of cost of goods sold.

LO6 UNDERSTAND AND PREPARE MANUFACTURING REPORTS.

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CC11 Explain the basic inventory flow equation.

CC12 Prepare a schedule of cost of goods manufactured, including the computation of the cost of direct materials used.

CHAPER LEARNING OBJECTIVES AND THE CPA CANADA TECHNICAL COMPETENCIES

This chapter covers material outlined in **Section 1: Financial Reporting** and **Section 3: Management Accounting** of the CPA Competency Map.

Chapter LOs	**CPA Technical Competencies**	
	1.3	**Financial Report Preparation**
LO5, 6	1.3.1	Prepares financial statements
	3.3	**Cost Management**
LO1, 2, 3, 4, 5, 6	3.3.1	Evaluates cost classifications and costing methods for management of ongoing operations
LO1, 2, 3, 4, 5, 6	3.3.2	Evaluates and applies cost management techniques appropriate for specific costing decisions

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CHAPTER OUTLINE

LO1 UNDERSTAND COST CLASSIFICATION BY BEHAVIOUR.

Chapter Competency 1 - Define variable and fixed costs, and give examples.

The basic objective of cost classification is to enable managers get a better understanding of costs.

Cost behaviour refers to how a cost will react to changes in the level of activity within the relevant range. The most commonly used classifications of cost behaviour are variable and fixed costs.

- **Variable cost** – A cost that varies, in total, in direct proportion to changes in the level of activity. However, variable cost per unit is constant.

- **Fixed cost** - A cost that remains constant, in total, regardless of changes in the level of the activity. However, if expressed on a per unit basis, the average fixed cost per unit varies inversely with changes in activity.

Teaching suggestion – To illustrate fixed costs, ask students for the cost of a large pizza. Then ask, what would be the cost per student if two students but a pizza? What if four students buy a pizza? This makes it clear why average fixed costs change on a per unit basis.

To illustrate variable costs, add that a beverage costs $1 and each student eating the pizza has one beverage. So, if two people were eating the pizza, the total beverage bill would come to $2; if four people, $4. The cost per beverage remains the same, but the total cost depends on the number of people ordering a beverage.

LO2 UNDERSTAND COST CLASSIFICATION BY TRACEABILITY.

Chapter Competency 2 - Define direct and indirect costs, and give examples.

- **Cost Object** - Anything for which cost data are desired including products, customers, jobs, organizational subunits, etc. For purposes of assigning costs to cost objects, costs are classified two ways:

  - **Direct costs** — Cost that can be easily and conveniently traced to a unit of product or other cost object.
  - **Indirect costs** — Costs that cannot be easily and conveniently traced to a unit of product or other cost object.

To be traced to a cost object, the cost must be caused by the cost object.

Common costs – Indirect costs incurred to support a number of cost objects. These costs cannot be traced to any individual cost object.

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Exhibit 2–3 Direct and Indirect Costs of an Individual Flight

LO3 UNDERSTAND COST CLASSIFICATION BY RELEVANCE.

Chapter Competency 3 - Define differential costs, opportunity costs, and sunk costs, and give examples.

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It is important to realize that every decision involves a choice between at least two alternatives. The goal of making decisions is to identify those costs that are either **relevant** or **irrelevant** to the decision. To make decisions, it is essential to have a grasp of three concepts:

- **Differential costs (or incremental costs) -** A difference in cost between any two alternatives (a difference in revenue between two alternatives is called **differential revenue**). Differential costs can be either fixed or variable.

- **Opportunity cost** – The potential benefit that is given up when one alternative is selected over another. These costs are not usually entered into the accounting records of an organization, but must be explicitly considered in all decisions.

Teaching suggestion - An example of a decision that demonstrates opportunity cost is the decision to take a job or go to school. The opportunity cost of going to school is the income that would have been earned if one took the job.

Teaching suggestion – Ask students what *opportunity costs they incur by attending class. Their opportunity cost is the value to them of the activity they would be doing otherwise (e.g., working, sleeping, studying, partying, etc.).*

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- **Sunk cost** – A cost that has already been incurred and that cannot be changed by any decision now or in the future.

Teaching suggestion – Ask students: ***Suppose you had purchased gold for $400 an ounce, but now it is selling for $250 an ounce. Should you wait for the gold to reach $400 an ounce before selling it?" Many students will say "yes" even though the $400 purchase is a sunk cost.***

LO4 UNDERSTAND COST CLASSIFICATION BY FUNCTION.

Chapter Competency 4 - Distinguish between manufacturing and nonmanufacturing costs.

It might be useful to understand that every organization carries out a sequence of activities to fulfill its mission. Such a sequence of activities is known as the **value chain** of that organization.

Cost classification by function consist of associating costs with the type of activity for which that cost is incurred.

The term **manufacturing cost is** used to identify the cost associated with the production activity such as direct materials, direct labour, and manufacturing overhead.

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Chapter Competency 5 - Identify and give examples of direct materials, direct labour, and manufacturing overhead costs.

- **Direct materials -** Raw materials that become an integral part of the finished product and whose costs can be conveniently traced to it.

- **Direct labour** – Labour costs that can be easily traced to individual units of product.

- **Indirect labour** – Labour costs that cannot be physically traced to individual units of product or can only be traced.

- **Manufacturing overhead** – Includes all manufacturing costs except direct materials and direct labour. These costs cannot be easily traced to specific units produced (also called indirect manufacturing cost, factory overhead, and factory burden).

  - Includes **indirect materials** that are part of the finished product, but that cannot be easily traced to it.
  - Includes **indirect labour costs** that cannot be physically or conveniently traced to the creation of products.
  - Other examples of manufacturing overhead include: maintenance and repairs on production equipment, heat and light, property taxes, depreciation and insurance on manufacturing facilities, etc.

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Teaching suggestion - Use something in the classroom such as a desk or chair to illustrate manufacturing cost concepts. Center the discussion on the raw materials classified as direct materials and as manufacturing overhead; labour costs classified as direct labour and as manufacturing overhead; and other costs incurred to produce the chair that are classified as manufacturing overhead.

<u>Chapter Competency 6</u> - Identify and give examples of marketing or selling and administrative costs.

Nonmanufacturing costs are sub classified into two categories:

- **Selling costs** – Includes all costs necessary to secure customer orders and get the finished product into the hands of the customer.
- **Administrative costs** – Includes all executive, organizational, and clerical costs associated with the general management of an organization.

<u>Chapter Competency 7</u> - Distinguish between product and period costs, and give examples.

Product costs (also called **inventoriable costs**) – Includes all the costs that are involved in acquiring or making a product. In the case of manufactured goods, it includes direct materials, direct labour, and manufacturing overhead.

Consistent with the matching principle, product costs are recognized as expenses when the products are sold.

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Period costs – Includes all selling and administrative costs. These costs are expensed on the income statement in the period incurred. All **nonmanufacturing costs** are considered to be period cost.

Prime cost and **conversion cost**

- Prime cost – Direct materials plus direct labour.
- Conversion cost − Direct labour plus manufacturing overhead.

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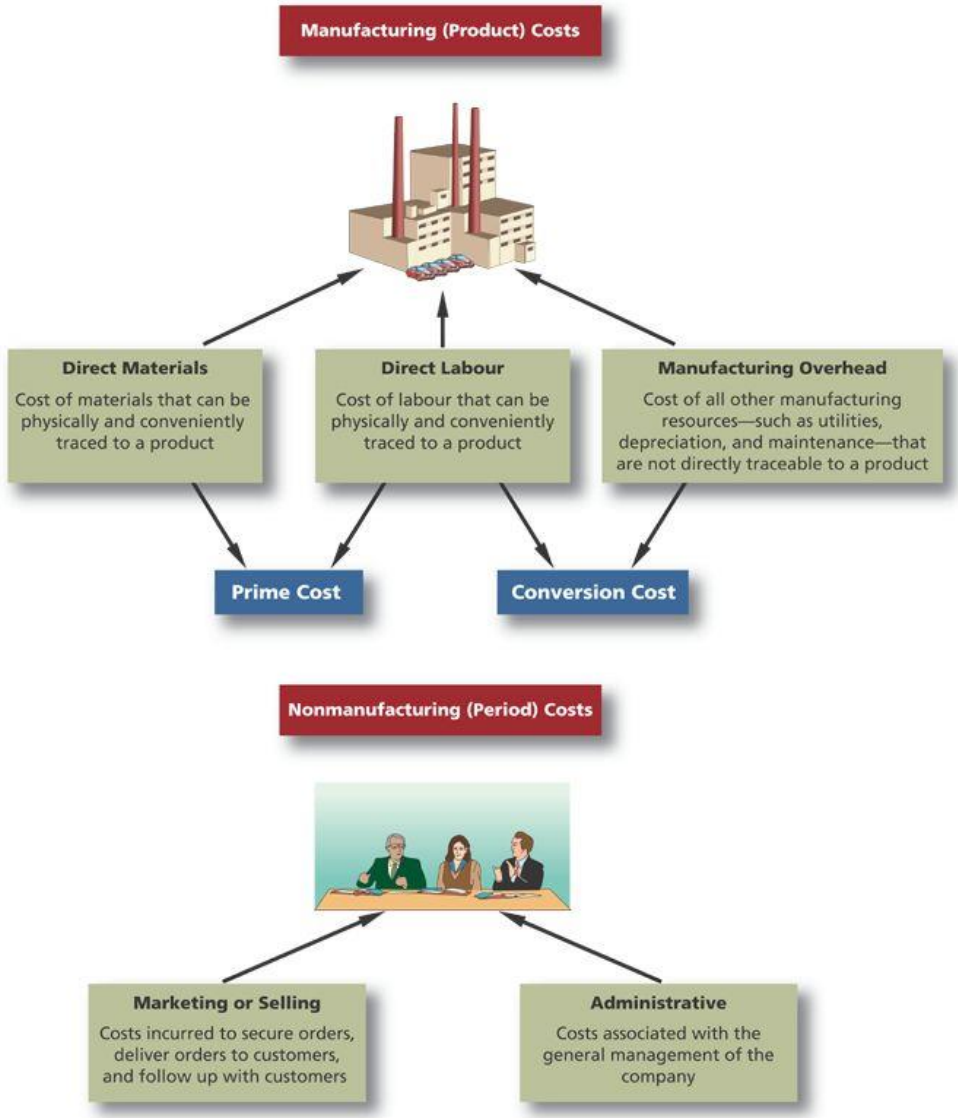
Exhibit 2-5: Summary of Cost Classifications by Function



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<u>Chapter Competency 8</u> - Explain how costs are classified in financial statements of merchandising and manufacturing companies.

Merchandising companies – Purchase finished goods from suppliers for resale to customers.

Manufacturing companies – Purchase raw materials from suppliers and produce and sell finished goods to customers.

Manufacturing companies produce its goods as well as market them. The production process gives rise to many costs and these costs must be accounted for on the manufacturing company's financial statements.

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LO5 PREPARE FINANCIAL REPORTS.

Chapter Competency 9 **- Prepare an income statement.**

Chapter Competency 10 **- Prepare a schedule of cost of goods sold.**

The balance sheet: merchandising vs. manufacturing companies

Merchandising companies do not have to distinguish between raw materials, work in process, and finished goods. They report one inventory number on their balance sheet labelled **merchandise inventory.**

Manufacturing companies report three types of inventory on their balance sheets.

1. **Raw materials** – The materials used to make the product.
2. **Work in process** – Consists of units of product that are partially complete, but that will require further work before they are ready for sale to customers.
3. **Finished goods** – Consists of units of product that have been completed but not yet sold to customers.

The income statement: merchandising vs. manufacturing companies

Merchandising companies calculate cost of goods sold as:

COGS = BMI + Purchases – EMI

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Manufacturing companies calculate cost of goods sold as:

COGS = BFGI + COGM – EFGI

Teaching suggestion - Explain that the raw materials, work in process, and finished goods inventories all follow the same logic. They start out with some beginning inventory. Additions are made during the period. At the end of the period, everything that started in the inventory or that was added must be in the ending inventory or have been transferred out to another inventory account or to cost of goods sold.

The schedule of cost of goods manufactured

This schedule contains the three elements of costs mentioned previously, namely **direct materials, direct labour, and manufacturing overhead.**

It calculates the cost of raw materials, direct labour, and manufacturing overhead used in production during the period.

It calculates the manufacturing costs associated with goods that were finished during the period.

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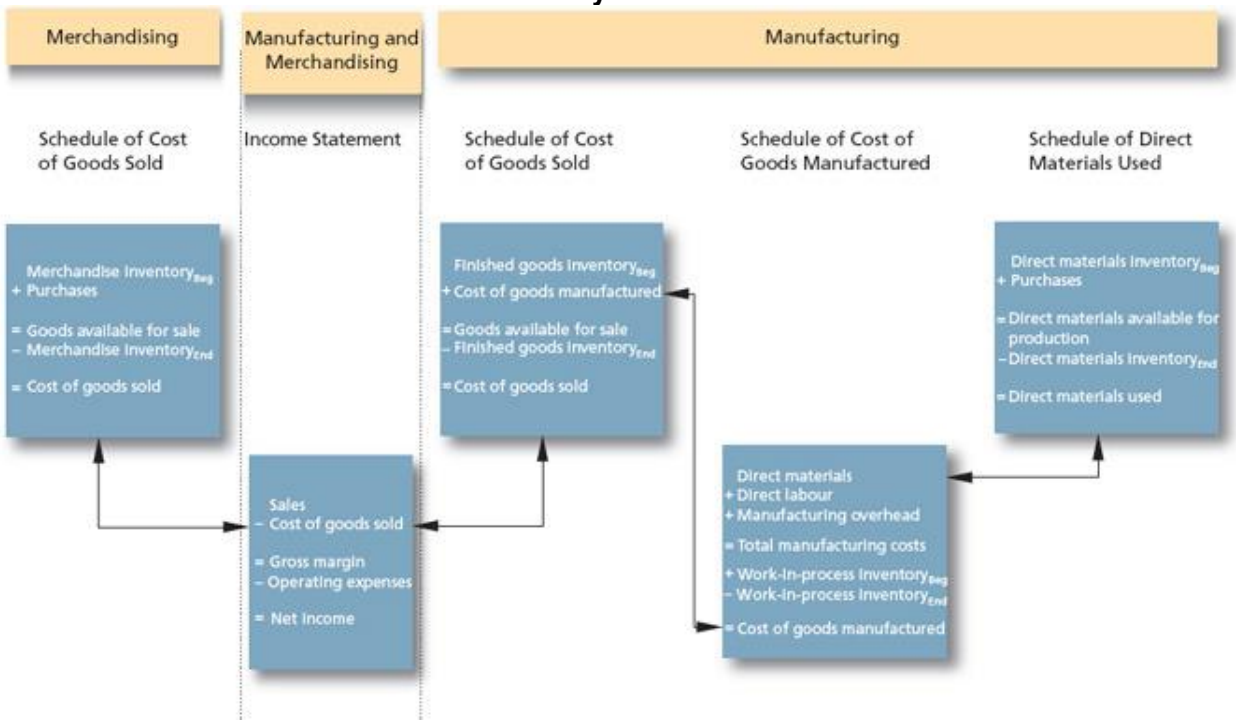
Exhibit 2-7C: Inventory and Cost of Goods Sold



LO6 UNDERSTAND AND PREPARE MANUFACTURING REPORTS.

<u>Chapter Competency 11</u> - Explain the basic inventory flow equation.

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<u>Chapter Competency 12</u> - Prepare a schedule of cost of goods manufactured, including the computation of the cost of direct materials used.

Product cost flows

To create a schedule of cost of goods manufactured as well as a balance sheet and income statement, it is important to understand the flow of product costs:

1. Raw material purchases made during the period are added to beginning raw materials inventory. The ending raw materials inventory is deducted to arrive at the **raw materials used in production.**

2. Direct labour and manufacturing overhead (also called conversion costs) used in production are added to direct materials to arrive at **total manufacturing costs.**

3. Total manufacturing costs are added to the beginning work in process to arrive at **total work in process**.

4. The ending work in process inventory is deducted from the total work in process for the period to arrive at the **cost of goods manufactured**.

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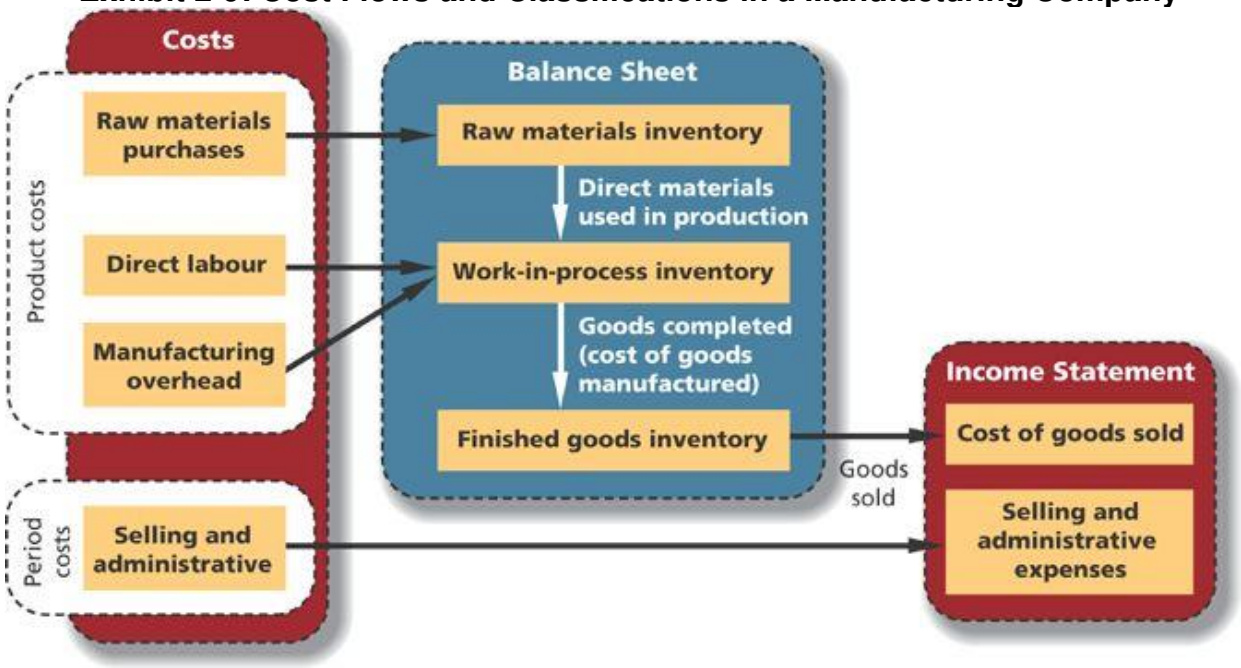
5. The cost of goods manufactured is added to the beginning finished goods inventory to arrive at cost of goods available for sale. The ending finished goods inventory is deducted from this figure to arrive at **cost of goods sold**.

6. All raw materials, work in process, and unsold finished goods at the end of the period are shown as inventoriable costs in the asset section of the **balance sheet**.

7. As finished goods are sold, their costs are transferred to cost of goods sold on the **income statement**.

8. Selling and administrative expenses are not involved in making the product; therefore, they are treated as **period costs** and reported in the income statement for the period the cost is incurred.

Exhibit 2-9: Cost Flows and Classifications in a Manufacturing Company



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Chapter 2 – 1-MINUTE QUESTION

(Note: The purpose of these short 1-minute questions is to encourage students to come to class prepared for the lesson, having read the chapter. The question may be given at the beginning of the class and count for ½ to 1 mark.)

If the cost of goods sold is $100,000 and the ending finished goods inventory is $30,000 higher than the beginning finished goods inventory, what must be the amount of the cost of goods manufactured?

a. $30,000

b. $100,000

c. $130,000

d. $70,000

Suggested solution:

C

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VOCABULARY QUIZ

Chapter 2

_____ 1. The manufacturing costs associated with the goods that were finished.

_____ 2. A cost that remains constant, in total, regardless of changes in the level activity within a relevant range.

_____ 3. Direct labour cost plus manufacturing overhead cost.

_____ 4. The potential benefit given up when one alternative is selected over another.

_____ 5. Direct materials cost plus direct labour cost.

_____ 6. A cost that can be easily and conveniently traced to a particular cost object.

_____ 7. Unit of product that is only partially complete and will require further work before they are ready for sale to a customer.

_____ 8. Cost that can be carried forward to inventory. Synonym for *product costs*.

_____ 9. Small items of material, such as glue and nails. These items may become an integral part of a finished product but are traceable to the product only at great cost or inconvenience.

_____ 10. All costs involved in acquiring or making a product. In the case of manufactured goods, these costs consist of direct materials, direct labour, and manufacturing overhead.

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SOLUTIONS TO VOCABULARY QUIZ

Chapter 2

1. Cost of goods manufactured
2. Fixed cost
3. Conversion Cost
4. Opportunity Cost
5. Prime Cost
6. Direct Cost
7. Work in progress
8. Inventoriable cost
9. Indirect material
10. Product cost

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Exercise 1 – COST FLOWS ACTIVITY

Chapter 2

EXAMPLE: Ryarder Company incurred the following costs last month:

Purchases of raw materials	$200,000
Direct labor	$270,000
Manufacturing overhead	$420,000

But:

- Some of the goods sold this month were produced in previous months.
- Some of the costs listed above were incurred to make goods that were not sold this month.

Therefore:

- Cost of goods sold does not equal the sum of the above costs.
- We need to determine the values of the various inventories.

Additional data for Ryarder Company:

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Raw materials inventory:

Beginning raw materials inventory.....	$10,000
Purchases of raw materials	$200,000
Ending raw materials inventory	$30,000
Raw materials used in production	?

Work in process inventory:

Beginning work in process inventory	$40,000
Total manufacturing costs	?
Ending work in process inventory.....	$60,000
Cost of goods manufactured (i.e., finished).....	?

Finished goods inventory:

Beginning finished goods inventory.....	$130,000
Cost of goods manufactured (i.e., finished).....	?
Ending finished goods inventory.....	$80,000
Cost of goods sold.....	?

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Solution:

Computation of raw materials used in production

	Beginning raw materials inventory	$ 10,000
+	Purchases of raw materials	200,000
–	Ending raw materials inventory	30,000
=	Raw materials used in production	$180,000

Computation of total manufacturing cost

	Raw materials used in production	$180,000
+	Direct labor	270,000
+	Manufacturing overhead	420,000
=	Total manufacturing costs	$870,000

Computation of cost of goods manufactured

	Beginning work in process inventory	$ 40,000
+	Total manufacturing costs	870,000
–	Ending work in process inventory	60,000
=	Cost of goods manufactured (i.e., finished)	$850,000

Computation of cost of goods sold

	Beginning finished goods inventory	$130,000
+	Cost of goods manufactured (i.e., finished)	850,000
–	Ending finished goods inventory	80,000
=	Cost of goods sold	$900,000

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SCHEDULE OF COST OF GOODS MANUFACTURED

Ryarder Company
Schedule of Cost of Goods Manufactured

Direct materials:		
Beginning raw materials inventory	$ 10,000	
Add: Purchases of raw materials	200,000	
Raw materials available for use	210,000	
Deduct: Ending raw materials inventory	30,000	
Raw materials used in production		$180,000
Direct labor		270,000
Manufacturing overhead		420,000
Total manufacturing cost		870,000
Add: Beginning work in process inventory		40,000
		910,000
Deduct: Ending work in process inventory		60,000
Cost of goods manufactured		$850,000

Cost of Goods Sold

Beginning finished goods inventory	$130,000
Add: Cost of goods manufactured	850,000
Goods available for sale	980,000
Deduct: Ending finished goods inventory	80,000
Cost of goods sold	$900,000

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Chapter 2
Cost Concepts

Solutions to Questions

2-1 Cost behaviour refers to how a cost will react or respond to changes in the level of business activity.

2-2 No. A variable cost is a cost that varies, in total, in direct proportion to changes in the level of activity. A variable cost is constant per unit of the activity level (e.g., number of beds occupied). A fixed cost is fixed in total, but will vary inversely on a per-unit basis with changes in the level of activity.

2-3 When fixed costs are involved, the cost per unit of activity will depend on the activity volume (or level). For example, as production increases, the cost per unit will fall because the fixed cost is spread over more units. Conversely, as production declines, the cost per unit will rise since a constant fixed cost figure will be spread over fewer units.

2-4 The cost of direct materials included in a product is a variable cost; similarly, sales commissions paid out on a per unit basis or as a percentage of sales dollars is a variable cost. On the other hand, costs such as building rent and the salary of a general manager are fixed costs.

2-5 Fixed costs *in total* do not vary with volume within a relevant range. However, fixed costs per unit of volume decrease as volume increases and increases as volume decreases. Therefore, an inverse relationship exists between volume and fixed costs per unit of volume.

2-6 Manufacturing overhead is an indirect cost since these costs cannot be easily and conveniently traced to individual products.

2-7 A differential cost is a cost that differs between alternatives in a decision. An opportunity cost is the potential benefit that is given up when one alternative is selected over another. A sunk cost is a cost that has already been incurred and cannot be altered by any decision taken now or in the future.

2-8 No; differential costs can be either variable or fixed. For example, the alternatives might consist of purchasing one computer software program over another to simplify the accounts receivable process. The difference in the fixed costs of purchasing the two programs would be a differential cost.

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2-9 The three major elements of product costs in a manufacturing company are direct materials, direct labour, and manufacturing overhead.

2-10

a. Direct materials: Direct materials are an integral part of a finished product and can be conveniently traced into it.

b. Indirect materials: Indirect materials are generally small items of material such as glue and nails. They may become an integral part of a finished product but are traceable into the product only at great cost or inconvenience. Indirect materials are ordinarily classified as part of manufacturing overhead.

c. Direct labour: Direct labour includes those labour costs that can be easily traced to particular products. Direct labour is also called "touch labour."

d. Indirect labour: Indirect labour includes the labour costs of workers who do not directly work on products but provide a support function. Examples of such labour include janitors, supervisors, materials handlers, and other factory workers that cannot be

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conveniently traced directly to particular products.

e. Manufacturing overhead: Manufacturing overhead includes all manufacturing costs except direct materials and direct labour.

2-11 PC = DM + DL
CC = DL + MOH
PC = DM + CC - MOH

2-12 A product cost is any cost incurred for the purchase or the manufacture of goods. In the case of manufactured goods, these costs consist of direct materials, direct labour, and manufacturing overhead. A period cost is a cost that is taken directly to the income statement as an expense in the period in which it is incurred. Examples include selling (marketing) and administrative expenses.

2-13 The income statement of a manufacturing firm differs from the income statement of a merchandising firm in the cost of goods sold section. The merchandising firm sells finished goods that it has purchased from a supplier. These goods are listed as "Purchases" in the cost of goods sold section. Since the manufacturing firm produces its goods rather than buying them from a supplier, it lists "Cost of Goods Manufactured" in place of "Purchases." Also, the manufacturing firm identifies its inventory in this section as "Finished Goods Inventory," rather than as "Merchandise Inventory."

2-14 The schedule of cost of goods manufactured is used to list and organize the manufacturing costs that have been incurred. These costs are organized under the three major headings of direct materials, direct labour, and manufacturing overhead. The total costs incurred are adjusted for any change in the Work in Process inventory to determine the cost of goods manufactured (i.e., finished) during the period.

The schedule of cost of goods manufactured ties into the income statement through the Cost of Goods Sold section. The cost of goods manufactured is added to the beginning Finished Goods inventory to determine the goods available for sale. In effect, the cost of goods manufactured takes the place of the "Purchases" account in a merchandising firm.

2-15 A manufacturing firm has three inventory accounts: Raw Materials, Work in Process, and Finished Goods. The merchandising firm generally identifies its inventory account simply as Merchandise Inventory.

2-16 Since product costs follow units of product into inventory, they are sometimes called inventoriable costs. The flow is from direct materials, direct labour, and manufacturing overhead into Work in Process. As goods are completed, their cost is removed from Work in Process and transferred into Finished Goods. As goods are sold, their cost is removed from Finished Goods and transferred into Cost of Goods Sold. Cost of Goods Sold is an expense on the income statement.

2-17 Yes, costs such as salaries and depreciation can end up as assets on the balance sheet if these are manufacturing costs. Manufacturing costs are inventoried until the associated finished goods are sold. Thus, such costs may be part of either Work in Process inventory or Finished Goods inventory at the end of a period if there are unsold units.

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The Foundational 15 (LO1 – CC1; LO2 – CC2; LO3 – CC3; LO4 – CC4, 5, 6, 7)

1.	Direct materials	$ 6.00	
	Direct labour	3.50	
	Variable manufacturing overhead	1.50	
	Variable manufacturing cost per unit	$11.00	
	Variable manufacturing cost per unit (a)	$11.00	
	Number of units produced (b)	20,000	
	Total variable manufacturing cost (a) × (b)		$220,000
	Fixed manufacturing overhead per unit (c)	$5.00	
	Number of units produced (d)	20,000	
	Total fixed manufacturing cost (c) × (d)		100,000
	Total product (manufacturing) cost		$320,000
2.	Sales commissions	$1.50	
	Variable administrative expense	0.75	
	Variable selling and administrative per unit	$2.25	
	Variable selling and admin. per unit (a)	$2.25	
	Number of units sold (b)	20,000	
	Total variable selling and admin. expense (a) × (b)		$45,000
	Fixed selling and administrative expense per unit ($4 fixed selling + $3 fixed admin.) (c)	$7.00	
	Number of units sold (d)	20,000	
	Total fixed selling and administrative expense (c) × (d)		140,000
	Total period (nonmanufacturing) cost		$185,000
3.	Direct materials	$ 6.00	
	Direct labour	3.50	
	Variable manufacturing overhead	1.50	
	Sales commissions	1.50	
	Variable administrative expense	0.75	
	Variable cost per unit sold	$13.25	

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The Foundational 15 (continued)

4.	Direct materials	$ 6.00
	Direct labour	3.50
	Variable manufacturing overhead	1.50
	Sales commissions	1.50
	Variable administrative expense	0.75
	Variable cost per unit sold	$13.25
5.	Variable cost per unit sold (a)	$12.50
	Number of units sold (b)	8,000
	Total variable costs (a) × (b)	$100,000
6.	Variable cost per unit sold (a)	$13.25
	Number of units sold (b)	25,000
	Total variable costs (a) × (b)	$331,250
7.	Total fixed manufacturing cost (see requirement 1) (a)	$100,000
	Number of units produced (b)	16,000
	Average fixed manufacturing cost per unit produced (a) ÷ (b)	$6.25
8.	Total fixed manufacturing cost (see requirement 1) (a)	$100,000
	Number of units produced (b)	25,000
	Average fixed manufacturing cost per unit produced (a) ÷ (b)	$4.00
9.	Total fixed manufacturing cost (see requirement 1)	$100,000
10.	Total fixed manufacturing cost (see requirement 1)	$100,000

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The Foundational 15 (continued)

11. Variable overhead per unit (a)	$1.50	
Number of units produced (b)	16,000	
Total variable overhead cost (a) × (b)		$24,000
Total fixed overhead (see requirement 1)		100,000
Total manufacturing overhead cost		$124,000
Total manufacturing overhead cost (a)		$124,000
Number of units produced (b)		16,000
Manufacturing overhead per unit (a) × (b)		$7.75
12. Variable overhead per unit (a)	$1.50	
Number of units produced (b)	25,000	
Total variable overhead cost (a) × (b)		$37,500
Total fixed overhead (see requirement 1)		100,000
Total manufacturing overhead cost		$137,500
Total manufacturing overhead cost (a)		$137,500
Number of units produced (b)		25,000
Manufacturing overhead per unit (a) × (b)		$5.50
13. Sales revenue (@$22.00 per unit)	$440,000	
Less: Cost of goods sold (same as product costs in requirement 1)	320,000	
Gross margin	$120,000	
14. Direct materials per unit	$6.00	
Direct labour per unit	3.50	
Direct manufacturing cost per unit (a)	$9.50	
Number of units produced (b)	22,000	
Total direct manufacturing cost (a) × (b)	$209,000	
Variable overhead per unit (a)	$1.50	
Number of units produced (b)	22,000	
Total variable overhead cost (a) × (b)		$33,000
Total fixed overhead (see requirement 1)		100,000
Total indirect manufacturing cost		$133,000

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The Foundational 15 (continued)

15.	Direct materials per unit	$6.00
	Direct labour per unit.....	3.50
	Variable manufacturing overhead per unit.....	1.50
	Sales commissions	1.50
	Variable administrative expense	0.75
	Incremental manufacturing cost per unit.....	$13.25

Solutions to Brief Exercises

Brief Exercise 2-1(LO3 CC3) (10 minutes)

The cost concept that best applies to Bill's response is the concept of opportunity cost. Bill's response of "no free lunch" suggests that the cost of the lunch is the time foregone which he could have utilized in completing the report. For Bill, the alternatives are time required to complete the financial performance report and time required to attend the company lunch. If Bill attends the lunch he will have less time available to finish the report and if he stays to finish the report he would miss the company lunch.

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Brief Exercise 2-2(LO1 CC1) (15 minutes)

Note to the instructor: A few of these costs may generate lively debate. For example, some may argue that the cost of advertising a U2 rock concert is a variable cost since the number of people who come to the rock concert depends on the amount of advertising. However, one can argue that if the price is within reason, any U2 rock concert in Vancouver will be sold out, and the function of advertising is simply to let people know the event will be happening. Moreover, while advertising may affect the number of people who ultimately buy tickets, the causation is in one direction. If more people buy tickets, the advertising costs don't go up.

	Cost Behaviour	
	Variable	*Fixed*
1. The costs of advertising a BTS rock concert in Vancouver		X

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2. The cost of leasing a CT-scan diagnostic machine at the hospital in London.....		X
3. The costs of shipping Alexa to retail stores.....	X	
4. Property taxes on your local cinema.....		X
5. The costs of synthetic materials used to make Reebok running shoes.....	X	
6. The electrical costs of running a roller coaster at the West Edmonton Mall	X	
7. Depreciation on the Starbucks building in Halifax.....		X

Brief Exercise 2-3(LO3 CC3) (15 minutes)

Item	Differential Cost	Opportunity Cost	Sunk Cost
1. Cost of the old printing machine			X
2. The salary of the head of the Printing Department			
3. The salary of the head of the Finance Department			
4. Rent on the space occupied by the Printing department			
5. The cost of maintaining the old printer	X		
6. Benefits from a new state-of-the-art scanner		X	
7. Cost of electricity to run the printing machine	X		

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Note: The costs of the salaries of the heads of the Printing and the Finance Departments and the rent on the space occupied by Printing are neither differential costs, nor opportunity costs, nor sunk costs. These are costs that do not differ between the alternatives and are therefore irrelevant in the decision, but they are not sunk costs since they occur in the future. The opportunity cost of the foregone benefit from a new state-of-the-art scanner is not a differential cost in the decision to replace the old printer with a new printer, but if the decision were instead whether to acquire a scanner or a printer, this opportunity cost would also be a differential cost.

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Brief Exercise 2-4 (LO4 CC4, 5, 6) (15 minutes)

1. Monthly salary of the company's accountant: Administrative cost.

2. The cost of a fan installed in a computer: Direct Materials cost.

3. Rental on equipment used to assemble computers: Manufacturing Overhead

4. The cost of advertising in the local community newspaper: Marketing and Selling cost.

5. Monthly charge paid to an outside company for quality testing (20% of the computers assembled are sent for testing): Manufacturing Overhead

6. The wages of employees who assemble computers from components: Direct Labour cost.

7. The salary of the assembly shop's supervisor: Manufacturing Overhead.

8. Sales commissions paid to the company's salespeople: Marketing and Selling cost.

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9. Rent on the facility: Manufacturing Overhead.

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Brief Exercise 2-5(LO4 CC7) (15 minutes)

	Product (Inventoriable) Cost	*Period (Non-inventoriable) Cost*
1. Depreciation on salespersons' cars.....		X
2. Rent on equipment used in the factory	X	
3. Lubricants used for maintenance of factory equipment.....	X	
4. Salaries of finished goods warehouse personnel.....		X
5. Soap and paper towels used by factory workers at the end of a shift	X	
6. Sales supervisors' salaries		X
7. Property taxes on the factory building.....	X	
8. Materials used in boxing units of finished product for shipment overseas (units are not normally boxed).....		X
9. Advertising outlays		X
10. Workers' compensation insurance on factory employees	X	
11. Depreciation on chairs and tables in the administrative boardroom		X
12. The salary of the production quality supervisor for the company.....		X
13. Depreciation on a Learjet used by the company's executives		X
14. Rent on rooms at a Florida resort for manufacturing conference.....	X	
15. Attractively designed box for packaging breakfast cereal.....	X	

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Brief Exercise 2-6(LO5 CC9, 10; LO6 CC 11) (15 minutes)

Brides N Grooms
Income Statement
For the Month Ended XXXX

Sales		$3,000,000
Cost of goods sold:		
Beginning merchandise inventory	$ 150,000	
Add: Purchases	950,000	
Goods available for sale	1,100,000	
Deduct: Ending merchandise inventory	200,000	900,000
Gross margin		2,100,000
Less operating expenses:		
Selling expense	365,000	
Administrative expense	435,000	800,000
Net income		$1,300,000

Brief Exercise 2-7(LO6 CC11, 12) (15 minutes)

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Lompac Products
Schedule of Cost of Goods Manufactured

Direct materials:		
Beginning raw materials inventory	$340,000	
Add: Purchases of raw materials	870,000	
Raw materials available for use	$1,210,000	
Deduct: Ending raw materials inventory	210,000	
Raw materials used in production		$ 1,000,000
Direct labour		245,000
Manufacturing overhead		560,000
Total manufacturing costs		$1,805,000
Add: Beginning work in process inventory		150,000
		$1,955,000
Deduct: Ending work in process inventory		170,000
Cost of goods manufactured		$ 1,785,000

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Solutions to Exercises

Exercise 2-1(LO1 CC1; LO3 CC3; LO4 CC4, 5, 6, 7) (45 minutes)

	By Behaviour		*By Function*				*By Relevance*	
			Product Cost			*Period Cost*		
Name of the Cost	*Variable Cost*	*Fixed Cost*	*Direct Materials*	*Direct Labour*	*Mfg. Overhead*	*Selling & Administrative*	*Opportunity Cost*	*Sunk Cost*
Rental revenue foregone, $75,000 per year.....							X	
Direct materials cost, $60 per unit	X		X					
Rental cost of warehouse, $2,000 per month.....		X				X		
Rental cost of equipment, $25,000 per month.....		X			X			
Direct labour cost, $80 per unit	X			X				
Depreciation of the annex space, $5,000 per year		X			X			X
Advertising cost, $250,000 per year.....		X				X		
Supervisor's salary, $5,500 per month.....		X			X			
Electricity for machines, $2.40 per unit.....	X				X			
Shipping cost, $18 per unit	X					X		

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Return earned on investments, $3,000 per year.....	X

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Exercise 2-2(LO1 CC1; LO3 CC3; LO4 CC7) (15 minutes)

1. Product; variable
2. Conversion
3. Opportunity
4. Prime
5. Sunk
6. Period; variable
7. Product; period; fixed
8. Product
9. Period
10. Fixed; product; conversion

Exercise 2-3(LO1 CC 1; LO2 CC2) (15 minutes)

	Cost Behaviour		*To Quantity of Baked Goods Produced*	
Cost Item	*Variable*	*Fixed*	*Direct*	*Indirect*
1. Accountant's salary.....		X		X
2. Building depreciation		X		X
3. Flour used in the making of croissants.....	X		X	
4. Bakery manager's salary		X		X
5. Wages of bakers.....	X		X	
6. Rent of commercial ovens used in baking.....		X		X
7. Insurance on the building.....		X		X

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Exercise 2-4(LO1 CC1; LO4 CC7) (30 minutes)

Cost Item	*Cost Behaviour*		*Selling and Administrative Cost*	*Product Cost*
	Variable	*Fixed*		
1. Apples processed and canned by Del Monte Corporation	X			X
2. Advertising by a dental office.....		X	X	
3. Shipping canned apples from a Del Monte plant to customers.		X*	X	
4. Insurance on IBM's manufacturing facilities		X		X
5. Commissions paid to *London Drugs* salespersons.....	X		X	
6. Steering wheels installed in BMWs	X			X
7. Depreciation of factory lunchroom facilities at a General Electric plant.....		X		X
8. Insurance on Samsung's corporate office		X		X
9. Salary of a supervisor overseeing production of circuit boards at Hewlett-Packard.....		X		X
10. Hamburger buns in a Burger King outlet	X			X

* This will likely be a semi-fixed cost because shipping costs will not vary by can but by a truckload of cans.

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Exercise 2-5(LO5 CC10; LO6 CC11, 12) (45 minutes)

1.

Mason Company
Schedule of Cost of Goods Manufactured

Direct materials:		
Raw materials inventory, beginning	$18,000	
Add: Purchases of raw materials	180,000	
Raw materials available for use	198,000	
Deduct: Raw materials inventory, ending	12,500	
Raw materials used in production		$185,500
Direct labour		70,000
Manufacturing overhead:		
Indirect labour	45,000	
Maintenance, factory equipment	6,000	
Insurance, factory equipment	1,900	
Rent, factory facilities	24,000	
Supplies	3,600	
Depreciation, factory equipment	4,500	
Total overhead costs		85,000
Total manufacturing costs		340,500
Add: Work in process, beginning		10,300
		350,800
Deduct: Work in process, ending		15,150
Cost of goods manufactured		$335,650

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2. The cost of goods sold section of Mason Company's income statement:

Finished goods inventory, beginning	$ 18,100
Add: Cost of goods manufactured	335,650
Goods available for sale	353,750
Deduct: Finished goods inventory, ending	23,000
Cost of goods sold	$330,750

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Exercise 2-6(LO4 CC8) (30 minutes)

1.a) Bolts of polyester purchased	10,000
Bolts drawn from inventory	9,200
Bolts remaining in inventory	800
Cost per bolt	× $80
Cost in Raw Materials Inventory at June 30	$ 64,000
b) Bolts of polyester used in production (9,200 – 200)	9,000
Linens completed and transferred to Finished Goods (90% × 9,000)	8,100
Linens still in Work in Process at June 30	900
Cost per bolts	× $80
Cost in Work in Process Inventory at June 30	$ 72,000
c) Linens completed and transferred to Finished Goods (above)	8,100
Linens sold during the month (70% × 8,100)	5,670
Linens still in Finished Goods at June 30	2,430
Cost per bolts	× $80
Cost in Finished Goods Inventory at June 30	$194,400
d) Linens sold during the month (above)	5,670
Cost per bolts	× $80
Cost in Cost of Goods Sold at April 30	$453,600
e) Bolts used for customer samples	200
Cost per bolts	× $80
Cost in Selling Expense at June 30	$ 16,000

2. a) Raw Materials Inventory—balance sheet
   b) Work in Process Inventory—balance sheet
   c) Finished Goods Inventory—balance sheet
   d) Cost of Goods Sold—income statement
   e) Selling Expense—income statement

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EXERCISE 2-7 (LO6 CC12) (15 minutes)

	Direct material used =	$ 78,000
	Direct labour costs =	$ 15,000
	Manufacturing overhead =	$ 16,500
	Total Manufacturing costs=	$ 109,500
	Opening inventory of work in process =	$ 13,000
Less:	Ending inventory of work in process =	$ 2,000
	Cost of goods manufactured =	$ 120,500

EXERCISE 2-8 (LO5 CC10; LO6 CC11, 12) (7 minutes)

Cost of goods sold = Sales – Gross margin
= $1,700,000 – (40% × $1,700,000)
= $1,700,000 - $680,000
= $1,020,000

Note that Cost of Goods Sold = Beginning finished goods inventory + Cost of goods manufactured – Ending finished goods inventory

Therefore,

Beginning finished goods inventory = Cost of goods sold – Cost of goods manufactured + Ending finished goods inventory

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= $1,020,000 - $975,000 + 85,000 = $130,000

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Solutions to Problems

Problem 2-1 (LO1 CC1; LO4 CC4, 5, 7) (30 minutes)

	By Behaviour		*By Function*				*By Relevance*	
			Product Cost			*Period Cost*		
Name of the Cost	*Variable Cost*	*Fixed Cost*	*Direct Materials*	*Direct Labour*	*Mfg. Overhead*	*Selling & Administrative*	*Opportunity Cost*	*Sunk Cost*
Staci's present salary, $70,000/year							X	
Building rent, $2,500/ month.....		X			X			
Clay and glaze, $3.50/pot ..	X		X					
Wages of production workers, $12/pot.....	X			X				
Advertising, $2,600/month.		X				X		
Sales commission, $4/pot...	X					X		
Rent of production equipment, $1,300/month		X			X			
Legal and filing fees, $5,000[1].....		X				X		X
Rent of sales office, $1,250/month		X				X		

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Phone for taking orders, $40/month.....	X	X	
Interest lost on savings account, $1,200/year.....			X

[1] Not a fixed cost per se because they are not a recurring expense.

2. The $5,000 cost of incorporating the business is not a differential cost. Even though the cost was incurred to start the business, it is a sunk cost. Whether Staci produces pottery or stays in her present job, she will have incurred this cost.

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Problem 2-2 (LO1 CC 1; LO2 CC2; LO4 CC4, 5, 6) (30 minutes)

Note to the instructor: There may be several exceptions to the answers below. The purpose of this problem is to get the students to start *thinking* about cost behaviour and cost purposes; therefore, try to avoid lengthy discussions about how a particular cost is classified.

Cost Item	*Variable or Fixed*	*Selling Cost*	*Administrative Cost*	*Manufacturing (Product) Cost*	
				Direct	*Indirect*
1. Property taxes, corp. office.....	F		X		
2. Boxes used for packaging detergent	V			X	
3. Salespersons' commissions.....	V	X			
4. Production supervisor's salary.	F				X
5. Depreciation, executive automobiles.....	F		X		
6. Wages of workers assembling computers.....	V			X	
7. Packing supplies for out-of-province shipment	V	X			
8. Insurance, finished goods warehouses.....	F	X			
9. Office computers	F		X		
10. Advertising costs.....	F	X			
11. "Chips" used in producing calculators.....	V			X	
12. Shipping costs on merchandise sold.....	V	X			
13. Magazine subscriptions, factory lunchroom.....	F				X
14. Velcro in a garment factory	V				X

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Problem 2-2 (continued)

Cost Item	*Variable or Fixed*	*Selling Cost*	*Administrative Cost*	*Manufacturing (Product) Cost*	
				Direct	*Indirect*
15. Billing costs	V	X*			
16. Executive life insurance.....	F		X		
17. Software used in textbook production.....	F				X
18. Fringe benefits, assembly line workers.....	V			X**	
19. Yarn used in sweater production.....	V			X	
20. Wages of receptionist, executive offices.....	F		X		

* Could be administrative cost.
** Could be indirect cost.

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Problem 2-3(LO1 CC1; LO2 CC2; LO4 CC4, 6) (60 minutes)

1.

	Cost Behaviour		*Selling or Administrative*	*Product Cost*	
Cost Item	*Variable*	*Fixed*	*Cost*	*Direct*	*Indirect*
Factory labour, direct.....	$340,000			$340,000	
Advertising.....		$ 80,000	$ 80,000		
Factory supervision.....		90,000			$90,000
Property taxes, factory building ..		14,500			14,500
Sales commissions.....	160,000		160,000		
Insurance, factory		5,500			5,500
Depreciation, office equipment...		24,000	24,000		
Lease cost, factory equipment....		16,000			16,000
Indirect materials, factory	26,000				26,000
Depreciation, factory building.....		18,000			18,000
General office supplies (billing)...	8,000		8,000		
General office salaries.....		80,000	80,000		
Direct materials used (wood, bolts, etc.)	214,000			214,000	
Utilities, factory	50,000				50,000
Total costs	$798,000	$328,000	$352,000	$554,000	$220,000

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Problem 2-3 (continued)

2.

Direct	$554,000
Indirect.....	220,000
Total.....	$774,000

$774,000 ÷ 4,000 sets = $193.50 per set

3. The average product cost per set would decrease. This is because the fixed costs would be spread over more units, causing the cost per unit to drop.

4. a) Yes. Ideally, the president would want to sell at the company's regular price (which may be labelled as 'wishful thinking') or at the average production cost ($193.50) to avoid "incurring a loss." He might expect a figure even higher than the average production cost to cover a portion of the administrative costs. The brother-in-law probably will be thinking of "cost" as including only direct materials used, or, at most, direct materials and direct labour. Direct materials alone would be only $85 per set, and direct materials and direct labour would be only $105. It is possible that the brother-in-law's pricing of materials at a building supply store may be more or less than $85.

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b) The term is relevant (or incremental) cost. The full, regular price of a set might not be appropriate here, since the company is operating only at 80% of its full capacity. Therefore, the president must ideally recover all the incremental costs that will be incurred in producing an additional patio set for the brother-in-law.

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Problem 2-4 (LO4 CC7) (30 minutes)

1. The controller is correct in his viewpoint that the salary cost should be classified as a selling (marketing) cost. The duties described in the problem have nothing to do with the manufacture of a product, but rather deal with movement of *finished units* from the factory to distribution warehouses. As stated in the text, selling costs would include all costs necessary to secure customer orders and get the finished product into the hands of customers. Coordination of shipments of finished units from the factory to distribution warehouses fall in this category.

2. No, the president is not correct; from the point of view of the reported net income for the year, it does make a difference how the salary cost is classified. If the salary cost is classified as a selling expense, all of it will appear on the income statement as a period cost. However, if the salary cost is classified as a manufacturing (product) cost, then it will be added to Work in Process Inventory along with other manufacturing costs for the period. To the extent that goods are still in process at the end of the period, part of the salary cost will remain with these goods in the Work in Process Inventory account. Only that portion of the salary cost that has been assigned to finished units will leave the Work in Process Inventory account and be transferred into the Finished Goods Inventory account. In like manner, to the extent that goods are unsold at the end of the period, part of the salary cost will remain with these goods in the Finished Goods Inventory account. Only the portion of the salary that has been assigned to finished units *that are sold during the period* will appear on the income statement as an expense (part of Cost of Goods Sold) for the period.

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Problem 2-5 (LO5 CC10; LO6 CC11, 12) (45 minutes)

	Case 1	*Case 2*	*Case 3*	*Case 4*
Direct materials	$ 14,500	$ 60,000	$ 5,000	$ 23,000
Direct labour	19,000 *	23,000	7,000	14,000
Manufacturing overhead.....	25,000	44,000	8,000 *	19,000
Total manufacturing costs	58,500	127,000 *	20,000	56,000 *
Beginning work in process inventory.....	3,500	8,000	3,000	0 *
Ending work in process inventory.....	(4,000)*	(4,000)	(4,000)*	(8,500)
Cost of goods manufactured...	$58,000	$131,000 *	$19,000	$47,500 *
Sales.....	$80,000	$201,000	$36,000	$90,000
Beginning finished goods inventory.....	10,000	12,500	3,000 *	12,000 *
Cost of goods manufactured...	58,000 *	131,000 *	19,000 *	47,500
Goods available for sale	68,000 *	143,500 *	22,000 *	59,500
Ending finished goods inventory.....	(4,000)*	(11,500)	(4,000)	(3,500)
Cost of goods sold	64,000 *	132,000 *	18,000	56,000 *
Gross margin.....	16,000	69,000 *	18,000	34,000 *
Operating expenses	(9,000)*	(33,500)	(13,000)*	(25,000) *
Net income.....	$ 4,000	$ 35,500 *	$ 5,000	$ 9,000

* Missing data in the problem.

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Problem 2-6 (LO5 CC9, 10; LO6 CC11, 12) (75 minutes)

1.

GALLUP ENTERPRISES
Schedule of Cost of Goods Manufactured
For the Month Ended August 31

Direct materials:		
Raw materials inventory, August 1	$ 51,000	
Add: Purchases of raw materials	402,000	
Raw materials available for use	453,000	
Deduct: Raw materials inventory, August 31	88,000	
Raw materials used in production		$365,000
Direct labour		120,000
Manufacturing overhead:		
Indirect labour cost	19,000	
Utilities (70% × $45,000)	31,500	
Depreciation, factory equipment	34,000	
Insurance (40% × $28,000)	11,200	
Rent on facilities (60% × $140,000)	84,000	
Total overhead costs		179,700
Total manufacturing costs		664,700
Add: Work in process inventory, August 1		28,000
		692,700
Deduct: Work in process inventory, August 31		34,000
Cost of goods manufactured		$658,700

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Problem 2-6 (continued)

2.

GALLUP ENTERPRISES
Income Statement
For the Month Ended August 31

Sales		$920,000
Less cost of goods sold:		
Finished goods inventory, August 1	$ 50,000	
Add: Cost of goods manufactured	658,700	
Goods available for sale	708,700	
Deduct: Finished goods inventory, August 31	55,000	653,700
Gross margin		266,300
Less operating expenses:		
Utilities (30% × $45,000)	13,500	
Depreciation, sales equipment	18,000	
Insurance (60% × $28,000)	16,800	
Rent on facilities (40% × $140,000)	56,000	
Selling and administrative salaries	38,000	
Advertising	95,000	237,300
Net income (loss)		$ 29,000

3. In preparing the income statement for August, Hilda did not (1) distinguish between product costs and period costs, and (2) recognize the changes in inventories between the beginning and end of the month. Once these errors have been corrected, the financial condition of the company looks much better (although net income is still just over 3% of sales) and selling the company may not yet be advisable.

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Problem 2-7 (LO1 CC1; LO5 CC10; LO6 CC11, 12) (75 minutes)

1.

MERIWELL COMPANY
Schedule of Cost of Goods Manufactured
For the year just completed

Direct materials:		
Raw materials inventory, beginning	$ 9,000	
Add: Purchases of raw materials	125,000	
Raw materials available for use	134,000	
Deduct: Raw materials inventory, ending	6,000	
Raw materials used in production		$128,000
Direct labour		70,000
Manufacturing overhead:		
Depreciation, factory	27,000	
Utilities, factory	8,000	
Maintenance, factory	40,000	
Supplies, factory	11,000	
Insurance, factory	4,000	
Indirect labour	15,000	
Total overhead costs		105,000
Total manufacturing costs		303,000
Add: Work in process inventory, beginning		17,000
		320,000
Deduct: Work in process inventory, ending		30,000
Cost of goods manufactured		$290,000

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Problem 2-7 (continued)

2.

MERIWELL COMPANY
Income Statement
For the year just completed

Sales		$500,000
Cost of goods sold:		
Finished goods inventory, beginning	$ 20,000	
Add: Cost of goods manufactured	290,000	
Goods available for sale	310,000	
Deduct: Finished goods inventory, ending	40,000	270,000
Gross margin		230,000
Less operating expenses:		
Selling expenses	80,000	
Administrative expenses	110,000	190,000
Net income		$ 40,000

3. Direct materials: $128,000 ÷ 10,000 units = $12.80 per unit.
Factory Depreciation: $27,000 ÷ 10,000 units = $2.70 per unit.

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4. Direct materials:
   Average cost per unit: $12.80 (unchanged)
   Total cost: 15,000 units × $12.80 per unit = $192,000.

   Factory Depreciation:
   Average cost per unit: $27,000 ÷ 15,000 units = $1.80 per unit.
   Total cost: $27,000 (unchanged)

   The average production cost per unit will decrease (see explanation below).

5. Average cost per unit for depreciation dropped from $2.70 to $1.80, because of the increase in production between the two years. Since fixed costs do not change *in total* as the activity level changes, they will decrease on a per unit basis as the activity level rises.

   The average cost per unit for direct materials remained the same because a direct material is variable cost which remains constant on a per-unit basis.

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Problem 2-8 (LO1 CC1; LO5 CC9, 10; LO6 CC11, 12) (90 minutes)

1.

SUPERIOR COMPANY
Schedule of Cost of Goods Manufactured
For the Year Ended December 31

Direct materials:			
Raw materials inventory, beginning	$ 30,000		
Add: Purchases of raw materials	390,000 *		
Raw materials available for use	420,000		
Deduct: Raw materials inventory, ending	10,000		
Raw materials used in production		$410,000 *	
Direct labour		73,000	
Manufacturing overhead:			
Insurance, factory	8,000		
Utilities, factory	65,000		
Indirect labour	60,000		
Cleaning supplies, factory	7,000		
Rent, factory building	90,000		
Maintenance, factory	40,000		
Total overhead costs		270,000	
Total manufacturing costs		753,000	(given)
Add: Work in process inventory, beginning		37,000 *	
		790,000	
Deduct: Work in process inventory, ending		20,000	
Cost of goods manufactured		$770,000	

The cost of goods sold section of the income statement follows on the next page.

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Problem 2-8 (continued)

Finished goods inventory, beginning.....	$ 20,000
Add: Cost of goods manufactured	770,000 *
Goods available for sale	790,000 *
Deduct: Finished goods inventory, ending.....	50,000
Cost of goods sold.....	$740,000 (given)

* These items must be computed by working backwards up through the statements. An effective way of doing this is to place the form and known balances on the chalkboard, and then to work toward the unknown figures.

2. Direct materials: $410,000 ÷ 50,000 units = $8.20 per unit.
   Rent, factory building: $90,000 ÷ 50,000 units = $1.80 per unit.

3.

	Per Unit	*Total*
Direct materials	$8.20 (Same)	$328,000 ** (Changed)
Rent, factory building.....	$ 2.25 * (Changed)	$ 90,000 (Same)

* $90,000 ÷ 40,000 units = $2.25 per unit.
** $8.20 × 40,000 units = $328,000.

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4. The average cost per unit for rent increased from $1.80 to $2.25, because of the decrease in production between the two years. Since fixed costs do not change *in total* as the activity level changes, they will decrease on a per unit basis as the activity level rises.

The average cost per unit for direct materials remained the same because direct materials is a variable cost which remains constant on a per-unit basis. The total change is in relation to amount of goods produced.

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PROBLEM 2-9 (LO1 – CC1; LO2 – CC2; LO4 – CC5, CC6, CC7; LO5 – CC9) (40 minutes)

1.

		Behaviour		Function		
		VARIABLE	**FIXED**	**MFG**	**SALES/MKT**	**ADMIN**
Direct materials & components		$ 3,200,000		$3,200,000		
Direct production wages		$ 1,448,000		$1,448,000		
Production supervisory salaries			$ 261,400	$ 261,400		
Salaries paid to sales representatives		$ 464,000	$ 84,000		$ 548,000	
Advertising			$ 675,300		$ 675,300	
Insurance			$ 115,670	$ 75,186		$ 40,484
Building rent			$ 258,640	$181,048	$ 38,796	$ 38,796
Other salaries			$1,160,000	$ 580,000	$ 232,000	$348,000
Honorarium to the members of the Board			$ 430,200			$430,200
Production quality control		$ 78,390	$ 52,260	$ 130,650		
Market research			$ 346,200		$ 346,200	
Depreciation			$1,326,700	$ 928,690	$ 265,340	$132,670
Facilities management			$ 884,230	$353,692		$530,538
Legal			$ 685,600			$685,600
Personnel department			$196,500			$196,500
Utilities - production		$ 298,410	$ 554,190	$ 852,600		
Utilities - other		$ 144,136	$ 216,204		$ 180,170	$180,170
Customer service		$ 229,350	$ 688,050		$ 917,400	
		$5,862,286	$7,935,144	$8,011,266	$ 3,203,206	$2,582,958
		$13,797,430		$ 13,797,430		

Note that the amounts are calculated using the percentage breakdowns given in the data.

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Problem 2-9 (continued)

2.

Product costs (manufacturing costs from table in Part 1)
= $8,011,266

Period costs (sales/marketing + administration from table in Part 1)
= $3,203,206 + $2,582,958 = $5,786,164

Product costs are classified as direct and indirect as follows:

Product costs		**Direct**	**Indirect**
Direct materials & components		√	
Direct production wages		√	
Production supervisory salaries			√
Insurance			√
Building rent			√
Other salaries			√
Production quality control			√
Depreciation			√
Facilities management			√
Utilities - production			√

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Problem 2-9 (continued)

3.

CRATER CORPORATION - NORTH AMERICAN DIVISION
INCOME STATEMENT
FOR THE YEAR ENDED DECEMBER 31, 2022

Sales Revenue		$23,200,000
Less: Cost of goods sold		
Materials and components	$ 3,200,000	
Production wages	1,448,000	
Production supervisory salaries	261,400	
Insurance	75,186	
Building rent	181,048	
Other salaries	580,000	
Production quality control	130,650	
Depreciation	928,690	
Facilities management	353,692	
Utilities - production	852,600	8,011,266
Gross margin		$15,188,734
Less: Selling & administrative expenses		
Salaries paid to sales representatives	548,000	
Advertising	675,300	
Insurance	40,485	
Building rent	77,592	
Other salaries	580,000	
Honorarium paid to Board members	430,200	
Market research	346,200	
Depreciation	398,010	
Facilities management	530,538	
Legal	685,600	
Personnel department	196,500	
Utilities - other	360,340	
Customer service	917,400	5,786,165
Net income		$ 9,402,569

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Gross margin per unit = $15,188,734 ÷ 60,000 ≈ $253.15

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PROBLEM 2-10 (LO4 CC7; LO5 CC10) (30 minutes)

1. The income statement includes several conceptual errors including:

- The amount of purchases instead of direct materials used
- Inventories do not seem to have been considered in computing the cost of goods manufactured and goods sold
- Annual insurance amount included rather than a quarterly amount
- Format of the income statement does not follow the conventional classification of the cost of goods sold, gross margin and selling & administrative costs

2.

RUSSELL MANUFACTURING COMPANY			
COST OF GOODS MANUFACTURED STATEMENT			
FOR THE QUARTER ENDING DECEMBER 31 2022			
Direct materials:			
Beginning inventory		$ 7,860	
+ Purchases		171,948	
= Direct materials available for use		$ 179,808	
- Ending inventory		6,870	
= Direct materials used			$ 172,938
Direct labour			160,072
Overhead:			
Indirect materials		73,692	
Indirect labour		106,714	
Manufacturing utilities		49,400	
Facility rental		72,000	
Depreciation		38,100	
Annual insurance		40,000	
Management salaries		232,800	612,706
Total manufacturing costs			$ 945,716
+ Beginning WIP inventory			9,120
- Ending WIP inventory			8,070
= Cost of goods manufactured			$ 946,766

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Problem 2-10 (continued)

Notes:

1. Purchase of direct materials = $245,640 × 70%
2. Indirect materials = $245,640 × 30%
3. Direct labour = $266,786 × 60%
4. Indirect labour = $266,786 × 40%
5. Facility rental = $90,000 × 80%
6. Depreciation = $63,500 × 60%
7. Management salaries = $388,000 × 60%

3.

RUSSELL MANUFACTURING COMPANY			
INCOME STATEMENT			
FOR THE QUARTER ENDING DECEMBER 31 2022			
Sales			$1,367,600
Cost of goods sold:			
Beginning FG inventory		$ 7,420	
+ Cost of goods manufactured		946,766	
= Cost of goods available for sale		54,186	
- Ending FG inventory		11,280	
= Cost of goods sold			942,906
Gross margin			$ 424,694
Selling, general and administrative expenses:			
Advertising		37,000	
Administrative travel		27,600	
Facility rental		18,000	
Depreciation		25,400	
Sales commissions		41,000	
Office utilities		22,400	
Management salaries		155,200	326,600
Net income			$ 98,094

Notes:

1. Facility rental = $90,000 × 20%
2. Depreciation = $63,500 × 40%
3. Management salaries = $388,000 × 40%

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Problem 2-11 (LO4 CC5; LO5 CC 9, 10; LO6 CC11, 12) (20 minutes)

1.

SofTouch Corporation
Income Statement
For the Year Ended December 31, XXXX

Sales (332,000 dolls @ $24 per doll)		$7,968,000
Cost of goods sold (332,000 @ $12.50 per doll)	4,150,000	
Gross margin		3,818,000
Selling and administrative expenses:		
Commissions ($2.50 per doll)	$830,000	
Advertising	650,000	
Administration	570,000	2,050,000
Net income		$1,768,000

Note: The number of dolls sold is computed as:

Beginning finished goods inventory	20,000
+ Number of units produced	340,000
- Ending finished goods inventory	28,000
=	332,000

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2 a. Prime cost ($2.25 + $0.50) $2.75
b. Conversion cost ($0.50 + $2.50 + $7.25) $10.25
c. Variable cost ($2.25 + $0.50 + $2.50 + 2.50) $7.75

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Comprehensive Problem (LO1 CC1; LO3 CC3; LO4 CC4, 5, 6, 7) (60 minutes)

1.

Cost Classification

	Behaviour		Function		Relevance	
Cost Item	**Variable**	**Fixed**	**Product**	**Period**	**Opportunity**	**Sunk**
Lost rental income					√	
Direct materials	√		√			
Direct labour	√		√			
Equipment rental		√	√			
Warehouse space rental		√		√		
Manufacturing facility (building) depreciation		√	√			√
Production supervisor salary		√	√			
Other production costs	√		√			
Delivery costs	√			√		
Selling and administrative		√		√		
Annual return on investments foregone					√	

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Comprehensive Problem (continued)

2.

Product Cost (₹)		**Per unit**
Direct materials		6,000.00
Direct labour		2,750.00
Manufacturing overhead:		
Equipment rental (₹450,000 ÷ 3,600 units)	125.00	
Manufacturing facility depreciation (₹400,500 ÷ 3,600)	111.25	
Production supervisor salary (₹78,120 ÷ 3,600)	21.70	
Other production costs	80.00	337.95
Total product costs per unit		9,087.95

3.

Incremental Costs for 500 Additional Units (₹)	
	Per unit
Direct materials	6,000
Direct labour	2,750
Other production costs	80
Delivery costs	520
Total costs per unit (₹)	9,350
Total costs for 500 units (₹)	**2,805,000**

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Note that all the variable costs are incremental costs; however, fixed costs are assumed to remain constant within a certain relevant range. The only issue is that currently the capacity is 4,000 units and producing additional 500 units will result in a capacity utilization of 102.5% (4,100 ÷ 4,000 units). This in turn means that production is outside of the relevant range and may require the incurrence of additional fixed costs.

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Thinking Analytically (LO3CC5, 7; LO5CC9, 10; LO6CC11, 12) (30 minutes)

Schedule of Cost of Goods Manufactured

KHAN MACHINES, INC.			
COST OF GOODS MANUFACTURED STATEMENT			
FOR THE YEAR ENDING DECEMBER 31 2022			
Direct materials:			
Beginning inventory		$ 36,000	
+ Purchases		17,310,500	
= Direct materials available for use		$17,346,500	
- Ending inventory		30,000	
= Direct materials used			$17,316,500
+ Direct labour			12,375,000
+ Manufacturing overhead			18,562,500
= Total manufacturing costs			$48,254,000
+ Beginning WIP inventory			36,000
- Ending WIP inventory			30,000
= Cost of goods manufactured			$48,260,000

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Notes:

Computing Total Manufacturing Costs

Cost of goods manufactured (given)	= $48,260,000
+ Ending WIP inventory	= $ 30,000
- Beginning WIP inventory	= $ 36,000
= Total manufacturing costs	= $48,254,000

Computing Manufacturing Overhead cost

We are told that manufacturing overhead = 60% of conversion costs. Therefore, the remaining 40% must be direct labour cost (recall that conversion costs are made up of direct labour and manufacturing overhead). This means manufacturing overhead cost is 1.5 times the amount of direct labour.

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Thinking Analytically (continued)

Therefore, overhead cost = $12,375,000 × 1.5 = $18,562,500

Computing Cost of Direct Materials Used

Total manufacturing costs	= $48,254,000
- Direct labour	= $12,375,000
- Manufacturing overhead	= $18,562,500
= Direct materials used	= $17,316,500

Computing Cost of Direct Materials Purchased

Direct materials used	= $17,316,500
+ Ending inventory	= $ 30,000
- Beginning inventory	= $ 36,000
= Direct materials purchased	= $17,310,000

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KHAN MACHINES, INC.			
INCOME STATEMENT			
FOR THE YEAR ENDING DECEMBER 31 2022			
Sales			$76,500,000
Cost of goods sold:			
Beginning FG inventory		$ 20,000	
+ Cost of goods manufactured		48,260,000	
= Cost of goods available for sale		48,280,000	
- Ending FG inventory		15,000	
= Cost of goods sold			48,265,000
Gross margin			$28,235,000
- Selling, general and administrative expenses			$19,055,000
Net income			$ 9,180,000

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Thinking Analytically (Continued)

Notes:

Computing Net Income

Net income	= 12% of sales revenues
	= 0.12 × $76,500,000
	= $9,180,000

Computing SG & A Expenses

Gross margin	= $28,235,000
- Net income	= $ 9,180,000
= SG & A Expenses	= $19,055,000

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Communicating in Practice (LO4 CC7, 8; LO5 CC9, 10; LO6 CC11, 12) (90 minutes)

1. Memorandum to president:

   Date: Current date
   To: Brittany Patel, President
   From: Student
   Subject: Income Statement

   I reviewed the income statement for Sun Power Communications, Inc. and noted that no distinction has been made between period expenses and product costs. Period expenses should be included on the income statement when incurred. However, product costs (that is, direct materials, direct labour, and manufacturing overhead) should be assigned to inventory (that is, capitalized or recorded as inventory on the balance sheet) when incurred and flow through to the income statement as cost of goods sold only when finished products are sold.

   All of the direct materials purchased and the direct labour and manufacturing overhead costs incurred during the period are included on the income statement that I reviewed for the quarter ended March 31. This treatment would be appropriate only if the inventory level does not change during the period (that is, the ending inventory is the same as the beginning inventory which is not the case in this question). As such, this income statement does not reflect the results of the company's operations and should be revised.

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Communicating in Practice (continued)

2.

SUN POWER COMMUNICATIONS, INC.
Schedule of Cost of Goods Manufactured
For the Quarter Ended March 31

Direct materials:		
Raw materials inventory, beginning	$ –0–	
Add: Purchases of raw materials	660,000	
Raw materials available for use	660,000	
Deduct: Raw materials inventory, ending	10,000	
Raw materials used in production		$650,000
Direct labour		120,000
Manufacturing overhead:		
Maintenance, production	96,000	
Indirect labour	160,000	
Cleaning supplies, production	17,000	
Rental cost, facilities (80% × $165,000)	132,000	
Insurance, production	28,000	
Utilities (90% × $140,000)	126,000	
Depreciation, production equipment	180,000	
Total overhead costs		739,000
Total manufacturing costs		1,509,000
Add: Work in process inventory, beginning		–0–
		1,509,000
Deduct: Work in process inventory, ending		50,000
Cost of goods manufactured		$1,459,000

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Communicating in Practice (continued)

3. Before an income statement can be prepared, the cost of the 8,000 phones in the ending finished goods inventory must be determined. Altogether, the company produced 40,000 phones during the quarter; thus, the production cost per phone would be:

$$\frac{\text{Cost of goods manufactured}}{\text{Phones produced during the quarter}} = \frac{\$1{,}459{,}000}{40{,}000 \text{ units}} \approx \$36.475 \text{ per unit}$$

Since 8,000 phones (40,000 – 32,000 = 8,000) were in the finished goods inventory at the end of the quarter, the total cost of this inventory would be:

8,000 phones × $36.475 per phone = $291,800.

With this figure and other data from the case, the company's income statement for the quarter can be prepared as follows:

SUN POWER COMMUNUCATIONS, INC.
Income Statement
For the Quarter Ended March 31

Sales (32,000 phones)		$1,920,000
Less cost of goods sold:		
Finished goods inventory, beginning	$ –0–	
Add: Cost of goods manufactured	1,459,000	
Goods available for sale	1,459,000	
Deduct: Finished goods inventory, ending	291,800	1,167,200
Gross margin		752,800
Less operating expenses:		
Selling and administrative salaries	280,000	
Advertising	90,000	
Rental cost, facilities (20% × $165,000)	33,000	
Depreciation, office equipment	47,000	
Utilities (10% × $140,000)	14,000	
Travel, salespersons	80,000	544,000
Net income		$ 208,800

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Communicating in Practice (continued)

4. Memorandum to president:

Date: Current date
To: Brittany Patel, President
From: Student
Subject: Insurance Claim

On April 3, 8,000 unsold phones were destroyed by fire. The insurance policy indicates that the company will be reimbursed for the cost of any finished phones destroyed or stolen. The key question is how "cost" is defined in the insurance contract. Typically, insurance contracts limit reimbursement for losses to those costs that would normally be considered product costs—in other words, the direct materials, direct labour, and manufacturing overhead costs that were incurred to manufacture the units that were insured.

The 8,000 unsold phones were in the company's ending finished goods inventory on March 31. As you know, the income statement for the quarter ended March 31 was recently revised. That income statement shows an ending finished goods inventory of $291,800. Accordingly, assuming cost is defined as set forth above the insurance company owes Sun Power Communications, Inc. $291,800 for the 8,000 phones that were destroyed.

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This amount is considerably less than the $384,000 that was computed by the company's accountant. The $384,000 figure is overstated for two reasons. First, it includes period costs (that is, selling and administrative expenses) as well as product costs. Period costs may not be included in inventory. Second, it includes some costs incurred during the period that were in the raw materials and work in process inventories on March 31. Those inventories were not destroyed and, as such, may not be part of the loss claimed.

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Ethics Challenge (LO4 CC7) (45 minutes)

1. A cost that is classified as a period cost will be recognized on the income statement as an expense in the current period. A cost that is classified as a product cost will be recognized on the income statement as an expense (i.e., cost of goods sold) only when the associated units of product are sold. If some units are unsold at the end of the period, the costs of those unsold units are treated as assets. Therefore, by reclassifying period costs as product costs, the company is able to carry forward in inventories some costs that would have been treated as current expenses.

2. The discussion below is divided into two parts—Gallant's actions to postpone expenditures and the actions to reclassify period costs as product costs.

   The decision to postpone expenditures is highly questionable. It is one thing to postpone expenditures due to a cash bind; it is quite another to postpone expenditures in order to hit a profit target. Postponing these expenditures may have the effect of ultimately increasing future costs and reducing future profits. If orders to the company's suppliers are changed, it may disrupt the suppliers' operations. The additional costs may be passed on to Gallant's company and may create ill-will and a feeling of mistrust. Postponing maintenance on equipment is particularly questionable. The result may be breakdowns, inefficient and/or unsafe operations, and a shortened life for the machinery.

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   Interestingly, in a survey of 649 managers reported in *Management Accounting*, only 12% stated that it is unethical to defer expenses and thereby manipulate quarterly earnings. The proportion who felt it was unethical increased to 24% when it involved annual earnings. Another 41% said that deferring expenses is a questionable practice when it involved quarterly reports and 35% said this when annual reports were involved. Finally, 47% said that it is completely ethical to manipulate quarterly reports in this way and 41% gave the green light for annual reports. (See William J. Bruns, Jr. and Kenneth A. Merchant, "The Dangerous Morality of Managing Earnings," *Management Accounting*, August 1990, pp. 22-25)

   Gallant's decision to reclassify period costs is not ethical—assuming that there is no intention of disclosing in the financial reports this reclassification. Such a reclassification would be a violation of the principle of consistency in financial reporting and is a clear attempt to mislead readers of the financial reports. Although some may argue that the overall effect of Gallant's action will be a "wash"—that is, profits gained in this period will simply be taken from the next period—the trend of earnings will be affected. Hopefully, the auditors would discover any such attempt to manipulate annual earnings and would refuse to issue an unqualified opinion due to the lack of consistency.

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Teamwork in Action (LO1 CC1)

1. A fixed cost is normally defined as a cost that remains constant, in total, for changes in activity within the relevant range. A variable cost is normally defined as a cost that varies, in total, in direct proportion to changes in the level of activity within the relevant range.

2. a) Fixed costs for a steel company consist of items such as factory rent or depreciation, insurance, and periodic equipment depreciation. Variable costs include items such as the cost of raw materials and certain supplies. Labour may or may not be a variable cost. The relevant measure of production is the volume of steel produced. As production of steel increases within the relevant range, total fixed costs and unit variable costs remain constant, while total variable costs increase and unit fixed costs decrease.

   b) Fixedcosts for a hospital include items such as property taxes, supervisory salaries, and insurance. Variable costs include supplies, drugs, and perhaps some nursing and other labour. A relevant measure of production might be the number of patients treated. As the number of patients treated increase within the relevant range, total fixed costs and unit variable costs remain constant, while total variable costs increase and unit fixed costs decrease.

   c) Fixed costs for a university include property taxes, salaries, and advertising. Variable costs depend on the measure of activity. If the measure of activity is students enrolled, the variable costs are limited to the costs of handouts and other supplies (such as in science laboratories). As the number of students enrolled increases within the relevant range, total fixed costs and unit variable costs remain constant, while total variable costs increase and unit fixed costs decrease.

   d) Fixed costs for an auto manufacturer would include items such as factory rent or depreciation, insurance, supervisory salaries, and periodic equipment depreciation. Variable costs include raw materials and perhaps some labour cost. A relevant measure of productive activity would be the number of cars produced. As the number of cars produced increases within the relevant range, total fixed costs and unit variable costs remain constant, while total variable costs increase and unit fixed costs decrease.

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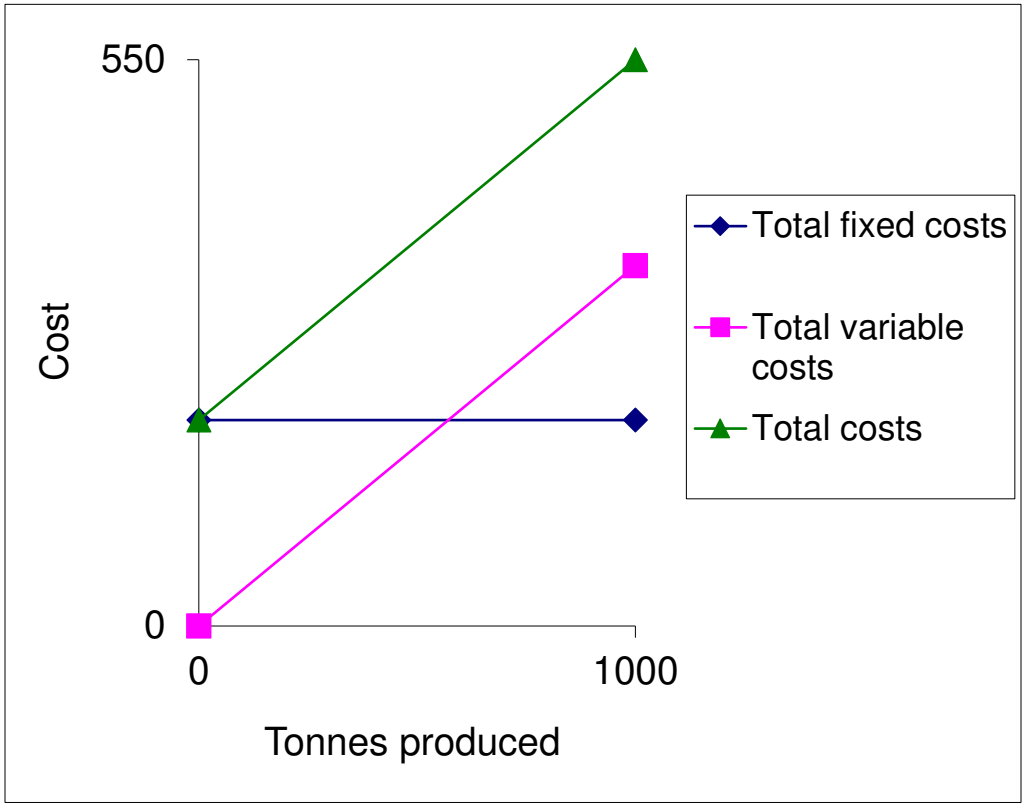
Teamwork in Action (continued)

3. As the volume of steel produced increases within the relevant range, total fixed costs remain the same; the fixed cost per unit decreases; total variable costs increase; the variable cost per unit remains the same; total cost increases (due to the increase in total variable cost); and the average unit cost declines (due to the presence of fixed costs).

4.



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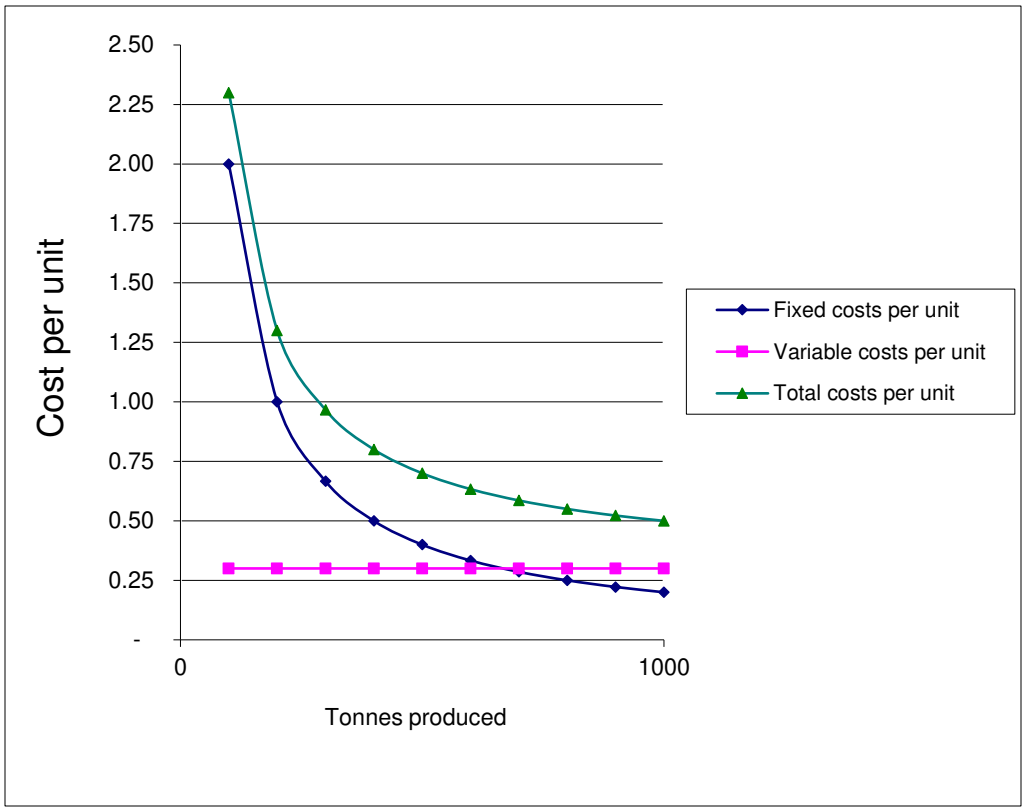
Teamwork in Action (continued)

5.



6. Once capacity has been set, total costs increase with increases in demand due to the presence of variable costs while per unit costs drop due to the presence of fixed costs.

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