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.

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 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.

Solutions to Brief Exercises

Brief Exercise 2-1 (LO3 CC5, 6) (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.

Brief Exercise 2-2 (LO1 CC1, 2) (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 U2 rock concert in Vancouver		X
2. Depreciation on the Hard Rock Cafe building in Ottawa ..		X
3. The electrical costs of running a roller coaster at the West Edmonton Mall	X	
4. Property taxes on your local cinema		X
5. The costs of synthetic materials used to make Reebok running shoes	X	
6. The costs of shipping Apple iPods to retail stores	X	
7. The cost of leasing a CT-scan diagnostic machine at the American Hospital in Paris.....		X

Brief Exercise 2-3 (LO3 CC5, 6) (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		

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.

Brief Exercise 2-4 (LO4 CC7, 8, 9) (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.

9. Rent on the facility: Manufacturing Overhead.

Brief Exercise 2-5 (LO4 CC 10, 11) (15 minutes)

	Product (Inventoriable) Cost	*Period (Noninventoriable) Cost*
1. Depreciation on salespersons' cars		X
2. Rent on equipment used in the factory	X	
3. Lubricants used for maintenance of machines	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. Factory supervisors' salaries	X	
7. Heat, water, and power consumed in the factory	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 factory lunchroom	X	
12. The salary of the switchboard operator 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 the annual sales conference		X
15. Attractively designed box for packaging breakfast cereal	X	

Brief Exercise 2-6 (LO5 CC 13, 14; LO6 CC 15) (15 minutes)

Bims
Income Statement

Sales		$3,000,000
Cost of goods sold:		
Beginning merchandise inventory	$ 250,000	
Add: Purchases	950,000	
Goods available for sale	1,200,000	
Deduct: Ending merchandise inventory	100,000	1,100,000
Gross margin		1,900,000
Less operating expenses:		
Selling expense	315,000	
Administrative expense	385,000	700,000
Net income		$1,200,000

Brief Exercise 2-7 (LO6 CC 15, 16) (15 minutes)

Lompac Products
Schedule of Cost of Goods Manufactured

Direct materials:		
Beginning raw materials inventory	$170,000	
Add: Purchases of raw materials	870,000	
Raw materials available for use	1,040,000	
Deduct: Ending raw materials inventory	150,000	
Raw materials used in production		$ 890,000
Direct labour		245,000
Manufacturing overhead		560,000
Total manufacturing costs		1,695,000
Add: Beginning work in process inventory		210,000
		1,905,000
Deduct: Ending work in process inventory		340,000
Cost of goods manufactured		$ 1,565,000

Solutions to Exercises

Exercise 2-1 (LO1 CC1, 2; LO3 CC 5, 6; LO4 CC 7, 8, 9, 10, 11) (45 minutes)

			Product Cost			*Period (Selling and Admin.)*		
Name of the Cost	*Variable Cost*	*Fixed Cost*	*Direct Materials*	*Direct Labour*	*Mfg. Overhead*	*Cost*	*Opportunity Cost*	*Sunk Cost*
Rental revenue foregone, $50,000 per year							X	
Direct materials cost, $60 per unit	X		X					
Rental cost of warehouse, $1,000 per month		X				X		
Rental cost of equipment, $15,000 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, $150,000 per year		X				X		
Supervisor's salary, $3,500 per month		X			X			
Electricity for machines, $1.80 per unit	X				X			
Shipping cost, $12 per unit.....	X					X		
Return earned on investments, $5,000 per year							X	

Exercise 2-2 (LO1 CC 1, 2; LO3 CC 5, 6; LO4 CC 10, 11) (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, 2; LO2 CC 3, 4) (15 minutes)

	Cost Behaviour		*To Quantity of Baked Goods Produced*	
Cost Item	*Variable*	*Fixed*	*Direct*	*Indirect*
1. Account manager's salary.....		X		X
2. Rent on building		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. Depreciation of commercial ovens used in baking		X		X
7. Insurance on the building.....		X		X

Exercise 2-4 (LO1 CC 1, 2; LO4 CC 10, 11) (30 minutes)

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

Exercise 2-5 (LO5 CC 14; LO6 CC 15, 16) (45 minutes)

1.

Mason Company
Schedule of Cost of Goods Manufactured

Direct materials:		
Raw materials inventory, beginning	$ 18,000	
Add: Purchases of raw materials	120,000	
Raw materials available for use	138,000	
Deduct: Raw materials inventory, ending	12,500	
Raw materials used in production		$125,500
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	17,000	
Total overhead costs		97,500
Total manufacturing costs		293,000
Add: Work in process, beginning		10,300
		303,300
Deduct: Work in process, ending		15,150
Cost of goods manufactured		$288,150

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

Finished goods inventory, beginning	$ 23,000
Add: Cost of goods manufactured	288,150
Goods available for sale	311,150
Deduct: Finished goods inventory, ending	18,100
Cost of goods sold	$293,050

Exercise 2-6 (LO4 CC 12) (30 minutes)

1.a)	Bolts of polyester purchased	8,000
	Bolts drawn from inventory	7,600
	Bolts remaining in inventory	400
	Cost per bolt	× $100
	Cost in Raw Materials Inventory at June 30	$ 40,000
b)	Bolts of polyester used in production (7,600 – 100)	7,500
	Linens completed and transferred to Finished Goods (90% × 7,500)	6,750
	Linens still in Work in Process at June 30	750
	Cost per bolts	× $100
	Cost in Work in Process Inventory at June 30	$ 75,000
c)	Linens completed and transferred to Finished Goods (above)	6,750
	Linens sold during the month (70% × 6,750)	4,725
	Linens still in Finished Goods at June 30	2,025
	Cost per bolts	× $100
	Cost in Finished Goods Inventory at June 30	$202,500
d)	Linens sold during the month (above)	4,725
	Cost per bolts	× $100
	Cost in Cost of Goods Sold at April 30	$472,500
e)	Bolts used for customer samples	100
	Cost per bolts	× $100
	Cost in Selling Expense at June 30	$ 10,000

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

EXERCISE 2-7 (LO6 CC 16) (15 minutes)

Direct material used =	$ 92,000	
Direct labour costs =	$ 25,000	
Manufacturing overhead =	$ 6,500	
Total Manufacturing costs=	$123,500	
Opening inventory of work in process =	$ 6,000	
Less: Ending inventory of work in process =	$ 17,000	
Cost of goods manufactured =		$112,500

EXERCISE 2-8 (LO5 CC 14; LO6 CC 15, 16) (7 minutes)

Cost of goods sold = Sales – Gross margin
= $1,700,000 – $800,000
= $900,000

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

= $900,000 + $185,000 – $30,000 = $1,055,000

Solutions to Problems

Problem 2-1 (LO1 CC 1, 2; LO4 CC 7, 8, 10, 11) (30 minutes)

1.

			Product Cost			*Period (Selling and Admin.)*		
Name of the Cost	*Variable Cost*	*Fixed Cost*	*Direct Materials*	*Direct Labour*	*Mfg. Overhead*	*Cost*	*Oppor-tunity 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		
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.

Problem 2-2 (LO1 CC 1, 2; LO2 CC 3, 4; LO4 CC 7, 9) (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*	*Adminis-trative Cost*	*Manufacturing (Product) Cost*	
				Direct	*Indirect*
1. Property taxes, factory	F				X
2. Boxes used for packaging detergent	V			X	
3. Salespersons' commissions	V	X			
4. Supervisor's salary, factory	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. Lubricants for machines	V				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. Thread in a garment factory	V				X

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. Ink used in textbook production	V				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.

Problem 2-3 (LO1 CC 1, 2; LO2 CC 3, 4; LO4 CC 7, 9) (60 minutes)

1.

	Cost Behaviour		*Selling or Administrative*	*Product Cost*	
Cost Item	*Variable*	*Fixed*	*Cost*	*Direct*	*Indirect*
Factory labour, direct	$168,000			$168,000	
Advertising		$ 50,000	$ 50,000		
Factory supervision		50,000			$50,000
Property taxes, factory building		4,500			4,500
Sales commissions	80,000		80,000		
Insurance, factory		3,500			3,500
Depreciation, office equipment		14,000	14,000		
Lease cost, factory equipment		6,000			6,000
Indirect materials, factory	6,000				6,000
Depreciation, factory building		8,000			8,000
General office supplies (billing)	4,000		4,000		
General office salaries		50,000	50,000		
Direct materials used (wood, bolts, etc.)	114,000			114,000	
Utilities, factory	30,000				30,000
Total costs	$402,000	$186,000	$198,000	$282,000	$108,000

Problem 2-3 (continued)

2.

Direct	$282,000
Indirect	108,000
Total	$390,000

$390,000 ÷ 2,000 sets = $195 per set

3. The average product cost per set would increase. This is because the fixed costs would be spread over fewer units, causing the cost per unit to rise.

4. a) Yes, the president may expect a minimum price of $195, which is the average cost to manufacture one set. He might expect a figure even higher than this to cover a portion of the administrative costs as well. 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 $57 per set, and direct materials and direct labour would be only $141.

   b) The term is opportunity cost. The full, regular price of a set might be appropriate here, since the company is operating at full capacity, and this is the amount that must be given up (benefit foregone) in order to sell a set to the brother-in-law.

Problem 2-4 (LO4 CC 10, 11) (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.

Problem 2-5 (LO5 CC 14; LO6 CC 15, 16) (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	3,500 *	12,000
Cost of goods manufactured.....	58,000 *	131,000 *	19,000 *	47,500
Goods available for sale.....	68,000 *	143,500 *	22,500 *	59,500 *
Ending finished goods inventory.....	(1,000)*	(11,500)	(4,000)	(3,500)
Cost of goods sold	67,000	132,000 *	18,500	56,000 *
Gross margin	13,000	69,000 *	17,500	34,000 *
Operating expenses	(9,000)*	(33,500)	(12,500)*	(25,000) *
Net income.....	$ 4,000	$ 35,500 *	$ 5,000	$ 9,000

* Missing data in the problem.

Problem 2-6 (LO5 CC 13, 14; LO6 CC 15, 16) (75 minutes)

1.

SWIFT COMPANY
Schedule of Cost of Goods Manufactured
For the Month Ended August 31

Direct materials:		
Raw materials inventory, August 1	$ 21,000	
Add: Purchases of raw materials	165,000	
Raw materials available for use	186,000	
Deduct: Raw materials inventory, August 31	18,000	
Raw materials used in production		$168,000
Direct labour		70,000
Manufacturing overhead:		
Indirect labour cost	12,000	
Utilities (50% × $15,000)	7,500	
Depreciation, factory equipment	21,000	
Insurance (80% × $4,000)	3,200	
Rent on facilities (75% × $50,000)	37,500	
Total overhead costs		81,200
Total manufacturing costs		319,200
Add: Work in process inventory, August 1		8,000
		327,200
Deduct: Work in process inventory, August 31		20,000
Cost of goods manufactured		$307,200

Problem 2-6 (continued)

2.

SWIFT COMPANY
Income Statement
For the Month Ended August 31

Sales		$450,000
Less cost of goods sold:		
Finished goods inventory, August 1	$ 50,000	
Add: Cost of goods manufactured	307,200	
Goods available for sale	357,200	
Deduct: Finished goods inventory, August 31	55,000	302,200
Gross margin		147,800
Less operating expenses:		
Utilities (50% × $15,000)	7,500	
Depreciation, sales equipment	18,000	
Insurance (20% × $4,000)	800	
Rent on facilities (25% × $50,000)	12,500	
Selling and administrative salaries	32,000	
Advertising	75,000	145,800
Net income (loss)		$ 2,000

3. In preparing the income statement for August, Sam failed to distinguish between product costs and period costs, and he also failed to 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 the income is still only marginally above zero) and selling the company may not yet be advisable.

Problem 2-7 (LO1 CC 1, 2; LO5 CC 13, 14; LO6 CC 15, 16) (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

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.

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)

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 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.

Problem 2-8 (LO1 CC 1, 2; LO5 CC 13, 14; LO6 CC 15, 16) (90 minutes)

1.

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

Direct materials:			
Raw materials inventory, beginning	$ 40,000		
Add: Purchases of raw materials	290,000		
Raw materials available for use	330,000		
Deduct: Raw materials inventory, ending	10,000		
Raw materials used in production		$320,000	
Direct labour		93,000	*
Manufacturing overhead:			
Insurance, factory	8,000		
Utilities, factory	45,000		
Indirect labour	60,000		
Cleaning supplies, factory	7,000		
Rent, factory building	120,000		
Maintenance, factory	30,000		
Total overhead costs		270,000	
Total manufacturing costs		683,000	(given)
Add: Work in process inventory, beginning		42,000	*
		725,000	
Deduct: Work in process inventory, ending		35,000	
Cost of goods manufactured		$690,000	

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

Problem 2-8 (continued)

Finished goods inventory, beginning	$ 50,000	
Add: Cost of goods manufactured	690,000	*
Goods available for sale	740,000	(given)
Deduct: Finished goods inventory, ending	80,000	*
Cost of goods sold	$660,000	(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: $320,000 ÷ 40,000 units = $8 per unit.
   Rent, factory building: $120,000 ÷ 40,000 units = $3 per unit.

3.

	Per Unit	*Total*
Direct materials	$8.00 (Same)	$400,000 ** (Changed)
Rent, factory building	$2.40 * (Changed)	$120,000 (Same)

* $120,000 ÷ 50,000 units = $2.40 per unit.
** $8 × 50,000 units = $400,000.

4. The average cost per unit for rent dropped from $3.00 to $2.40, 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 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.

PROBLEM 2-9 (LO5 CC 14; LO6 CC 15, 16) (40 minutes)

(Please see the Cost of Goods Manufactured and Cost of Goods Sold statements for the detailed calculations.)

1. Ending raw materials inventory = Raw materials inventory, beginning + Purchases of raw materials – Raw materials used in production

   = $13,000 + $198,000 – $195,000 = $16,000

2. Total manufacturing costs= Raw materials used in production + Direct labour + Total overhead costs

   = $195,000 + $283,000 + $326,600 = $804,600

3. Cost of goods manufactured= Total manufacturing costs + Work in process, beginning – Work in process, ending

   = $804,600 + $26,000 – $34,000 = $796,600

4. Finished goods inventory, ending= Finished goods inventory, beginning + Cost of goods manufactured – Cost of goods sold

   = $63,000 + $796,600 – $805,000 = $54,600

Martin, Inc.
Schedule of Cost of Goods Manufactured
For the Year Ended December 31, 2014

Direct materials:		
Raw materials inventory, beginning	$ 13,000	
Add: Purchases of raw materials	198,000	
Raw materials available for use	211,000	
Deduct: Raw materials inventory, ending	16,000	
Raw materials used in production		$195,000
Direct labour		283,000
Manufacturing overhead:		
Indirect Labour	39,000	
Indirect Materials	37,600	
Factory Maintenance	74,000	
Factory Insurance	49,000	
Factory Utilities	67,000	
Depreciation, factory equipment	60,000	
Total overhead costs		326,600
Total manufacturing costs		804,600
Add: Work in process, beginning		26,000
		830,600
Deduct: Work in process, ending		34,000
Cost of goods manufactured		$796,600

The cost of goods sold section of Martin, Inc.'s income statement:

Finished goods inventory, beginning	$ 63,000
Add: Cost of goods manufactured	796,600
Goods available for sale	859,600
Deduct: Finished goods inventory, ending	54,600
Cost of goods sold	$805,000

PROBLEM 2-10 (LO4 CC 10, 11; LO5 CC 14) (20 minutes)

1. Prime Cost = Direct Materials + Direct Labour
= $90,000 + $25,000 = $115,000

2. Conversion Cost = Direct Labour + Manufacturing Overhead
= $25,000 + ($3,000 + $4,000 + $3,500 + $5,000 + $2,000 + $15,000 + $3,000)
= $60,500

3. Cost of goods Sold = Total Manufacturing costs – Ending finished goods inventory
=$150,500* – $7,000 = $143,500

* Total Manufacturing costs = $90,000 + $25,000 + $3,000 + $4,000 + $3,500 + $5,000 + $2,000 + $15,000 + $3,000 = $150,500

PROBLEM 2-11 (LO5 CC 13, 14; LO6 CC 15, 16) (20 minutes)

1. Gross profit = Net income + Non-manufacturing costs
   = $60,000 + $150,000
   = $210,000

   Cost of goods sold = Sales – Gross profit
   = $800,000 – $210,000
   = $590,000

   Ending inventory of finished goods =
   Beginning inventory of finished goods
   + Cost of goods manufactured
   – Cost of goods sold
   = $300,000 + $570,000 – $590,000
   = $280,000

2. Total manufacturing cost =
   Cost of goods manufactured
   + ending inventory of work in process
   – beginning inventory of work in process
   = $570,000 + $0 – $120,000
   = $450,000

Comprehensive Problem (LO1 CC 1, 2; LO3 CC 5, 6; LO4 CC 7, 8, 9, 10, 11) (60 minutes)

1.

	Behaviour		Function		Relevance	
Cost Item	**Variable**	**Fixed**	**Product**	**Period**	**Opportunity**	**Sunk**
Lost rental income (₹1,800,000 per year)					√	
Direct materials (₹4,000 per unit)	√		√			
Direct labour (₹2,200 per unit)	√		√			
Equipment rental (₹250,000 per month)		√	√			
Warehouse space rental (₹26,500 per month)		√		√		
Manufacturing facility depreciation (₹300,000 per year)		√	√			√
Production supervisor salary (₹52,000 per month)		√	√			
Electricity for machines (₹54 per unit)	√		√			
Delivery costs (₹390 per unit)	√			√		
Advertising (₹3,100,000 per year)		√		√		
Annual return (₹92,000 per year)					√	

2.

Product Cost (₹)		**Per unit**
Direct materials		4,000.00
Direct labour		2,200.00
Manufacturing overhead:		
Equipment rental (₹250,000 ÷ 1,800 units)	138.89	
Manufacturing facility depreciation ((₹300,000/12) ÷ 1,800)	13.89	
Production supervisor salary (₹52,000 ÷ 1,800)	28.89	
Electricity	54.00	235.67
Total product costs per unit (using 1,800 units production)		6,435.67

3.

Incremental Costs for 300 Additional Units (₹)	
	Per unit
Direct materials	4,000
Direct labour	2,200
Electricity	54
Delivery costs	390
Total costs per unit	6,644
Total costs for 300 units	**1,993,200**

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 2,000 units and producing additional 300 units will result in a capacity utilization of 105% (2,100 ÷ 2,000 units). This in turn means that production is outside of the relevant range and may require the incurrence of additional fixed costs.

Analytical Thinking (LO5 CC13, 14; LO6 CC 15, 16) (75 minutes)

1.

BYDO INC
Schedule of Cost of Goods Manufactured
($ '000s)

Direct materials:		
Raw materials inventory, beginning	$ 13,000	
Add: Purchases of raw materials	13,000	
Raw materials available for use	26,000	
Deduct: Raw materials inventory, ending	6,000[1]	
Raw materials used in production		$20,000
Direct labour		25,000
Manufacturing overhead		8,000[2]
Total manufacturing costs		53,000
Add: Work in process inventory, beginning		8,000
		61,000
Deduct: Work in process inventory, ending		7,000
Cost of goods manufactured		$54,000

Analytical Thinking (continued)

BYDO INC
Schedule of cost of goods sold
($ '000s)

Finished goods, beginning inventory	$ 6,000	
Plus: Cost of goods manufactured		54,000
Less: Finished goods, ending inventory	**5,000**	
Cost of goods sold	$ 55,000	

[1] Raw materials, beginning inventory	$ 13,000	
Purchase of raw materials	13,000	
Less: raw materials, ending inventory	**6,000**	
Direct materials		$ 20,000

Prime Cost – Direct labour = Direct materials ($45M – $25M = $20M)

[2] Conversion Cost = Direct Labour + Manufacturing Overhead
Manufacturing Overhead = ($33M – $25M = $8M)

Analytical Thinking (continued)

2.

BYDO INC.
Income Statement
For the year ended December 31, 2014
($ '000s)

Sales	**$ 64,000**[3]
Less: Cost of goods sold	55,000
Gross profit	9,000
Less: Operating expenses	**13,000**[4]
Operating income (loss)	$ (4,000)

[3] Sales = Cost of Goods Sold + Gross Profit
Sales = ($55M + 9M = 64M)

[4] Operating Income = Gross Profit – Operating Expense
Operating expenses = ($9M – (-$4M) = $13M)

3.

COGM = $54,000,000

Units of goods manufactured = 432,000

Cost per unit = $125 ($54,000,000/432,000)

Finished goods, ending inventory = $5,000,000

Number of units in finished goods = (#5,000,000/$125) = 40,000 units

Communicating in Practice (LO4 CC 10, 11, 12; LO5 CC 13, 14; LO6 CC 15, 16) (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.

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	460,000	
Raw materials available for use	460,000	
Deduct: Raw materials inventory, ending	10,000	
Raw materials used in production		$450,000
Direct labour		90,000
Manufacturing overhead:		
Maintenance, production	73,000	
Indirect labour	120,000	
Cleaning supplies, production	7,000	
Rental cost, facilities (80% × $95,000)	76,000	
Insurance, production	18,000	
Utilities (90% × $100,000)	90,000	
Depreciation, production equipment	140,000	
Total overhead costs		524,000
Total manufacturing costs		1,064,000
Add: Work in process inventory, beginning		–0–
		1,064,000
Deduct: Work in process inventory, ending		50,000
Cost of goods manufactured		$1,014,000

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:

$$\frac{\text{Cost of goods manufactured}}{\text{Phones produced during the quarter}} = \frac{\$1{,}014{,}000}{40{,}000 \text{ units}} = \$25.35 \text{ per unit}$$

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 × $25.35 per phone = $202,800.

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)		$1,280,000
Less cost of goods sold:		
Finished goods inventory, beginning	$ –0–	
Add: Cost of goods manufactured	1,014,000	
Goods available for sale	1,014,000	
Deduct: Finished goods inventory, ending	202,800	811,200
Gross margin		468,800
Less operating expenses:		
Selling and administrative salaries	150,000	
Advertising	90,000	
Rental cost, facilities (20% × $95,000)	19,000	
Depreciation, office equipment	47,000	
Utilities (10% × $100,000)	10,000	
Travel, salespersons	40,000	356,000
Net income		$ 112,800

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 $202,800. Accordingly, assuming cost is defined as set forth above the insurance company owes Sun Power Communications, Inc. $202,800 for the 8,000 phones that were destroyed.

   This amount is considerably less than the $286,000 that was computed by the company's accountant. The $286,000 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.

Ethics Challenge (LO4 CC 10, 11) (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.

   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)

Ethics Challenge (continued)

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.

Teamwork in Action (LO1 CC 1, 2)

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) Fixed costs 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.

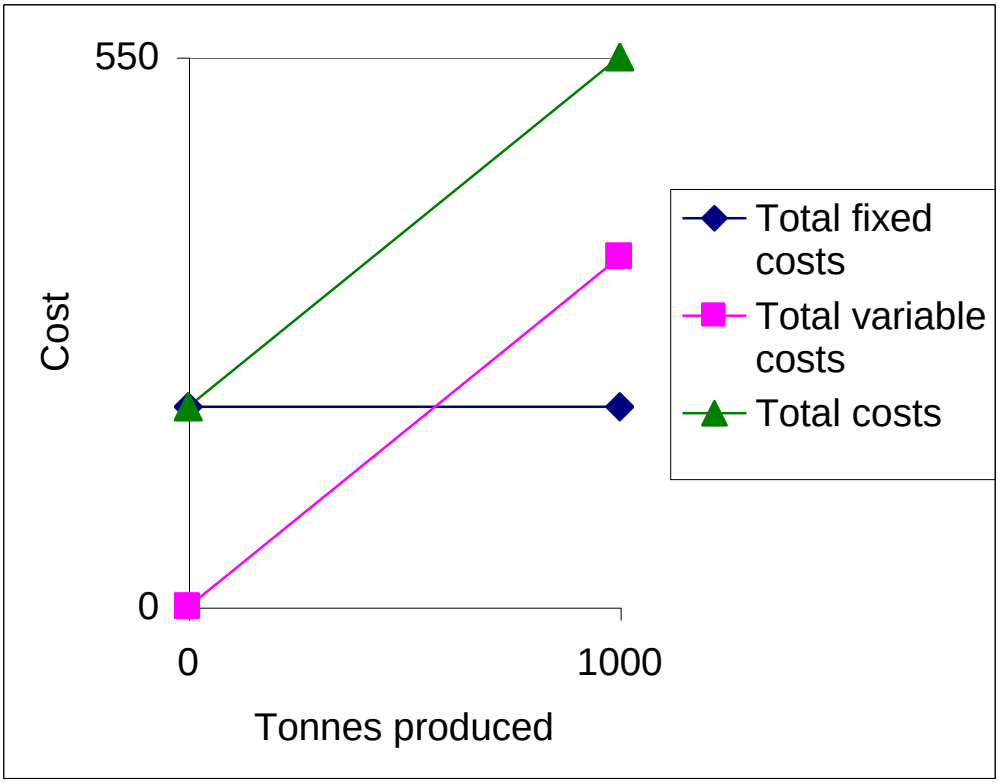
   c) Fixed costs for a university include property taxes, salaries, and advertising. Variable costs depend on the measure of activity. If the measure of activity is students enrolled, the variable costs are limited to the costs of handouts and other supplies (such as in science laboratories). As the number 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.

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).

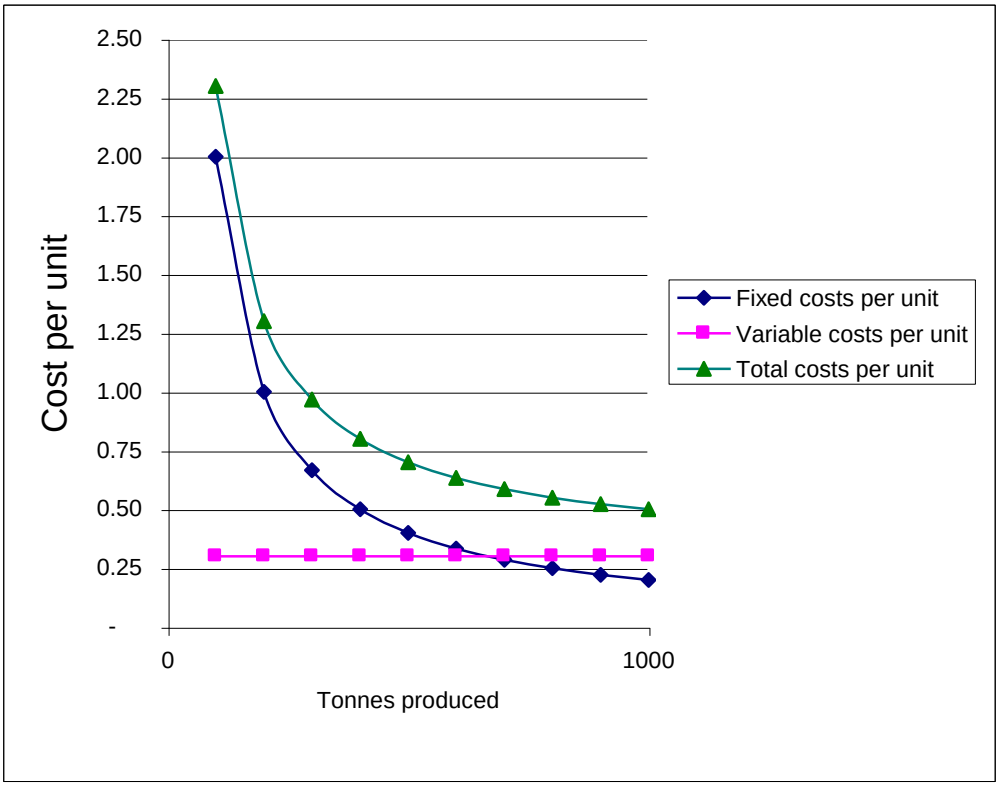
Teamwork in Action (continued)

4.



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.