Chapter 2
Managerial Accounting and Cost Concepts

Solutions to Questions

2-1 Managers carry out three major activities in an organization: planning, directing and motivating, and controlling. Planning involves establishing a basic strategy, selecting a course of action, and specifying how the action will be implemented. Directing and motivating involves mobilizing people to carry out plans and run routine operations. Controlling involves ensuring that the plan is actually carried out and is appropriately modified as circumstances change.

2-2 The planning and control cycle involves formulating plans, implementing plans, measuring performance, and evaluating differences between planned and actual performance.

2-3 In contrast to financial accounting, Managerial Accounting for Managers: (1) focuses on the needs of managers rather than outsiders; (2) emphasizes decisions affecting the future rather than the financial consequences of past actions; (3) emphasizes relevance rather than objectivity and verifiability; (4) emphasizes timeliness rather than precision; (5) emphasizes the segments of an organization rather than summary data concerning the entire organization; (6) is not governed by GAAP; and (7) is not mandatory.

2-4 The three major elements of product costs in a manufacturing company are direct materials, direct labor, and manufacturing overhead.

2-5

a. Direct materials are an integral part of a finished product and their costs can be conveniently traced to it.

b. Indirect materials are generally small items of material such as glue and nails. They may be an integral part of a finished product but their costs can be traced to the product only at great cost or inconvenience.

c. Direct labor consists of labor costs that can be easily traced to particular products. Direct labor is also called "touch labor."

d. Indirect labor consists of the labor costs of janitors, supervisors, materials handlers, and other factory workers that cannot be conveniently traced to particular products. These labor costs are incurred to support production, but the workers involved do not directly work on the product.

e. Manufacturing overhead includes all manufacturing costs except direct materials and direct labor. Consequently, manufacturing overhead includes indirect materials and indirect labor as well as other manufacturing costs.

2-6 A product cost is any cost involved in purchasing or manufacturing goods. In the case of manufactured goods, these costs consist of direct materials, direct labor, 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.

2-7 The income statement of a manufacturing company differs from the income statement of a merchandising company in the cost of goods sold section. A merchandising company sells finished goods that it has purchased from a supplier. These goods are listed as "purchases" in the cost of goods sold section. Because a manufacturing company produces its goods rather than buying them from a supplier, it lists "cost of goods manufactured" in place of "purchases." Also, the manufacturing company identifies its inventory in this section as Finished Goods inventory, rather than as Merchandise Inventory.

2-8 The schedule of cost of goods manufactured lists the manufacturing costs that have been incurred during the period. These costs are organized under the three categories of direct materials, direct labor, 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.

2-9 A manufacturing company usually has three inventory accounts: Raw Materials, Work in Process, and Finished Goods. A merchandising company may have a single inventory account—Merchandise Inventory.

2-10 Product costs are assigned to units as they are processed and hence are included in inventories. The flow is from direct materials, direct labor, and manufacturing overhead to Work in Process inventory. As goods are completed, their cost is removed from Work in Process inventory and transferred to Finished Goods inventory. As goods are sold, their cost is removed from Finished Goods inventory and transferred to Cost of Goods Sold. Cost of Goods Sold is an expense on the income statement.

2-11 Yes, costs such as salaries and depreciation can end up as part of assets on the balance sheet if they are manufacturing costs. Manufacturing costs are inventoried until the associated finished goods are sold. Thus, if some units are still in inventory, such costs may be part of either Work in Process inventory or Finished Goods inventory at the end of the period.

2-12 No. A variable cost is a cost that varies, in total, in direct proportion to changes in the level of activity. The variable cost per unit is constant. A fixed cost is fixed in total, but the average cost per unit changes with the level of activity.

2-13 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.

2-14 No, differential costs can be either variable or fixed. For example, the alternatives might consist of purchasing one machine rather than another to make a product. The difference between the fixed costs of purchasing the two machines is a differential cost.

Exercise 2-1 (10 minutes)

1. Directing and motivating
2. Budgets
3. Planning
4. Precision; Timeliness
5. Managerial Accounting for Managers; Financial accounting
6. Managerial Accounting for Managers
7 Financial accounting; Managerial Accounting for Managers
8. Feedback
9. Controller
10. Performance report

Exercise 2-2 (10 minutes)

1. The cost of a hard drive installed in a computer: direct materials.

2. The cost of advertising in the *Puget Sound Computer User* newspaper: selling.

3. The wages of employees who assemble computers from components: direct labor.

4. Sales commissions paid to the company's salespeople: selling.

5. The wages of the assembly shop's supervisor: manufacturing overhead.

6. The wages of the company's accountant: administrative.

7. Depreciation on equipment used to test assembled computers before release to customers: manufacturing overhead.

8. Rent on the facility in the industrial park: a combination of manufacturing overhead, selling, and administrative. The rent would most likely be prorated on the basis of the amount of space occupied by manufacturing, selling, and administrative operations.

Exercise 2-3 (15 minutes)

	Product Cost	*Period Cost*
1. Depreciation on salespersons' cars		X
2. Rent on equipment used in the factory	X	
3. Lubricants used for machine maintenance	X	
4. Salaries of personnel who work in the finished goods warehouse		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 for boxing products for shipment overseas (units are not normally boxed)		X
9. Advertising costs		X
10. Workers' compensation insurance for factory employees	X	
11. Depreciation on chairs and tables in the factory lunchroom	X	
12. The wages of the receptionist in the administrative offices		X
13. Cost of leasing the corporate jet used by the company's executives		X
14. The cost of renting rooms at a Florida resort for the annual sales conference		X
15. The cost of packaging the company's product	X	

Exercise 2-4 (15 minutes)

CyberGames
Income Statement

Sales		$1,450,000
Cost of goods sold:		
Beginning merchandise inventory	$ 240,000	
Add: Purchases	950,000	
Goods available for sale	1,190,000	
Deduct: Ending merchandise inventory	170,000	1,020,000
Gross margin		430,000
Selling and administrative expenses:		
Selling expense	210,000	
Administrative expense	180,000	390,000
Net operating income		$ 40,000

Exercise 2-5 (15 minutes)

Lompac Products
Schedule of Cost of Goods Manufactured

Direct materials:		
Beginning raw materials inventory.....	$ 60,000	
Add: Purchases of raw materials	690,000	
Raw materials available for use.....	750,000	
Deduct: Ending raw materials inventory ..	45,000	
Raw materials used in production.....		$ 705,000
Direct labor		135,000
Manufacturing overhead.....		370,000
Total manufacturing costs		1,210,000
Add: Beginning work in process inventory..		120,000
		1,330,000
Deduct: Ending work in process inventory..		130,000
Cost of goods manufactured.....		$1,200,000

Exercise 2-6 (15 minutes)

A few of these costs may generate debate. For example, some may argue that the cost of advertising a rock concert is a variable cost because 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 rock concert in New York City 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 persons who ultimately buy tickets, the causation is in one direction. If more people buy tickets, the advertising costs don't go up.

	Cost Behavior	
Cost (Measure of Activity)	*Variable*	*Fixed*
1. The cost of X-ray film used in the radiology lab at Virginia Mason Hospital in Seattle (Number of X-rays taken)	X	
2. The cost of advertising a rock concert in New York City (Number of rock concert tickets sold)		X
3. The cost of renting retail space for a McDonald's restaurant in Hong Kong (Total sales at the restaurant)		X
4. The electrical cost of running a roller coaster at Magic Mountain (Number of times the roller coaster is run)	X	
5. Property taxes paid by your local cinema theater (Number of tickets sold)		X
6. The cost of sales commissions paid to salespersons at a Nordstrom store (Total sales at the store)	X	
7. Property insurance on a Coca Cola bottling plant (Number of cases of bottles produced)		X
8. The costs of synthetic materials used to make a particular model of running shoe (Number of shoes of that model produced)	X	
9. The costs of shipping Panasonic televisions to retail stores (Number of televisions sold)	X	
10. The cost of leasing an ultra-scan diagnostic machine at the American Hospital in Paris (Number of patients scanned with the machine)		X

Exercise 2-7 (15 minutes)

	Cost	*Cost Object*	*Direct Cost*	*Indirect Cost*
1.	The wages of pediatric nurses	The pediatric department	X	
2.	Prescription drugs	A particular patient	X	
3.	Heating the hospital	The pediatric department		X
4.	The salary of the head of pediatrics	The pediatric department	X	
5.	The salary of the head of pediatrics	A particular pediatric patient		X
6.	Hospital chaplain's salary	A particular patient		X
7.	Lab tests by outside contractor	A particular patient	X	
8.	Lab tests by outside contractor	A particular department	X	

Exercise 2-8 (15 minutes)

Item	*Differential Cost*	*Opportunity Cost*	*Sunk Cost*
1. Cost of the old X-ray machine ...			X
2. The salary of the head of the Radiology Department.....			
3. The salary of the head of the Pediatrics Department			
4. Cost of the new color laser printer	X		
5. Rent on the space occupied by Radiology			
6. The cost of maintaining the old machine	X		
7. Benefits from a new DNA analyzer.....		X	
8. Cost of electricity to run the X-ray machines	X		

Note: The costs of the salaries of the head of the Radiology Department and Pediatrics Department and the rent on the space occupied by Radiology are neither differential costs, nor opportunity costs, nor sunk costs. These costs do not differ between the alternatives and therefore are irrelevant in the decision, but they are not sunk costs because they occur in the future.

Exercise 2-9 (15 minutes)

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

Exercise 2-10 (15 minutes)

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

Exercise 2-11 (30 minutes)

1.

Mason Company
Schedule of Cost of Goods Manufactured

Direct materials:		
Beginning raw materials inventory	$ 7,000	
Add: Purchases of raw materials	118,000	
Raw materials available for use	125,000	
Deduct: Ending raw materials inventory	15,000	
Raw materials used in production		$110,000
Direct labor		70,000
Manufacturing overhead		80,000
Total manufacturing costs		260,000
Add: Beginning work in process inventory		10,000
		270,000
Deduct: Ending work in process inventory		5,000
Cost of goods manufactured		$265,000

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

Beginning finished goods inventory	$ 20,000
Add: Cost of goods manufactured	265,000
Goods available for sale	285,000
Deduct: Ending finished goods inventory	35,000
Cost of goods sold	$250,000

Exercise 2-12 (30 minutes)

1. a.	Batteries purchased	8,000
	Batteries drawn from inventory	7,600
	Batteries remaining in inventory	400
	Cost per battery	× $10
	Cost in Raw Materials Inventory at April 30	$4,000
b.	Batteries used in production (7,600 – 100)	7,500
	Motorcycles completed and transferred to Finished Goods (90% × 7,500)	6,750
	Motorcycles still in Work in Process at April 30	750
	Cost per battery	× $10
	Cost in Work in Process Inventory at April 30	$7,500
c.	Motorcycles completed and transferred to Finished Goods (see above)	6,750
	Motorcycles sold during the month (70% × 6,750)	4,725
	Motorcycles still in Finished Goods at April 30	2,025
	Cost per battery	× $10
	Cost in Finished Goods Inventory at April 30	$20,250
d.	Motorcycles sold during the month (above)	4,725
	Cost per battery	× $10
	Cost in Cost of Goods Sold at April 30	$47,250
e.	Batteries used in salespersons' motorcycles	100
	Cost per battery	× $10
	Cost in Selling Expense at April 30	$ 1,000

2. Raw Materials Inventory—balance sheet
   Work in Process Inventory—balance sheet
   Finished Goods Inventory—balance sheet
   Cost of Goods Sold—income statement
   Selling Expense—income statement

Problem 2-13 (30 minutes)

Note to the Instructor: There may be some exceptions to the answers below. The purpose of this problem is to get the student to start *thinking* about cost behavior and cost purposes; 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, factory	F				X
2. Boxes used for packaging detergent produced by the company	V			X	
3. Salespersons' commissions	V	X			
4. Supervisor's salary, factory	F				X
5. Depreciation, executive autos	F		X		
6. Wages of workers assembling computers	V			X	
7. Insurance, finished goods warehouses	F	X			
8. Lubricants for production equipment	V				X
9. Advertising costs	F	X			
10. Microchips used in producing calculators	V			X	
11. Shipping costs on merchandise sold	V	X			
12. Magazine subscriptions, factory lunchroom	F				X
13. Thread in a garment factory	V				X
14. Billing costs	V	X*			
15. Executive life insurance	F		X		

Problem 2-13 (continued)

Cost Item	*Variable or Fixed*	*Selling Cost*	*Administrative Cost*	*Manufacturing (Product) Cost*	
				Direct	*Indirect*
16. Ink used in textbook production.....	V				X
17. Fringe benefits, assembly-line workers	V			X**	
18. Yarn used in sweater production.....	V			X	
19. Wages of receptionist, executive offices	F		X		

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

Problem 2-14 (30 minutes)

			Product Cost			*Period (Selling and Admin) Cost*		
Name of the Cost	*Variable Cost*	*Fixed Cost*	*Direct Materials*	*Direct Labor*	*Manu-facturing Overhead*		*Oppor-tunity Cost*	*Sunk Cost*
Rental revenue forgone, $30,000 per year							X	
Direct materials cost, $80 per unit	X		X					
Rental cost of warehouse, $500 per month		X				X		
Rental cost of equipment, $4,000 per month		X			X			
Direct labor cost, $60 per unit	X			X				
Depreciation of the annex space, $8,000 per year		X			X			X
Advertising cost, $50,000 per year		X				X		
Supervisor's salary, $1,500 per month		X			X			
Electricity for machines, $1.20 per unit	X				X			
Shipping cost, $9 per unit	X					X		
Return earned on investments, $3,000 per year							X	

Problem 2-15 (30 minutes)

	Cost Behavior		*To Units of Product*	
Cost Item	*Variable*	*Fixed*	*Direct*	*Indirect*
1. Electricity to run production equipment	X			X
2. Rent on a factory building		X		X
3. Cloth used to make drapes	X		X	
4. Production superintendent's salary		X		X
5. Wages of laborers assembling a product	X		X	
6. Depreciation of air purification equipment used to make furniture		X		X
7. Janitorial salaries		X		X
8. Peaches used in canning fruit	X		X	
9. Lubricants for production equipment	X			X
10. Sugar used in soft drink production	X		X	
11. Property taxes on the factory		X		X
12. Wages of workers painting a product	X		X	
13. Depreciation on cafeteria equipment		X		X
14. Insurance on a building used in producing helicopters		X		X
15. Cost of rotor blades used in producing helicopters	X		X	

Problem 2-16 (45 minutes)

1.

Swift Company
Schedule of Cost of Goods Manufactured
For the Month Ended August 31

Direct materials:		
Raw materials inventory, August 1	$ 8,000	
Add: Purchases of raw materials	165,000	
Raw materials available for use	173,000	
Deduct: Raw materials inventory, August 31	13,000	
Raw materials used in production		$160,000
Direct labor		70,000
Manufacturing overhead		85,000
Total manufacturing costs		315,000
Add: Work in process inventory, August 1		16,000
		331,000
Deduct: Work in process inventory, August 31		21,000
Cost of goods manufactured		$310,000

2.

Swift Company
Income Statement
For the Month Ended August 31

Sales		$450,000
Cost of goods sold:		
Finished goods inventory, August 1	$ 40,000	
Add: Cost of goods manufactured	310,000	
Goods available for sale	350,000	
Deduct: Finished goods inventory, August 31	60,000	290,000
Gross margin		160,000
Selling and administrative expenses		142,000
Net operating income		$ 18,000

Problem 2-16 (continued)

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 and selling the company may not be advisable.

Problem 2-17 (15 minutes)

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

2. No, the president is not correct. The reported net operating income for the year will differ depending on 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, 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. The remainder of the salary costs will be on the balance sheet as part of inventories.

Problem 2-18 (45 minutes)

1.

Meriwell Company
Schedule of Cost of Goods Manufactured

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 labor		70,000
Manufacturing overhead		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

2.

Meriwell Company
Income Statement

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
Selling and administrative expenses:		
Selling expenses	80,000	
Administrative expenses	110,000	190,000
Net operating income		$ 40,000

Problem 2-18 (continued)

3. Direct materials: $128,000 ÷ 10,000 units = $12.80 per unit.
   Fixed manufacturing overhead: $90,000 ÷ 10,000 units = $9.00 per unit.

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

   Fixed manufacturing overhead:
   Unit cost: $90,000 ÷ 15,000 units = $6.00 per unit.
   Total cost: $90,000 (unchanged)

5. Unit cost for fixed manufacturing overhead dropped from $9.00 to $6.00, because of the increase in production between the two years. Because fixed costs do not change *in total* as the activity level changes, they will decrease on a unit basis as the activity level rises.

Problem 2-19 (45 minutes)

1.

	Cost Behavior		*Selling or Administrative*	*Product Cost*	
Cost Item	*Variable*	*Fixed*	*Cost*	*Direct*	*Indirect*
Factory labor, direct	$118,000			$118,000	
Advertising		$50,000	$50,000		
Factory supervision		40,000			$40,000
Property taxes, factory building		3,500			3,500
Sales commissions	80,000		80,000		
Insurance, factory		2,500			2,500
Depreciation, administrative office equipment		4,000	4,000		
Lease cost, factory equipment		12,000			12,000
Indirect materials, factory	6,000				6,000
Depreciation, factory building		10,000			10,000
Administrative office supplies	3,000		3,000		
Administrative office salaries		60,000	60,000		
Direct materials used	94,000			94,000	
Utilities, factory	20,000				20,000
Total costs	$321,000	$182,000	$197,000	$212,000	$94,000

Problem 2-19 (continued)

2.

Direct	$212,000
Indirect.....	94,000
Total.....	$306,000

$306,000 ÷ 2,000 sets = $153 per set

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

4. a. Yes, the president may expect a minimum price of $153, which is the average cost to manufacture one set. He might expect a price even higher than this to cover a portion of the administrative costs as well. The brother-in-law probably is thinking of cost as including only direct materials, or, at most, direct materials and direct labor. Direct materials alone would be only $47 per set, and direct materials and direct labor would be only $106.

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

Problem 2-20 (30 minutes)

1.

			Product Cost			*Period (Selling and Admin) Cost*	*Oppor-tunity Cost*	*Sunk Cost*
Name of the Cost	*Variable Cost*	*Fixed Cost*	*Direct Materials*	*Direct Labor*	*Manuf. Overhead*			
Staci's current salary, $3,800 per month		X					X	
Building rent, $500 per month.		X			X			
Clay and glaze, $2 per pot.....	X		X					
Wages of production workers, $8 per pot	X			X				
Advertising, $600 per month ...		X				X		
Sales commission, $4 per pot ..	X					X		
Rent of production equipment, $300 per month .		X			X			
Legal and filing fees, $500		X				X		X
Rent of sales office, $250 per month		X				X		
Phone for taking orders, $40 per month		X				X		
Interest lost on savings account, $1,200 per year.....		X					X	

Problem 2-20 (continued)

2. The $500 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 2-21 (60 minutes)

1.

Superior Company
Schedule of Cost of Goods Manufactured
For the Year Ended December 31

Direct materials:			
Raw materials inventory, beginning (given)	$ 40,000		
Add: Purchases of raw materials (given)	290,000		
Raw materials available for use	330,000		
Deduct: Raw materials inventory, ending (given)	10,000		
Raw materials used in production		$320,000	
Direct labor		93,000	*
Manufacturing overhead (given)		270,000	
Total manufacturing costs (given)		683,000	
Add: Work in process inventory, beginning		42,000	*
		725,000	
Deduct: Work in process inventory, ending (given)		35,000	
Cost of goods manufactured		$690,000	

The cost of goods sold section of the income statement follows:

Finished goods inventory, beginning (given)	$ 50,000	
Add: Cost of goods manufactured	690,000	*
Goods available for sale (given)	740,000	
Deduct: Finished goods inventory, ending	80,000	*
Cost of goods sold (given)	$660,000	

* These items must be computed by working backwards up through the statements.

2. Direct materials: $320,000 ÷ 40,000 units = $8.00 per unit.
   Manufacturing overhead: $270,000 ÷ 40,000 units = $6.75 per unit.

3. Direct materials: $8.00 per unit.
   Manufacturing overhead: $270,000 ÷ 50,000 units = $5.40 per unit.

Problem 2-21 (continued)

4. The average cost per unit for manufacturing overhead dropped from $6.75 to $5.40 because of the increase in production between the two years. Because fixed costs do not change *in total* as the activity level changes, the average cost per unit will decrease as the activity level rises.

Problem 2-22 (30 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 some costs forward in inventories 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 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)

Problem 2-22 (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. However, recent accounting scandals may lead to some skepticism about how forceful auditors have been in enforcing tight accounting standards.

Problem 2-23 (20 minutes)

Item	*Description*	*Direct or Indirect Cost of the Meals-On-Wheels Program*		*Direct or Indirect Cost of Particular Seniors Served by the Meals-On-Wheels Program*		*Variable or Fixed with Respect to the Number of Seniors Served by the Meals-On-Wheels Program*	
		Direct	*Indirect*	*Direct*	*Indirect*	*Variable*	*Fixed*
a.	The cost of leasing the meals-on-wheels van	X			X		X
b.	The cost of incidental supplies such as salt, pepper, napkins, and so on	X			X*	X	
c.	The cost of gasoline consumed by the meals-on-wheels van.....	X			X	X	
d.	The rent on the facility that houses Madison Seniors Care Center, including the meals-on-wheels program		X		X*		X
e.	The salary of the part-time manager of the meals-on-wheels program.....	X			X		X
f.	Depreciation on the kitchen equipment used in the meals-on-wheels program	X			X		X
g.	The hourly wages of the caregiver who drives the van and delivers the meals.....	X		X		X	
h.	The costs of complying with health safety regulations in the kitchen.....	X			X		X
i.	The costs of mailing letters soliciting donations to the meals-on-wheels program	X			X		X

*These costs could be direct costs of serving particular seniors.

Problem 2-24 (60 minutes)

1.

Visic Corporation
Schedule of Cost of Goods Manufactured

Direct materials:		
Raw materials inventory, beginning	$ 20,000	
Add: Purchases of raw materials	480,000	
Raw materials available for use	500,000	
Deduct: Raw materials inventory, ending	30,000	
Raw materials used in production		$470,000
Direct labor		90,000
Manufacturing overhead		300,000
Total manufacturing costs		860,000
Add: Work in process inventory, beginning		50,000
		910,000
Deduct: Work in process inventory, ending		40,000
Cost of goods manufactured		$870,000

2. a. To compute the number of units in the finished goods inventory at the end of the year, we must first compute the number of units sold during the year.

$$\frac{\text{Total sales}}{\text{Unit selling price}} = \frac{\$1{,}300{,}000}{\$50 \text{ per unit sold}} = 26{,}000 \text{ units sold}$$

Units in the finished goods inventory, beginning	0
Units produced during the year	29,000
Units available for sale	29,000
Units sold during the year (above)	26,000
Units in the finished goods inventory, ending	3,000

b. The average production cost per unit during the year is:

$$\frac{\text{Cost of goods manufactured}}{\text{Number of units produced}} = \frac{\$870{,}000}{29{,}000 \text{ units}} = \$30 \text{ per unit}$$

Thus, the cost of the units in the finished goods inventory at the end of the year is: 3,000 units × $30 per unit = $90,000.

Problem 2-24 (continued)

3.

Visic Corporation
Income Statement

Sales		$1,300,000
Cost of goods sold:		
Finished goods inventory, beginning	$ 0	
Add: Cost of goods manufactured	870,000	
Goods available for sale	870,000	
Finished goods inventory, ending	90,000	780,000
Gross margin		520,000
Selling and administrative expenses		380,000
Net operating income		$ 140,000

Problem 2-25 (45 minutes)

	Case 1	*Case 2*	*Case 3*	*Case 4*
Direct materials	$ 4,500	$ 6,000	$ 5,000	$ 3,000
Direct labor	9,000 *	3,000	7,000	4,000
Manufacturing overhead	5,000	4,000	8,000 *	9,000
Total manufacturing costs	18,500	13,000 *	20,000	16,000 *
Beginning work in process inventory	2,500	2,000 *	3,000	4,500 *
Ending work in process inventory	(3,000)*	(1,000)	(4,000)	(3,000)
Cost of goods manufactured	$18,000	$14,000	$19,000 *	$17,500
Sales	$30,000	$21,000	$36,000	$40,000
Beginning finished goods inventory	1,000	2,500	3,500 *	2,000
Cost of goods manufactured	18,000	14,000	19,000 *	17,500
Goods available for sale	19,000 *	16,500 *	22,500 *	19,500 *
Ending finished goods inventory	(2,000)*	(1,500)	(4,000)	(3,500)
Cost of goods sold	17,000	15,000 *	18,500	16,000 *
Gross margin	13,000	6,000 *	17,500	24,000 *
Selling and administrative expenses	(9,000)*	(3,500)	(12,500)*	(15,000)*
Net operating income	$ 4,000	$ 2,500 *	$ 5,000	$ 9,000

* Missing data in the problem.

Case 2-26 (60 minutes)

The following cost items are needed before a schedule of cost of goods manufactured can be prepared:

Materials used in production:

Prime cost	$410,000
Less direct labor cost	180,000
Direct materials cost	$230,000

Manufacturing overhead cost:

$$\frac{\text{Direct labor cost}}{\text{Percentage of conversion cost}} = \frac{\$180,000}{30\%*}$$

$$= \$600,000 \text{ total conversion cost}$$

*100% – 70% = 30%.

Conversion cost	$600,000
Less direct labor cost	180,000
Manufacturing overhead cost	$420,000

Cost of goods manufactured:

Goods available for sale	$810,000
Less finished goods inventory, beginning	45,000
Cost of goods manufactured	$765,000

The easiest way to proceed from this point is to place all known amounts in a partially completed schedule of cost of goods manufactured and a partially completed income statement. Then fill in the missing amounts by analysis of the available data.

Case 2-26 (continued)

Direct materials:	
Raw materials inventory, beginning	$ 18,000
Add: Purchases of raw materials	290,000
Raw materials available for use	308,000
Deduct: Raw materials inventory, ending	A
Raw materials used in production (see above)	230,000
Direct labor cost	180,000
Manufacturing overhead cost (see above)	420,000
Total manufacturing costs	830,000
Add: Work in process inventory, beginning	65,000
	895,000
Deduct: Work in process inventory, ending	B
Cost of goods manufactured (see above)	$765,000

Therefore, "A" (Raw materials inventory, ending) is $78,000; and "B" (Work in process inventory, ending) is $130,000.

Sales		$1,200,000
Cost of goods sold:		
Finished goods inventory, beginning	$ 45,000	
Add: Cost of goods manufactured (see above)	765,000	
Goods available for sale	810,000	
Deduct: Finished goods inventory, ending	C	720,000
Gross margin		$ 480,000

*$1,200,000 × (100% – 40%) = $720,000.

Therefore, "C" (Finished goods inventory, ending) is $90,000. The procedure outlined above is just one way in which the solution to the case can be approached. Some may wish to start at the bottom of the income statement (with gross margin) and work upwards from that point. Also, the solution can be obtained by use of T-accounts.

Case 2-27 (60 minutes)

1. No distinction has been made between period expenses and product costs on the income statement filed by the company's accountant. Product costs (e.g., direct materials, direct labor, and manufacturing overhead) should be assigned to inventory accounts and flow through to the income statement as cost of goods sold only when finished products are sold. Because there were ending inventories, some of the product costs should appear on the balance sheet as assets rather than on the income statement as expenses.

2.

Solar Technology, 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	360,000	
Raw materials available for use	360,000	
Deduct: Raw materials inventory, ending	10,000	
Raw materials used in production		$350,000
Direct labor		70,000
Manufacturing overhead		410,000
Total manufacturing costs		830,000
Add: Work in process inventory, beginning		0
		830,000
Deduct: Work in process inventory, ending		50,000
Cost of goods manufactured		$780,000

Case 2-27 (continued)

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

$$\frac{\text{Cost of goods manufactured}}{\text{Batteries produced during the quarter}} = \frac{\$780{,}000}{40{,}000 \text{ units}} = \$19.50 \text{ per unit}$$

Because 8,000 batteries (40,000 – 32,000 = 8,000) were in the finished goods inventory at the end of the quarter, the total cost of this inventory was:

8,000 units × $19.50 per unit = $156,000.

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

Solar Technology, Inc.
Income Statement
For the Quarter Ended March 31

Sales (32,000 batteries)		$960,000
Cost of goods sold:		
Finished goods inventory, beginning	$ 0	
Add: Cost of goods manufactured	780,000	
Goods available for sale	780,000	
Deduct: Finished goods inventory, ending	156,000	624,000
Gross margin		336,000
Selling and administrative expenses		290,000
Net operating income		$ 46,000

Case 2-27 (continued)

4. No, the insurance company probably does not owe Solar Technology $226,000. The key question is how "cost" was defined in the insurance contract. It is most likely that the insurance contract limits reimbursement for losses to those costs that would normally be considered product costs—in other words, direct materials, direct labor, and manufacturing overhead. The $226,000 is overstated because it includes elements of selling and administrative expenses as well as product costs. The $226,000 also does not recognize that some costs incurred during the period are in the ending Raw Materials and Work in Process inventory accounts, as explained in part (1) above. The insurance company's liability is probably just $156,000, which is the amount of cost associated with the ending Finished Goods inventory as shown in part (3) above.

Research and Application 2-28

1. Dell succeeds because of its operational excellence customer value proposition. Page 1 of the 10-K (under the heading Business Strategy) lists the key tenets of Dell's business strategy. The first three tenets focus on operational excellence. The first tenet discusses the direct business model, which "eliminates wholesale and retail dealers that add unnecessary time and cost or diminish Dell's understanding of customer expectations." The second tenet is Dell's build-to-order manufacturing process that "enables Dell to turn over inventory every four days on average, and reduce inventory levels." The third tenet is "Dell's relentless focus on reducing its costs [which] allows it to consistently provide customers with superior value." Also, the first bullet point on Page 8 of the 10-K says "Dell's success is based on its ability to profitably offer its products at a lower price than its competitors."

2. Dell faces numerous business risks as described in pages 7-10 of the 10-K. Students may mention other risks beyond those specifically mentioned in the 10-K. Here are four risks faced by Dell with suggested control activities:
   - Risk: Profits may fall short if Dell's product, customer, and geographic mix is substantially different than anticipated. Control activities: Maintain a budgeting program that forecasts sales by product line, customer segment, and geographic region. While the budget is not going to be perfectly accurate, a reasonably accurate forecast would help Dell manage investor expectations.
   - Risk: Disruptions in component availability from suppliers could reduce Dell's ability to meet customer orders. This is of particular concern for Dell because its lean production practices result in minimal inventory levels and because Dell relies on several single-sourced suppliers. Control activities: Develop a plan with single-sourced suppliers to ensure that they can produce the necessary components at more than one plant location and to ensure that each location has more than one means of delivering the parts to Dell's assembly facilities.

Research and Application 2-28 (continued)

- Risk: Infrastructure failures (e.g., computer viruses, intentional disruptions of IT systems and website outages) may threaten Dell's ability to book or process orders, manufacture products, or ship products in a timely manner. Control activities: Install controls such as physical security, data storage backup sites, firewalls and passwords that protect technology assets.
- Risk: Losing government contracts could adversely affect the company's revenues. Control activities: Develop a formal review process, supervised by legal counsel, to ensure that Dell complies with governmental regulations.

3. Pages 34-35 of Dell's Form 10-K contain the audit report issued by PricewaterhouseCoopers (PWC). The audit report makes reference to the role of the Public Company Accounting Oversight Board (PCAOB) that was created by the Sarbanes-Oxley Act of 2002 (SOX). The audit report also contains two opinions dealing with internal control. The first opinion relates to management's assessment of its internal controls. The second opinion relates to the auditor's assessment of the effectiveness of Dell's internal controls. These two opinions were required by SOX at the time of this 10-K filing. Page 59 includes management's report on internal control over financial reporting. This report includes a reference to SOX. Finally, pages 76-78 contain signed certifications from the CEO (Kevin Rollins) and the CFO (James Schneider). SOX requires the CEO and CFO to certify that the 10-K and its accompanying financial statements do not contain any untrue statements and are fairly stated in all material respects.

4. Based solely on the inventories number on the balance sheet, students cannot determine the answer to this question. Furthermore, given that Dell's total amount of inventories is so small, the company does not report the break down of its inventories between raw materials, work-in-process, and finished goods. Nonetheless, students should be able to readily ascertain that Dell is a manufacturer. Page 2 of the 10-K says "Dell designs, develops, manufactures, markets, sells, and supports a wide range of products that are customized to customer requirements." Page 5 states "Dell's manufacturing process consists of assembly,

Research and Application 2-28 (continued)

software installation, functional testing, and quality control." Page 7 states that Dell has manufacturing facilities in Austin, Texas, Eldorado do Sul, Brazil, Nashville and Lebanon, Tennessee, Limerick, Ireland, Penang, Malaysia, and Xiamen, China.

5. Examples of direct inventoriable costs include the component parts that go into making Dell's main product families, which include enterprise systems, client systems, printing and imaging systems, software, and peripherals. The "touch" laborers that work in each of the aforementioned plants would also be a direct inventoriable cost. Examples of indirect inventoriable costs include the costs to sustain the manufacturing plants that cannot be conveniently traced to specific products. The utility bills, insurance premiums, plant management salaries, and equipment-related costs, etc. that are incurred to sustain plant operations would all be indirect inventoriable costs.

   The gross margin (in dollars) has steadily increased and the gross margin as a percent of sales has remained fairly steady for two reasons. First, the cost of goods sold consists largely of variable costs (e.g., direct materials and direct labor costs). As sales grow, these variable costs increase in total, but as a percentage of sales, they remain fairly stable over time.

   Some students may ask about the fixed overhead costs that are incurred to run the plants. Spreading fixed overhead costs over a higher volume of sales would increase the gross margin percentage. However, the fixed overhead costs are relatively small in relation to the dollar value of raw materials that flows through Dell's plants each year.

   Second, pages 22-23 mention that Dell plans to reduce product costs in four areas: manufacturing costs, warranty costs, design costs, and overhead costs. The company says that its "general practice is to aggressively pass on declines in costs to its customers in order to add customer value while increasing global market share." In other words, rather than holding price constant when costs decline, thereby increasing the gross margin percentage, the company lowers prices. Using terminology that will be defined in Chapter 12, Dell grows profits by increasing turnover while holding margin reasonably constant.

Research and Application 2-28 (continued)

6. The inventory balance on January 28, 2005 is $459 million. As discussed on Page 2 of the 10-K, the balance is low because of Dell's build-to-order (lean) manufacturing process that enables the company to "turn over inventory every four days on average, and reduce inventory levels." When units are built to order rather than built to stock, it not only reduces finished goods inventory, it reduces work-in-process inventory because large batches of partially completed goods do not accumulate in front of workstations or in temporary storage areas. It also reduces raw materials inventory because suppliers provide just-in-time delivery of the quantities needed to satisfy customer orders.

   As stated on page 2, this offers Dell a competitive advantage because it allows the company to "rapidly introduce the latest relevant technology more quickly than companies with slow-moving, indirect distribution channels, and to rapidly pass on component cost savings directly to customers."

   The negative cash conversion cycle is a good sign for Dell. Although this term is not defined in the chapter, students can ascertain from page 27 of the 10-K that it is computed as follows: days sales outstanding + days of supply in inventory – days in accounts payable. As stated on pages 26-27, the negative cash conversion cycle means that Dell is "collecting amounts due from customers before paying vendors, thus allowing the company to generate annual cash flows from operating activities that typically exceed net income."

7. As shown on page 23, Dell's two main categories of operating expenses are selling, general, and administrative ($4,298 million) and research, development, and engineering ($463 million). Page 42 explains that Dell's selling, general, and administrative expenses "include items such as sales commissions, marketing and advertising costs, and contractor services." It also mentions that advertising costs totaled $576 million in fiscal 2005. General and administrative costs include "Finance, Legal, Human Resources and information technology support." Dell's website development costs are included in Research, Development, and Engineering costs along with payroll, infrastructure, and administrative costs related directly to research and development.

Research and Application 2-28 (continued)

For financial reporting purposes, costs are classified as either product costs or period costs. Product costs include those costs involved with making or acquiring the product. Period costs include all costs that are not product costs. The expenses mentioned in the paragraph above are not involved with making the product so they are expensed as incurred. When the focus changes from external reporting to internal decision making, the need to comply with GAAP disappears. So for example, on page 42 it says "Research, development, and engineering costs are expensed as incurred, in accordance with SFAS No. 2, *Accounting for Research and Development Costs*." However, for internal reporting purposes it may be entirely appropriate to assign some research and development costs to particular products.

8. Here are four examples of cost objects for Dell including one direct and one indirect cost for each cost object.
   - A product line, such as a particular type of server. A direct cost would be the cost of raw material component parts and an indirect cost would be factory utility costs.
   - A particular product family, such as enterprise systems, which according to page 2 includes servers, storage, workstations, and networking products. A direct cost would be the component parts used to make these products and an indirect cost would be factory insurance costs that are assigned to these products.
   - A particular geographic region, such as Asia Pacific-Japan, which is mentioned on page 55. A direct cost would be the salary of William Amelio, Senior Vice-President, Asia Pacific-Japan (see page 11) and an indirect cost would be the salary of Martin J. Garvin, Senior Vice President, Worldwide Procurement and Global Customer Experience (see page 11), given that he oversees worldwide procurement operations.
   - A particular customer segment, such as the government segment as mentioned on page 4. A direct cost would be a sales representative who is dedicated to serving the government segment and an indirect cost would be research and development costs that are expended on products purchased by more than one customer segment.