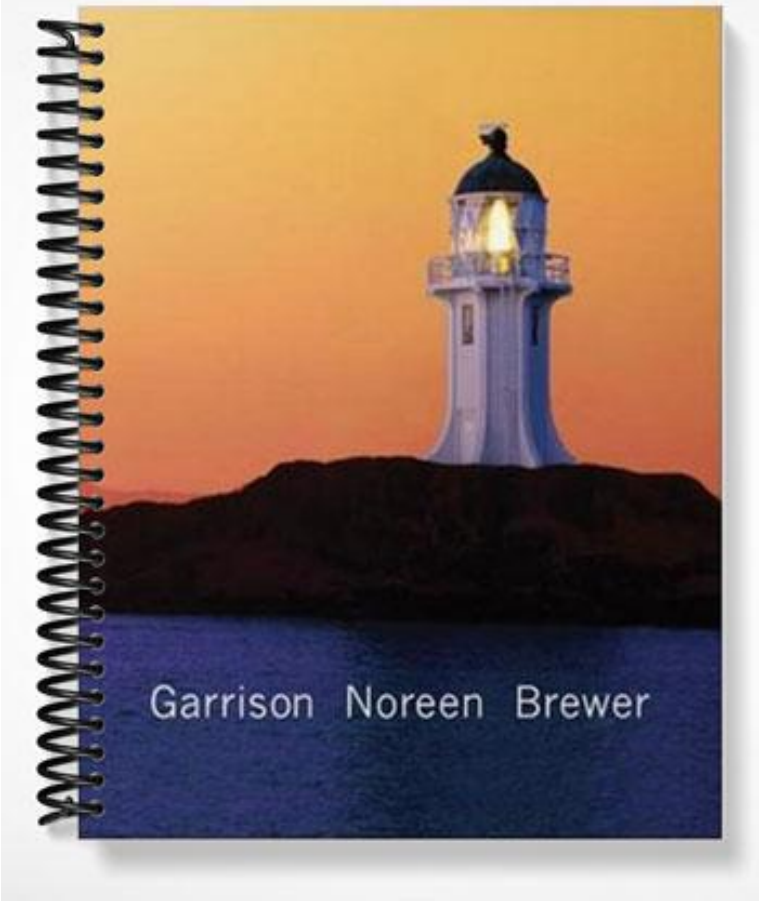
SOLUTIONS MANUAL



Chapter 2
Cost Terms, Concepts, and Classifications

Solutions to Questions

2-1 The three major elements of product costs in a manufacturing company are direct materials, direct labor, and manufacturing overhead.

2-2

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

d. Indirect labor includes 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.

2-3 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.

2-4 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. Since 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.

2-5 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.

2-6 A manufacturing company has three inventory accounts: Raw Materials, Work in Process, and Finished Goods. A merchandising company generally identifies its inventory account simply as Merchandise Inventory.

2-7 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 Pro-

cess 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.

2-8 Yes, costs such as salaries and depreciation can end up as part of assets on the balance sheet if these 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 a period.

2-9 Cost behavior refers to how a cost reacts to changes in the level of activity.

2-10 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 product. A fixed cost is fixed in total, but the average cost per unit changes with the level of activity.

2-11 When fixed costs are involved, the average cost of a unit of product will depend on the number of units being manufactured. As production increases, the average cost per unit will fall as the fixed cost is spread over more units. Conversely, as production declines, the average cost per unit will rise as the fixed cost is spread over fewer units.

2-12 Manufacturing overhead is an indirect cost since these costs cannot be easily and conveniently traced to particular units of products.

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 in the fixed costs of purchasing the two machines would be a differential cost.

2-15

Direct labor cost	
(34 hours × $15 per hour).....	$510
Manufacturing overhead cost	
(6 hours × $15 per hour)	90
Total wages earned	$600

2-16

Direct labor cost	
(45 hours × $14 per hour).....	$630
Manufacturing overhead cost	
(5 hours × $7 per hour)	35
Total wages earned	$665

2-17 Costs associated with the quality of conformance can be broken down into prevention costs, appraisal costs, internal failure costs, and external failure costs. Prevention costs are incurred in an effort to keep defects from occurring. Appraisal costs are incurred to detect defects before they can create further problems. Internal and external failure costs are incurred as a result of producing defective units.

2-18 Total quality costs are usually minimized by *increasing* prevention and appraisal costs in order to reduce internal and external failure costs. Total quality costs usually decrease as prevention and appraisal costs increase.

2-19 Shifting the focus to prevention and away from appraisal is usually the most effective way to reduce total quality costs. It is usually more effective to prevent defects than to attempt to fix them after they have occurred.

2-20 First, a quality cost report helps managers see the financial consequences of defects. Second, the report may help managers identify the most important areas for improvement. Third, the report helps managers see whether quality costs are appropriately distributed among prevention, appraisal, internal failure, and external failure costs.

2-21 Most accounting systems do not track and accumulate the costs of quality. It is particularly difficult to get a feel for the magnitude of quality costs since they are incurred in many departments throughout the organization.

Exercise 2-1 (15 minutes)

1. The wages of employees who build the sailboats: direct labor cost.

2. The cost of advertising in the local newspapers: marketing and selling cost.

3. The cost of an aluminum mast installed in a sailboat: direct materials cost.

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

5. Rent on the boathouse: a combination of manufacturing overhead, administrative, and marketing and selling cost. The rent would most likely be prorated on the basis of the amount of space occupied by manufacturing, administrative, and marketing operations.

6. The wages of the company's bookkeeper: administrative cost.

7. Sales commissions paid to the company's salespeople: marketing and selling cost.

8. Depreciation on power tools: manufacturing overhead cost.

Exercise 2-2 (15 minutes)

	Product (Inventoriable) Cost	*Period Cost*
1. The cost of the memory chips used in a radar set	X	
2. Factory heating costs	X	
3. Factory equipment maintenance costs	X	
4. Training costs for new administrative employees		X
5. The cost of the solder that is used in assembling the radar sets	X	
6. The travel costs of the company's salespersons		X
7. Wages and salaries of factory security personnel	X	
8. The cost of air-conditioning executive offices		X
9. Wages and salaries in the department that handles billing customers		X
10. Depreciation on the equipment in the fitness room used by factory workers	X	
11. Telephone expenses incurred by factory management	X	
12. The costs of shipping completed radar sets to customers		X
13. The wages of the workers who assemble the radar sets	X	
14. The president's salary		X
15. Health insurance premiums for factory personnel	X	

Exercise 2-3 (15 minutes)

Mountain High
Income Statement

Sales		$3,200,000
Cost of goods sold:		
Beginning merchandise inventory	$ 140,000	
Add: Purchases	2,550,000	
Goods available for sale	2,690,000	
Deduct: Ending merchandise inventory	180,000	2,510,000
Gross margin		690,000
Selling and administrative expenses:		
Selling expense	110,000	
Administrative expense	470,000	580,000
Net operating income		$ 110,000

Exercise 2-4 (15 minutes)

Mannerman Fabrication
Schedule of Cost of Goods Manufactured

Direct materials:		
Beginning raw materials inventory.....	$ 55,000	
Add: Purchases of raw materials	440,000	
Raw materials available for use.....	495,000	
Deduct: Ending raw materials inventory .	65,000	
Raw materials used in production.....		$ 430,000
Direct labor		215,000
Manufacturing overhead.....		380,000
Total manufacturing costs		1,025,000
Add: Beginning work in process inventory		190,000
		1,215,000
Deduct: Ending work in process inventory		220,000
Cost of goods manufactured.....		$ 995,000

Exercise 2-5 (15 minutes)

Cost (Measure of Activity)	*Cost Behavior*	
	Variable	*Fixed*
1. The cost of small glass plates used for lab tests in a hospital (Number of lab tests performed)	X	
2. A boutique jewelry store's cost of leasing retail space in a mall (Dollar sales)		X
3. Top management salaries at FedEx (Total sales)....		X
4. Electrical costs of running production equipment at a Toyota factory (Number of vehicles produced)	X	
5. The cost of insuring a dentist's office against fire (Patient-visits)		X
6. The cost of commissions paid to salespersons at a Honda dealer (Total sales).....	X	
7. The cost of heating the intensive care unit at Swedish Hospital (Patient-days).....		X
8. The cost of batteries installed in trucks produced at a GM factory (Number of trucks produced).....	X	
9. The salary of a university professor (Number of students taught by the professor).....		X
10. The costs of cleaning supplies used at a fast-food restaurant to clean the kitchen and dining areas at the end of the day (Number of customers served)	*	X

*May include a small variable element.

Exercise 2-6 (15 minutes)

	Cost	*Cost Object*	*Direct Cost*	*Indirect Cost*
1.	The salary of the head chef	The hotel's restaurant	X	
2.	The salary of the head chef	A particular restaurant customer		X
3.	Room cleaning supplies	A particular hotel guest		X
4.	Flowers for the reception desk	A particular hotel guest		X
5.	The wages of the doorman	A particular hotel guest		X
6.	Room cleaning supplies	The housecleaning department	X	
7.	Fire insurance on the hotel building	The hotel's gym		X
8.	Towels used in the gym	The hotel's gym	X	

Note: The room cleaning supplies would most likely be considered an indirect cost of a particular hotel guest because it would not be practical to keep track of exactly how much of each cleaning supply was used in the guest's room.

Exercise 2-7 (15 minutes)

Item	*Differential Cost*	*Opportunity Cost*	*Sunk Cost*
1. Cost of the new flat-panel displays	X		
2. Cost of the old computer terminals			X
3. Rent on the space occupied by the registration desk			
4. Wages of registration desk personnel			
5. Benefits from a new freezer		X	
6. Costs of maintaining the old computer terminals	X		
7. Cost of removing the old computer terminals	X		
8. Cost of existing registration desk wiring			X

Note: The costs of the rent on the space occupied by the registration desk and the wages of registration desk personnel are neither differential costs, 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.

Exercise 2-8 (15 minutes)

1. No. It appears that the overtime spent completing the job was simply a matter of how the job happened to be scheduled. Under these circumstances, an overtime premium probably should not be charged to a customer whose job happens to fall at the tail end of the day's schedule.

2.

Direct labor cost: 9 hours × $20 per hour.....	$180
General overhead cost: 1 hour × $10 per hour ..	10
Total labor cost.....	$190

3. A charge for an overtime premium might be justified if the customer requested that the work be done on a "rush" basis.

Exercise 2-9 (15 minutes)

1.

	Prevention Costs	*Appraisal Costs*	*Internal Failure Costs*	*External Failure Costs*
a. Repairs of goods still under warranty				X
b. Customer returns due to defects				X
c. Statistical process control	X			
d. Disposal of spoiled goods			X	
e. Maintaining testing equipment		X		
f. Inspecting finished goods		X		
g. Downtime caused by quality problems			X	
h. Debugging errors in software			X	
i. Recalls of defective products				X
j. Training quality engineers	X			
k. Re-entering data due to typing errors			X	
l. Inspecting materials received from suppliers.....		X		
m. Audits of the quality system	X			
n. Supervision of testing personnel.....		X		
o. Rework labor			X	

2. Prevention costs and appraisal costs are incurred to keep poor quality of conformance from occurring. Internal and external failure costs are incurred because poor quality of conformance has occurred.

Exercise 2-10 (30 minutes)

1. a. Emblems purchased	35,000
Emblems drawn from inventory	31,000
Emblems remaining in inventory	4,000
Cost per emblem	× $2
Cost in Raw Materials Inventory at May 31	$ 8,000
b. Emblems used in production (31,000 – 1,000)	30,000
Units completed and transferred to Finished Goods (90% × 30,000)	27,000
Units still in Work in Process at May 31	3,000
Cost per emblem	× $2
Cost in Work in Process Inventory at May 31	$ 6,000
c. Units completed and transferred to Finished Goods (above)	27,000
Units sold during the month (75% × 27,000)	20,250
Units still in Finished Goods at May 31	6,750
Cost per emblem	× $2
Cost in Finished Goods Inventory at May 31	$13,500
d. Units sold during the month (above)	20,250
Cost per emblem	× $2
Cost in Cost of Goods Sold at May 31	$40,500
e. Emblems used in advertising	1,000
Cost per emblem	× $2
Cost in Advertising Expense at May 31	$ 2,000

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

Exercise 2-11 (30 minutes)

1.

Eccles Company
Schedule of Cost of Goods Manufactured

Direct materials:		
Raw materials inventory, beginning	$ 8,000	
Add: Purchases of raw materials	132,000	
Raw materials available for use	140,000	
Deduct: Raw materials inventory, ending	10,000	
Raw materials used in production		$130,000
Direct labor		90,000
Manufacturing overhead:		
Rent, factory building	80,000	
Indirect labor	56,300	
Utilities, factory	9,000	
Maintenance, factory equipment	24,000	
Supplies, factory	700	
Depreciation, factory equipment	40,000	
Total manufacturing overhead costs		210,000
Total manufacturing costs		430,000
Add: Work in process, beginning		5,000
		435,000
Deduct: Work in process, ending		20,000
Cost of goods manufactured		$415,000

2. The cost of goods sold section would be:

Finished goods inventory, beginning	$ 70,000
Add: Cost of goods manufactured	415,000
Goods available for sale	485,000
Deduct: Finished goods inventory, ending	25,000
Cost of goods sold	$460,000

Exercise 2-12 (15 minutes)

	Cost Behavior		*Selling and Administrative*	*Product*
Cost Item	*Variable*	*Fixed*	*Cost*	*Cost*
1. The costs of turn signal switches used at a General Motors plant.....	X			X
2. Interest expense on CBS's long-term debt		X	X	
3. Salesperson's commissions at Avon Products	X		X	
4. Insurance on one of Cincinnati Milacron's factory buildings		X		X
5. The costs of shipping brass fittings to customers in California	X		X	
6. Depreciation on the bookshelves at Reston Bookstore.....		X	X	
7. The costs of X-ray film at the Mayo Clinic's radiology lab....	X			X
8. The cost of leasing an 800 telephone number at L.L. Bean.....		X	X	
9. The depreciation on the playground equipment at a McDonald's outlet		X	X	
10. The cost of the mozzarella cheese used at a Pizza Hut outlet.....	X			X

Exercise 2-13 (15 minutes)

1. Direct labor cost: 34 hours × $12 per hour $408
   Manufacturing overhead cost: 6 hours × $12 per hour 72
   Total cost $480

2. Direct labor cost: 50 hours × $12 per hour $600
   Manufacturing overhead cost: 10 hours × $6 per hour 60
   Total cost $660

3. The company could treat the cost of fringe benefits relating to direct labor workers as part of manufacturing overhead. This approach spreads the cost of such fringe benefits over all units of output. Alternatively, the company could treat the cost of fringe benefits relating to direct labor workers as additional direct labor cost. This latter approach charges the costs of fringe benefits to specific jobs rather than to all units of output.

Problem 2-14 (30 minutes)

Note to the Instructor: Some of the answers below are debatable.

Cost Item	*Variable or Fixed*	*Selling Cost*	*Administrative Cost*	*Manufacturing (Product) Cost*	
				Direct	*Indirect*
1. Depreciation, executive jet	F		X		
2. Costs of shipping finished goods to customers	V	X			
3. Wood used in manufacturing furniture	V			X	
4. Sales manager's salary	F	X			
5. Electricity used in manufacturing furniture	V				X
6. Secretary to the company president	F		X		
7. Aerosol attachment placed on a spray can produced by the company	V			X	
8. Billing costs	V	X*			
9. Packing supplies for shipping products overseas	V	X			
10. Sand used in manufacturing concrete	V			X	
11. Supervisor's salary, factory	F				X
12. Executive life insurance	F		X		
13. Sales commissions	V	X			
14. Fringe benefits, assembly line workers	V			X**	
15. Advertising costs	F	X			
16. Property taxes on finished goods warehouses	F	X			
17. Lubricants for production equipment	V				X

*Could be an administrative cost.

**Could be an indirect cost.

Problem 2-15 (30 minutes)

1. Total wages for the week:

Regular time: 40 hours × $24 per hour		$ 960
Overtime: 5 hours × $36 per hour		180
Total wages		$1,140
Allocation of total wages:		
Direct labor: 45 hours × $24 per hour		$1,080
Manufacturing overhead: 5 hours × $12 per hour		60
Total wages		$1,140

2. Total wages for the week:

Regular time: 40 hours × $24 per hour		$ 960
Overtime: 10 hours × $36 per hour		360
Total wages		$1,320
Allocation of total wages:		
Direct labor: 46 hours × $24 per hour		$1,104
Manufacturing overhead:		
Idle time: 4 hours × $24 per hour	$ 96	
Overtime premium: 10 hours × $12 per hour	120	216
Total wages		$1,320

3. Total wages and fringe benefits for the week:

Regular time: 40 hours × $24 per hour		$ 960
Overtime: 8 hours × $36 per hour		288
Fringe benefits: 48 hours × $8 per hour		384
Total wages and fringe benefits		$1,632
Allocation of wages and fringe benefits:		
Direct labor: 45 hours × $24 per hour		$1,080
Manufacturing overhead:		
Idle time: 3 hours × $24 per hour	$ 72	
Overtime premium: 8 hours × $12 per hour	96	
Fringe benefits: 48 hours × $8 per hour	384	552
Total wages and fringe benefits		$1,632

Problem 2-15 (continued)

4. Allocation of wages and fringe benefits:

Direct labor:		
Wage cost: 45 hours × $24 per hour	$1,080	
Fringe benefits: 45 hours × $8 per hour	360	$1,440
Manufacturing overhead:		
Idle time: 3 hours × $24 per hour	72	
Overtime premium: 8 hours × $12 per hour	96	
Fringe benefits: 3 hours × $8 per hour	24	192
Total wages and fringe benefits		$1,632

Problem 2-16 (30 minutes)

Name of the Cost	*Variable Cost*	*Fixed Cost*	*Product Cost*			*Period (Selling and Admin.) Cost*	*Opportunity Cost*	*Sunk Cost*
			Direct Materials	*Direct Labor*	*Mfg. Overhead*			
Rental revenue forgone, $40,000 per year							X	
Direct materials cost, $40 per unit .	X		X					
Supervisor's salary, $2,500 per month		X			X			
Direct labor cost, $18 per unit	X			X				
Rental cost of warehouse, $1,000 per month		X				X		
Rental cost of equipment, $3,000 per month		X			X			
Depreciation of the building, $10,000 per year		X			X			X
Advertising cost, $50,000 per year		X				X		
Shipping cost, $10 per unit.....	X					X		
Electrical costs, $2 per unit.....	X				X			
Return earned on investments, $6,000 per year							X	

Problem 2-17 (20 minutes)

	Cost Behavior		*To Units of Product*	
Cost Item	*Variable*	*Fixed*	*Direct*	*Indirect*
1. Plastic washers used to assemble autos*...	X			X
2. Production superintendent's salary.....		X		X
3. Wages of workers who assemble a product.....	X		X	
4. Electricity to run production equipment.....	X			X
5. Janitorial salaries		X		X
6. Clay used to make bricks.....	X		X	
7. Rent on a factory building		X		X
8. Wood used to make skis.....	X		X	
9. Screws used to make furniture*.....	X			X
10. A supervisor's salary.....		X		X
11. Cloth used to make shirts.....	X		X	
12. Depreciation of cafeteria equipment.....		X		X
13. Glue used to make textbooks*.....	X			X
14. Lubricants for production equipment.....	X			X
15. Paper used to make textbooks.....	X		X	

*These materials would usually be considered indirect materials because their costs are relatively insignificant. It would not be worth the effort to trace their costs to individual units of product and therefore they would usually be classified as indirect materials.

Problem 2-18 (60 minutes)

1.

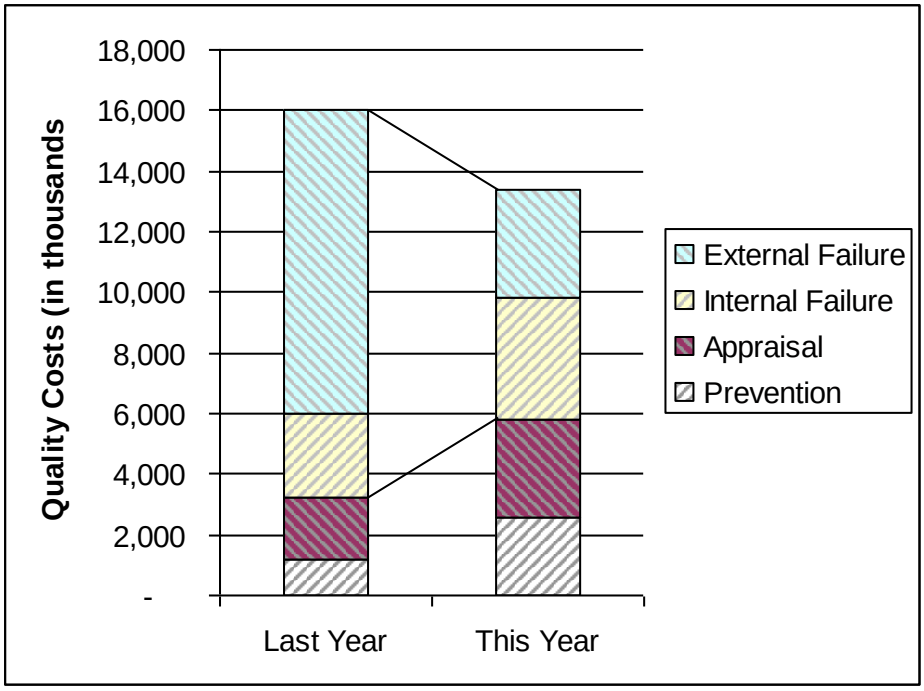
Yedder Enterprises
Quality Cost Report (in thousands of dollars)

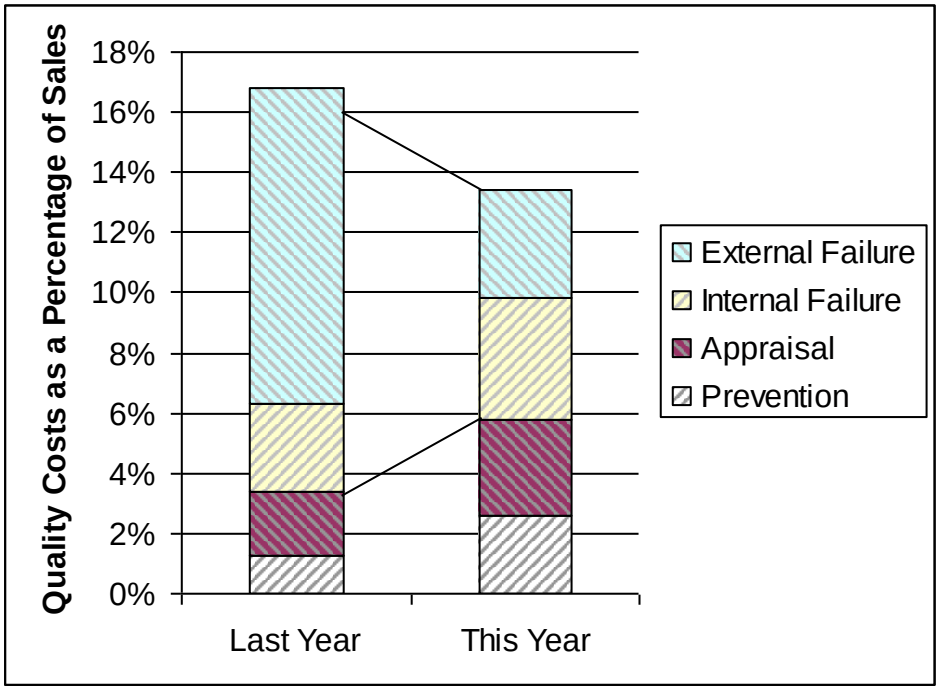
	Last Year		*This Year*	
	Amount	*Percent*	*Amount*	*Percent*
Prevention costs:				
Systems development	$ 120	0.13 %	$ 680	0.68 %
Statistical process control	—	0.00 %	270	0.27 %
Quality engineering	1,080	1.14 %	1,650	1.65 %
Total prevention cost	1,200	1.27 %	2,600	2.60 %
Appraisal costs:				
Inspection	1,700	1.79 %	2,770	2.77 %
Supplies used in testing	30	0.03 %	40	0.04 %
Cost of testing equipment	270	0.28 %	390	0.39 %
Total appraisal cost	2,000	2.10 %	3,200	3.20 %
Internal failure costs:				
Net cost of scrap	800	0.84 %	1,300	1.30 %
Rework labor	1,400	1.47 %	1,600	1.60 %
Downtime due to quality problems	600	0.63 %	1,100	1.10 %
Total internal failure cost	2,800	2.94 %	4,000	4.00 %
External failure costs:				
Product recalls	3,500	3.68 %	600	0.60 %
Warranty repairs	3,300	3.47 %	2,800	2.80 %
Customer returns of defective goods	3,200	3.37 %	200	0.20 %
Total external failure cost	10,000	10.52 %	3,600	3.60 %
Total quality cost	$16,000	16.84 %	$13,400	13.40 %

* As a percentage of total sales in each year.
Note: Figures in the percent columns are subject to rounding error.

2. See the graph on the following page.

Problem 2-18 (continued)





Problem 2-18 (continued)

3. During the past year the company has more than doubled its spending on prevention and it has increased its spending on appraisal activities by 60%. This increased emphasis on prevention and appraisal has resulted in a decline of total quality costs from 16.84% of sales last year to 13.4% of sales this year. While the situation has improved, internal and external failure costs still constitute the majority of the quality costs—and this does not include the lost sales due to customer perceptions of poor quality. However, if the company continues to emphasize prevention and appraisal, the internal and external failure costs should further decline until they are no longer dominant.

   Probably due to the increased emphasis on appraisal activities, internal failure costs have actually increased. This is because the increased appraisal activities catch more defects before they are shipped to customers. Thus, the company is incurring more costs for scrap and rework, but it is saving large amounts on external failure costs as a consequence of not releasing defective goods to customers. As better quality is built into products and better defect prevention systems are developed, defects should decrease and appraisal and internal failure costs should also fall.

Problem 2-19 (60 minutes)

1.

Medco, Inc.
Schedule of Cost of Goods Manufactured

Direct materials:		
Raw materials inventory, beginning	$ 10,000	
Add: Purchases of raw materials	90,000	
Raw materials available for use	100,000	
Deduct: Raw materials inventory, ending	17,000	
Raw materials used in production		$ 83,000
Direct labor		60,000
Manufacturing overhead:		
Depreciation, factory	42,000	
Insurance, factory	5,000	
Maintenance, factory	30,000	
Utilities, factory	27,000	
Supplies, factory	1,000	
Indirect labor	65,000	
Total overhead costs		170,000
Total manufacturing costs		313,000
Add: Work in process inventory, beginning		7,000
		320,000
Deduct: Work in process inventory, ending		30,000
Cost of goods manufactured		$290,000

Problem 2-19 (continued)

2.

Medco, Inc.
Income Statement

Sales		$450,000
Cost of goods sold:		
Finished goods inventory, beginning	$ 10,000	
Add: Cost of goods manufactured	290,000	
Goods available for sale	300,000	
Deduct: Finished goods inventory, ending	40,000	260,000
Gross margin		190,000
Selling and administrative expenses:		
Selling expenses	80,000	
Administrative expenses	70,000	150,000
Net operating income		$ 40,000

3. Direct materials: $83,000 ÷ 10,000 units = $8.30 per unit.
   Depreciation: $42,000 ÷ 10,000 units = $4.20 per unit.

4. Direct materials:
   Unit cost: $8.30 (unchanged)
   Total cost: 15,000 units × $8.30 per unit = $124,500.
   Depreciation:
   Unit cost: $42,000 ÷ 15,000 units = $2.80 per unit.
   Total cost: $42,000 (unchanged)

5. Unit cost for depreciation dropped from $4.20 to $2.80, 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.

Problem 2-20 (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 the product, but rather deal with order-taking and shipping finished goods to customers. As stated in the text, selling costs include all costs necessary to secure customer orders and get the finished product into the hands of customers.

2. No, the president is not correct; how the salary cost is classified can affect the reported net operating income for the year. 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 that 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 2-21 (30 minutes)

1.

Name of the Cost	*Variable Cost*	*Fixed Cost*	*Product Cost*			*Period (Selling and Admin.) Cost*	*Opportunity Cost*	*Sunk Cost*
			Direct Materials	*Direct Labor*	*Mfg. Overhead*			
Frieda's present salary of $4,000 per month							X	
Rent on the garage, $150 per month		X			X			
Rent of production equipment, $500 per month		X			X			
Materials for producing flyswatters, at $0.30 each	X		X					
Labor cost of producing flyswatters, at $0.50 each	X			X				
Rent of room for a sales office, $75 per month		X				X		
Answering device attachment, $20 per month		X				X		
Interest lost on savings account, $1,000 per year							X	
Advertising cost, $400 per month		X				X		
Sales commission, at $0.10 per flyswatter	X					X		
Legal and filing fees, $600								X

Problem 2-21 (continued)

2. The $600 legal and filing fees are not a differential cost. These legal and filing fees have already been paid and are a sunk cost. Thus, the cost will not differ depending on whether Frieda decides to produce flyswatters or to stay with the consulting firm. All other costs listed above are differential costs since they will be incurred only if Frieda leaves the consulting firm and produces the flyswatters.

Problem 2-22 (45 minutes)

1. A percentage analysis of the company's quality cost report is presented below:

	Year 1			*Year 2*		
	Amount	*Percentage**		*Amount*	*Percentage**	
Prevention costs:						
Machine maintenance	$ 215	5.2 %	22.3 %	$ 160	3.5 %	27.1 %
Training suppliers	5	0.1	0.5	15	0.3	2.5
Design reviews	20	0.5	2.1	95	2.1	16.1
Total prevention cost.....	240	5.8	24.9	270	6.0	45.7
Appraisal costs:						
Incoming inspection.....	45	1.1	4.7	22	0.5	3.7
Final testing.....	160	3.9	16.6	94	2.1	15.9
Total appraisal cost	205	5.0	21.3	116	2.6	19.6
Internal failure costs:						
Rework	120	2.9	12.4	62	1.4	10.5
Scrap	68	1.7	7.1	40	0.9	6.8
Total internal failure cost	188	4.6	19.5	102	2.3	17.3
External failure costs:						
Warranty repairs.....	69	1.7	7.2	23	0.5	3.9
Customer returns.....	262	6.4	27.2	80	1.8	13.5
Total external failure cost	331	8.0	34.3	103	2.3	17.4
Total quality cost.....	$ 964	23.4 %	100.0 %	$ 591	13.1 %	100.0 %
Total production cost.....	$4,120			$4,510		

*Percentage figures are subject to rounding error.

Problem 2-22 (continued)

From the above analysis it would appear that Bergen, Inc.'s program has been successful, because:

- total quality costs as a percentage of total production have declined from 23.4% to 13.1%.
- external failure costs, those costs signaling customer dissatisfaction, have declined from 8% of total production to 2.3%. These declines in warranty repairs and customer returns should translate into increased sales in the future.
- internal failure costs have been reduced from 4.6% to 2.3% of production costs, which represents a 50% drop.
- appraisal costs have decreased from 5.0% to 2.6% of total production—a drop of 48%. Higher quality is reducing the demand for final testing.
- quality costs have shifted to the area of prevention where problems are solved before the customer becomes involved. Maintenance, training, and design reviews have increased from 5.8% of total production cost to 6% and from 24.9% of total quality costs to 45.7%. The $30,000 increase is more than offset by decreases in other quality costs.

2. Tony Reese's current reaction to the quality improvement program is more favorable as he is seeing the benefits of having the quality problems investigated and solved before they reach the production floor. Because of improved designs, quality training, and additional preproduction inspections, scrap and rework costs have declined. Consequently, fewer resources are now required for customer service. Throughput has increased and throughput time has decreased; work is now moving much faster through the department.

3. To measure the opportunity cost of not implementing the quality program, Bergen Inc. could assume that:
   - sales and market share would continue to decline and then calculate the revenue and income lost.
   - the company would have to compete on price rather than quality and calculate the impact of having to lower product prices.

Problem 2-23 (45 minutes)

1.

Cost Item	*Cost Behavior*		*Selling or Administrative*	*Product Cost*	
	Variable	*Fixed*	*Cost*	*Direct*	*Indirect*
Direct materials used (wood, glass)	$430,000			$430,000	
General office salaries		$110,000	$110,000		
Factory supervision		70,000			$ 70,000
Sales commissions	60,000		60,000		
Depreciation, factory building		105,000			105,000
Depreciation, office equipment		2,000	2,000		
Indirect materials, factory	18,000				18,000
Factory labor (cutting and assembly)	90,000			90,000	
Advertising		100,000	100,000		
Insurance, factory		6,000			6,000
General office supplies	4,000		4,000		
Property taxes, factory		20,000			20,000
Utilities, factory	45,000				45,000
Total costs	$647,000	$413,000	$276,000	$520,000	$264,000

Problem 2-23 (continued)

2. Only the product costs will be included in the cost of a bookcase. The cost per bookcase will be:

Direct product costs.....	$520,000
Indirect product costs.....	264,000
Total product costs.....	$784,000

$784,000 ÷ 4,000 bookcases = $196 per bookcase

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

4. a. Yes, there probably would be a disagreement. The president is likely to want a price of at least $196, which is the average cost per unit to manufacture 4,000 bookcases. He may expect an even higher price than this to cover a portion of the administrative costs as well. The neighbor will probably be thinking of cost as including only materials used, or perhaps materials and direct labor.

   b. The term is opportunity cost. Since the company is operating at full capacity, the president must give up the full, regular price of a set to sell a bookcase to the neighbor. Therefore, the president's cost is really the full, regular price of a set.

Problem 2-24 (15 minutes)

		Direct or Indirect Cost of the Immunization Center		*Direct or Indirect Cost of Particular Patients*		*Variable or Fixed with Respect to the Number of Immunizations Administered*	
Item	*Description*	*Direct*	*Indirect*	*Direct*	*Indirect*	*Variable*	*Fixed*
a.	The salary of the head nurse in the Immunization Center	X			X		X
b.	Costs of incidental supplies consumed in the Immunization Center such as paper towels	X			X	X	
c.	The cost of lighting and heating the Immunization Center	X			X		X
d.	The cost of disposable syringes used in the Immunization Center	X		X		X	
e.	The salary of the Central Area Well-Baby Clinic's Information Systems manager		X		X		X
f.	The costs of mailing letters soliciting donations to the Central Area Well-Baby Clinic		X		X		X
g.	The wages of nurses who work in the Immunization Center*	X			X		X
h.	The cost of medical malpractice insurance for the Central Area Well-Baby Clinic		X		X		X
i.	Depreciation on the fixtures and equipment in the Immunization Center	X			X		X

* The wages of the nurses could be variable and a direct cost of serving particular patients.

Problem 2-25 (60 minutes)

1.

Skyler Company
Schedule of Cost of Goods Manufactured
For the Month Ended June 30

Direct materials:		
Raw materials inventory, June 1	$ 17,000	
Add: Purchases of raw materials	190,000	
Raw materials available for use	207,000	
Deduct: Raw materials inventory, June 30	42,000	
Raw materials used in production		$165,000
Direct labor		90,000
Manufacturing overhead:		
Rent on facilities (80% × $40,000)	32,000	
Insurance (75% × $8,000)	6,000	
Utilities (90% × $50,000)	45,000	
Indirect labor	108,000	
Maintenance, factory	7,000	
Depreciation, factory equipment	12,000	
Total overhead costs		210,000
Total manufacturing costs		465,000
Add: Work in process inventory, June 1		70,000
		535,000
Deduct: Work in process inventory, June 30		85,000
Cost of goods manufactured		$450,000

Problem 2-25 (continued)

2.

Skyler Company
Income Statement
For the Month Ended June 30

Sales		$600,000
Cost of goods sold:		
Finished goods inventory, June 1	$ 20,000	
Add: Cost of goods manufactured	450,000	
Goods available for sale	470,000	
Deduct: Finished goods inventory, June 30	60,000	410,000
Gross margin		190,000
Selling and administrative expenses:		
Selling and administrative salaries	35,000	
Rent on facilities (20% × $40,000)	8,000	
Depreciation, sales equipment	10,000	
Insurance (25% × $8,000)	2,000	
Utilities (10% × $50,000)	5,000	
Advertising	80,000	140,000
Net operating income		$ 50,000

3. In preparing the income statement shown in the text, the accountant failed to distinguish between product costs and period costs, and also failed to recognize the change 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 2-26 (30 minutes)

1. Mr. Richart's first action was to direct that discretionary expenditures be delayed until the first of the new year. Providing that these "discretionary expenditures" can be delayed without hampering operations, this is a good business decision. By delaying expenditures, the company can keep its cash a bit longer and thereby earn a bit more interest. There is nothing unethical about such an action. The second action was to ask that the order for the parts be cancelled. Since the clerk's order was a mistake, there is nothing unethical about this action either.

   The third action was to ask the accounting department to delay recognition of the delivery until the bill is paid in January. This action is dubious. Asking the accounting department to ignore transactions strikes at the heart of the integrity of the accounting system. If the accounting system cannot be trusted, it is very difficult to run a business or obtain funds from outsiders. However, in Mr. Richart's defense, the purchase of the raw materials really shouldn't be recorded as an expense. He has been placed in an extremely awkward position because the company's accounting policy is flawed.

2. The company's accounting policy with respect to raw materials is incorrect. Raw materials should be recorded as an asset when delivered rather than as an expense. If the correct accounting policy were followed, there would be no reason for Mr. Richart to ask the accounting department to delay recognition of the delivery of the raw materials. This flawed accounting policy creates incentives for managers to delay deliveries of raw materials until after the end of the fiscal year. This could lead to raw materials shortages and poor relations with suppliers who would like to record *their* sales before the end of the year.

   The company's "manage-by-the-numbers" approach does not foster ethical behavior—particularly when managers are told to "do anything so long as you hit the target profits for the year." Such "no excuses" pressure from the top too often leads to unethical behavior when managers have difficulty meeting target profits.

Problem 2-27 (60 minutes)

1.

Valenko Company
Schedule of Cost of Goods Manufactured

Direct materials:			
Raw materials inventory, beginning	$ 50,000		
Add: Purchases of raw materials	260,000		
Raw materials available for use	310,000		
Deduct: Raw materials inventory, ending	40,000		
Raw materials used in production		$270,000	
Direct labor		65,000	*
Manufacturing overhead:			
Insurance, factory	8,000		
Rent, factory building	90,000		
Utilities, factory	52,000		
Cleaning supplies, factory	6,000		
Depreciation, factory equipment	110,000		
Maintenance, factory	74,000		
Total overhead costs		340,000	
Total manufacturing costs		675,000	(given)
Add: Work in process inventory, beginning		48,000	*
		723,000	
Deduct: Work in process inventory, ending		33,000	
Cost of goods manufactured		$690,000	

Problem 2-27 (continued)

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

Finished goods inventory, beginning	$ 30,000	
Add: Cost of goods manufactured	690,000	*
Goods available for sale	720,000	(given)
Deduct: Finished goods inventory, ending	85,000	*
Cost of goods sold	$635,000	(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 work toward the unknown figures.

2. Direct materials: $270,000 ÷ 30,000 units = $9.00 per unit.
   Rent, factory building: $90,000 ÷ 30,000 units = $3.00 per unit.

3. Direct materials:
   Per unit: $9.00 (unchanged)
   Total: 50,000 units × $9.00 per unit = $450,000.

   Rent, factory building:
   Per unit: $90,000 ÷ 50,000 units = $1.80 per unit.
   Total: $90,000 (unchanged).

4. The average cost per unit for rent dropped from $3.00 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, the *average* unit cost will decrease as the activity level rises.

Problem 2-28 (60 minutes)

	Case 1		*Case 2*		*Case 3*		*Case 4*	
Direct materials	$ 7,000		$ 9,000		$ 6,000		$ 8,000	
Direct labor	2,000		4,000		5,000	*	3,000	
Manufacturing overhead	10,000		12,000	*	7,000		21,000	
Total manufacturing costs	19,000	*	25,000		18,000		32,000	*
Beginning work in process inventory	3,000	*	1,000		2,000		1,500	*
Ending work in process inventory	(4,000)		(3,500)		(4,000)	*	(2,000)	
Cost of goods manufactured	$18,000		$22,500	*	$16,000		$31,500	
Sales	$25,000		$40,000		$30,000		$50,000	
Beginning finished goods inventory	6,000		8,000	*	7,000		9,000	
Cost of goods manufactured	18,000		22,500	*	16,000		31,500	
Goods available for sale	24,000	*	30,500	*	23,000	*	40,500	*
Ending finished goods inventory	9,000		4,000		5,000	*	7,000	
Cost of goods sold	15,000	*	26,500		18,000		33,500	*
Gross margin	10,000	*	13,500	*	12,000	*	16,500	*
Selling and administrative expenses	6,000		8,000	*	9,000	*	10,000	
Net operating income	$ 4,000	*	$ 5,500		$ 3,000		$ 6,500	*

*Missing data in the problem.

Problem 2-29 (45 minutes)

1.

Hickey Corporation
Schedule of Cost of Goods Manufactured

Direct materials:		
Raw materials inventory, beginning	$ 20,000	
Add: Purchases of raw materials	160,000	
Raw materials available for use	180,000	
Deduct: Raw materials inventory, ending	10,000	
Raw materials used in production		$170,000
Direct labor		80,000
Manufacturing overhead:		
Indirect labor	60,000	
Building rent (80% × $50,000)	40,000	
Utilities, factory	35,000	
Royalty on patent ($1 per unit × 30,000 units)	30,000	
Maintenance, factory	25,000	
Rent on equipment: $6,000 + ($0.10 per unit × 30,000 units)	9,000	
Other factory overhead costs	11,000	
Total overhead costs		210,000
Total manufacturing costs		460,000
Add: Work in process inventory, beginning		30,000
		490,000
Deduct: Work in process inventory, ending		40,000
Cost of goods manufactured		$450,000

Problem 2-29 (continued)

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.

$$\frac{\text{Total sales}}{\text{Unit selling price}} = \frac{\$650{,}000}{\$25 \text{ per unit}} = 26{,}000 \text{ units sold}$$

Units in the finished goods inventory, beginning	0
Units produced during the year	30,000
Units available for sale	30,000
Units sold during the year (above)	26,000
Units in the finished goods inventory, ending	4,000

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

$$\frac{\text{Cost of goods manufactured}}{\text{Number of units produced}} = \frac{\$450{,}000}{30{,}000 \text{ units}} = \$15 \text{ per unit.}$$

Thus, the cost of the units in the finished goods inventory at the end of the year would be: 4,000 units × $15 per unit = $60,000.

3.

Hickey Corporation
Income Statement

Sales		$650,000
Cost of goods sold:		
Finished goods inventory, beginning	$ 0	
Add: Cost of goods manufactured	450,000	
Goods available for sale	450,000	
Finished goods inventory, ending	60,000	390,000
Gross margin		260,000
Selling and administrative expenses:		
Advertising	50,000	
Building rent (20% × $50,000)	10,000	
Selling and administrative salaries	140,000	
Other selling and administrative expense	20,000	220,000
Net operating income		$ 40,000

Case 2-30 (60 minutes)

1. No distinction has been made between period expenses and product costs on the income statement. 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. Since 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.

Medical Technology, Inc.
Schedule of Cost of Goods Manufactured
For the Quarter Ended June 30

Direct materials:		
Raw materials inventory, beginning	$ 0	
Add: Purchases of raw materials	310,000	
Raw materials available for use	310,000	
Deduct: Raw materials inventory, ending	40,000	
Raw materials used in production		$270,000
Direct labor		80,000
Manufacturing overhead:		
Cleaning supplies, factory	6,000	
Indirect labor cost	135,000	
Maintenance, factory	47,000	
Rental cost, facilities (80% × $65,000)	52,000	
Insurance, factory	9,000	
Utilities (90% × $40,000)	36,000	
Depreciation, factory equipment	75,000	
Total overhead costs		360,000
Total manufacturing costs		710,000
Add: Work in process inventory, beginning		0
		710,000
Deduct: Work in process inventory, ending		30,000
Cost of goods manufactured		$680,000

Case 2-30 (continued)

3. Before an income statement can be prepared, the cost of the 4,000 monitors in the ending finished goods inventory must be determined. Altogether, the company produced 20,000 units during the quarter; thus, the production cost per unit would be:

$$\frac{\text{Cost of goods manufactured}}{\text{Units produced during the quarter}} = \frac{\$680{,}000}{20{,}000 \text{ units}} = \$34 \text{ per unit}$$

Since 4,000 monitors (20,000 – 16,000 = 4,000) were in the ending finished goods inventory, the total cost of this inventory would be:

4,000 units × $34 per unit = $136,000.

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

Medical Technology, Inc.
Income Statement
For the Quarter Ended June 30

Sales		$975,000
Cost of goods sold:		
Finished goods inventory, beginning	$ 0	
Add: Cost of goods manufactured	680,000	
Goods available for sale	680,000	
Deduct: Finished goods inventory, ending	136,000	544,000
Gross margin		431,000
Selling and administrative expenses:		
Selling and administrative salaries	90,000	
Advertising	200,000	
Rental cost, facilities (20% × $65,000)	13,000	
Depreciation, office equipment	18,000	
Utilities (10% × $40,000)	4,000	
Travel, salespersons	60,000	385,000
Net operating income		$ 46,000

Case 2-30 (continued)

4. No, the insurance company probably does not owe Medical Technology $227,000. 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 $227,000 figure is overstated since it includes elements of selling and administrative expenses as well as all of the product costs. The $227,000 figure 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 $136,000, which is the amount of cost associated with the ending Finished Goods inventory as shown in part (3) above.

Case 2-31 (60 minutes)

The following cost items are needed before any schedules or statements can be prepared:

Direct labor cost:

¼ × Manufacturing overhead = Direct labor cost
¼ × $520,000 = $130,000

Materials used in production:

Direct labor and direct materials.....	$510,000
Less direct labor cost.....	130,000
Direct materials cost.....	$380,000

Cost of goods manufactured:

Goods available for sale.....	$960,000
Less finished goods inventory, beginning.....	90,000
Cost of goods manufactured	$870,000

The easiest way to proceed from this point is to place all known amounts on the chalkboard 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.

Direct materials:	
Raw materials inventory, beginning	$ 30,000
Add: Purchases of raw materials	420,000
Raw materials available for use	450,000
Deduct: Raw materials inventory, ending.....	A
Raw materials used in production (see above)	380,000
Direct labor cost (see above)	130,000
Manufacturing overhead cost	520,000
Total manufacturing costs.....	1,030,000
Add: Work in process inventory, beginning	50,000
	1,080,000
Deduct: Work in process inventory, ending.....	B
Cost of goods manufactured (see above).....	$ 870,000

Case 2-31 (continued)

Therefore, "A" (Raw materials inventory, ending) would be $70,000; and "B" (Work in process inventory, ending) would be $210,000.

Sales		$1,350,000
Cost of goods sold:		
Finished goods inventory, beginning	$ 90,000	
Add: Cost of goods manufactured (see above)	870,000	
Goods available for sale	960,000	
Deduct: Finished goods inventory, ending	C	810,000 *
Gross margin		$ 540,000

*$1,350,000 × (100% – 40%) = $810,000.

Therefore, "C" (Finished goods inventory, ending) would be $150,000. The procedure outlined above is just one way in which the solution to the case can be approached. Some students 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.

Research and Application 2-32 (240 minutes)

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 of investor expectations 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 infringe on 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 singe-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 2-32 (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). PWC's 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 PWC's assessment of the effectiveness of Dell's internal controls. These two opinions are required by SOX. Page 59 includes management's report on internal control over financial reporting. This report includes a reference to SOX. Finally, pages 76-78 contain the 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, software installation, functional testing, and quality control." Page 7 states

Research and Application 2-32 (continued)

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, 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 2-32 (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.

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For GAAP 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. It is worth mentioning that 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.
   - Cost object: Any 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).
   - Cost object: Any 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).
   - Cost object: Any particular geographic region, such 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).
   - Cost object: Any 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).

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