Solutions Manual

to accompany

MANAGERIAL ACCOUNTING

Tenth Edition (Global Edition)

Ronald W. Hilton
Cornell University

David E. Platt
University of Texas at Austin

Contents

Preface

The best way for most students to learn managerial accounting is to read the text and then solve a representative sample of the review questions, exercises, problems and cases at the end of each chapter. These end-of-chapter materials span a wide range of topics, types of organizations, and levels of difficulty. The topic of each exercise, problem, and case is indicated in the text. The estimated amount of time required is shown in the solutions manual. The *Solutions Manual* also includes a brief discussion of the points raised in the *Focus on Ethics* features, which appear at the end of most chapters in the text. We gratefully acknowledge Liesl Folks and Yinian Hou for their very able assistance in preparing discussion points for the text's *Focus on Ethics* features.

Several exercises and problems in each chapter (excluding chapter 1) include an optional requirement entitled *Build a Spreadsheet*, which is highlighted in the text in red. Here students are instructed to build an Excel spreadsheet that will solve one or more of the requirements in the exercise or problem. There are several alternatives for instructors with regard to assigning these optional *Build a Spreadsheet* requirements.

(1) Do not assign the optional *Build a Spreadsheet* requirement.

(2) Assign the optional *Build a Spreadsheet* requirement *in addition to* the manual computational requirements. Under this approach, the student would solve several of the problem's requirements twice, once manually and then a second time in the context of the Excel spreadsheet.

(3) Assign the optional *Build a Spreadsheet* requirement *instead of* the manual computational requirements that the optional Excel spreadsheet solves.

The electronic version of this solutions manual includes links to Excel spreadsheets that solve these optional spreadsheet requirements.

We have found that students' Excel skills vary widely. Consequently, the time that students will need to build each Excel spreadsheet will vary considerably as well. For this reason, the suggested solution times given for each exercise and problem *do not include* the time required to build the optional Excel spreadsheet.

Ronald W. Hilton and David E. Platt

CHAPTER 2
Basic Cost Management Concepts

ANSWERS TO REVIEW QUESTIONS

2-1 **Product costs are costs that are associated with manufactured goods until the time period during which the products are sold, when the product costs become expenses. Period costs are expensed during the time period in which they are incurred.**

2-2 **Product costs are also called inventoriable costs because they are assigned to manufactured goods that are inventoried until a later period, when the products are sold. The product costs remain in the Work-in-Process or Finished-Goods Inventory account until the time period when the goods are sold.**

2-3 **The most important difference between a manufacturing firm and a service industry firm, with regard to the classification of costs, is that the goods produced by a manufacturing firm are inventoried, whereas the services produced by a service industry firm are consumed as they are produced. Thus, the costs incurred in manufacturing products are treated as product costs until the period during which the goods are sold. Most of the costs incurred in a service industry firm to produce services are operating expenses that are treated as period costs.**

2-4 **Product costs include the backpack's direct material (e.g., fabric, stitching, zippers and pulls), direct labor involved in production, and various overhead costs (e.g., electricity, insurance on the plant, and depreciation on plant and equipment).**

2-5 **The four types of production processes are as follows:**

- **Job shop: Low production volume; little standardization; one-of-a-kind products. Examples include custom home construction, feature film production, and ship building.**
- **Batch: Multiple products; low volume. Examples include construction equipment, tractor trailers, and cabin cruisers.**
- **Assembly: A few major products; higher volume. Examples include kitchen appliances and automobile assembly.**
- **Continuous flow: High production volume; highly standardized commodity products. Examples include food processing, textiles, lumber, and chemicals.**

2-6 The cost of idle time is treated as manufacturing overhead because it is a normal cost of the manufacturing operation that should be spread out among all of the manufactured products. The alternative to this treatment would be to charge the cost of idle time to a particular job that happens to be in process when the idle time occurs. Idle time often results from a random event, such as a power outage. Charging the cost of the idle time resulting from such a random event to only the job that happened to be in process at the time would overstate the cost of that job.

2-7 Overtime premium is included in manufacturing overhead in order to spread the extra cost of the overtime over all of the products produced, since overtime often is a normal cost of the manufacturing operation. The alternative would be to charge the overtime premium to the particular job in process during overtime. In most cases, such treatment would overstate the cost of that job, since it is only coincidental that a particular job happened to be done on overtime. The need for overtime to complete a particular job results from the fact that other jobs were completed during regular hours.

2-8 The phrase "different costs for different purposes" refers to the fact that the word "cost" can have different meanings depending on the context in which it is used. Cost data that are classified and recorded in a particular way for one purpose may be inappropriate for another use.

2-9 The city of Tampa would use cost information for planning when it developed a budget for its operations during the next year. Included in that budget would be projected costs for police and fire protection, street maintenance, and city administration. At the end of the year this budget would be used for cost control. The actual costs incurred would be compared to projected costs in the budget. City administrators would also use cost data in making decisions, such as where to locate a new fire station.

2-10 A fixed cost remains constant in total across changes in activity, whereas the total variable cost changes in proportion to the level of activity.

2-11 The fixed cost per unit declines as the level of activity (or cost driver) increases. The cost per unit is reduced because the total fixed cost, which does not change as activity changes, is spread over a larger number of activity units.

2-12 The variable cost per unit remains constant as the level of activity (or cost driver) changes. Total variable costs change in proportion to activity, and the additional variable cost when one unit of activity is added is the variable cost per unit.

2-13 A volume-based cost driver, such as the number of passengers, causes costs to be incurred because of the quantity of service offered by the airline. An operations-based cost driver, such as hub domination, affects costs because of the basic way in which the airline conducts its operations. Greater control over a hub airport's facilities and services gives an airline greater ability to control its operating costs.

2-14 **a. Number of students: volume-based cost driver. This characteristic of the college relates to the quantity of services provided.**

b. Number of disciplines offered for study: operations-based cost driver. The greater the diversity in a college's course offerings, the greater will be the costs incurred, regardless of the overall size of the student body.

c. Urban versus rural location: operations-based cost driver. A college's location will affect the type of housing and food facilities required, the cost of obtaining services, and the cost of transportation for college employees acting on behalf of the college.

2-15 **Examples of direct costs of the food and beverage department in a hotel include the money spent on the food and beverages served, the wages of table service personnel, and the costs of entertainment in the dining room and lounge. Examples of indirect costs of the food and beverage department include allocations of the costs of advertising for the entire hotel, of the costs of the grounds and maintenance department, and of the hotel general manager's salary.**

2-16 **Costs that are likely to be controllable by a city's airport manager include the wages of personnel hired by the airport manager, the cost of heat and light in the airport manager's administrative offices, and the cost of some materials consumed in the process of operating the airport, such as cleaning, painting, and maintenance materials. Costs that are likely to be uncontrollable by the city's airport manager include depreciation of the airport facilities, fees paid by the airport to the federal government for air traffic control services, and insurance for the airport employees and patrons.**

2-17 a. Uncontrollable cost

b. Controllable cost

c. Uncontrollable cost

2-18 Out-of-pocket costs are paid in cash at or near the time they are incurred. An opportunity cost is the potential benefit given up when the choice of one action precludes the selection of a different action.

2-19 A sunk cost is a cost that was incurred in the past and cannot be altered by any current or future decision. A differential cost is the difference in a cost item under two decision alternatives.

2-20 A marginal cost is the extra cost incurred in producing one additional unit of output. The average cost is the total cost of producing a particular quantity of product or service, divided by the number of units of product or service produced.

2-21 The process of registering for classes varies widely among colleges and universities, and the responses to this question will vary as well. Examples of information that might be useful include the credit requirements and course requirements to obtain a particular degree, and a list of the prerequisites for each of the elective courses in a particular major. Such information could help the student plan an academic program over several semesters or quarters. An example of information that might create information overload is a comprehensive listing of every course offered by the college in the past five years.

2-22 The purchase cost of the old bar code scanners is a sunk cost, since it occurred in the past and cannot be changed by any future course of action. The manager is exhibiting a common behavioral tendency to pay too much attention to sunk costs.

2-23 a. Direct cost

b. Direct cost

c. Indirect cost

d. Indirect cost

SOLUTIONS TO EXERCISES

EXERCISE 2-24 (20 MINUTES)

1. **Advertising costs: Period cost, fixed**
2. **Straight-line depreciation: Product cost, fixed, manufacturing overhead**
3. **Wages of assembly-line personnel: Product cost, variable, direct labor**
4. **Delivery costs on customer shipments: Period cost, variable**
5. **Newsprint consumed: Product cost, variable, direct material**
6. **Plant insurance: Product cost, fixed, manufacturing overhead**
7. **Glass costs: Product cost, variable, direct material**
8. **Tire costs: Product cost, variable, direct material**
9. **Sales commissions: Period cost, variable**
10. **Wood glue: Product cost, variable, either direct material or manufacturing overhead (i.e., indirect material) depending on how significant the cost is**
11. **Wages of security guards: Product cost, variable, manufacturing overhead**
12. **Salary of financial vice-president: Period cost, fixed**

EXERCISE 2-25 (10 MINUTES)

The general formula for solving all three cases is as follows:

Beginning inventory of finished goods	+	Cost of goods manufactured during period	–	Ending inventory of finished goods	=	Cost-of-goods sold expense

EXERCISE 2-25 (CONTINUED)

Using this formula, we can find the missing amounts as follows:

	Case		
	I	II	III
Beginning inventory of finished goods	$ 21,000*	$ 18,000	$ 3,500
Add: Cost of goods manufactured	104,750	142,500	159,000*
Subtract: Ending inventory of finished goods	24,500	12,000	10,500
Cost of goods sold	$101,250	$148,500*	$152,000

*Amount missing in exercise.

EXERCISE 2-26 (10 MINUTES)

1.	Hours worked	40
	Wage rate	× $ 16
	Total compensation	$640
2.	Classification:	
	Direct labor (36 hours × $16)	$576
	Overhead (idle time: 4 hours × $16)	64
	Total compensation	$640

EXERCISE 2-27 (10 MINUTES)

1.	Regular wages (40 hours × $17)	$ 680
	Overtime wages (3 hours × $22)	66
	Total compensation	$ 746
2.	Overtime hours	3 hrs.
	Overtime premium per hour ($22 – $17)	× $ 5
	Total overtime premium	$ 15
3.	Classification:	
	Direct labor (43 hours × $17)	$ 731
	Overhead (overtime premium: 3 hours × $5)	15
	Total compensation	$ 746

EXERCISE 2-28 (25 MINUTES)

1. **ALHAMBRA ALUMINUM COMPANY**

SCHEDULE OF COST OF GOODS MANUFACTURED
FOR THE YEAR ENDED DECEMBER 31, 20X1

Direct material:		
Raw-material inventory, January 1	**$ 70,000**	
Add: Purchases of raw material	**380,000**	
Raw material available for use	**$450,000**	
Deduct: Raw-material inventory, December 31	**90,000**	
Raw material used		**$360,000**
Direct labor		**540,000**
Manufacturing overhead:		
Indirect material	**$ 23,000**	
Indirect labor	**35,000**	
Depreciation on plant and equipment	**132,000**	
Utilities	**30,000**	
Other	**40,000**	
Total manufacturing overhead		**260,000**
Total manufacturing costs		**$1,160,000**
Add: Work-in-process inventory, January 1		**210,000**
Subtotal		**$1,370,000**
Deduct: Work-in-process inventory, December 31		**240,000**
Cost of goods manufactured		**$1,130,000**

2.

ALHAMBRA ALUMINUM COMPANY
SCHEDULE OF COST OF GOODS SOLD
FOR THE YEAR ENDED DECEMBER 31, 20X1

Finished-goods inventory, January 1	**$ 190,000**
Add: Cost of goods manufactured	**1,130,000**
Cost of goods available for sale	**$1,320,000**
Deduct: Finished-goods inventory, December 31	**200,000**
Cost of goods sold	**$1,120,,000**

EXERCISE 2-28 (CONTINUED)

3.

ALHAMBRA ALUMINUM COMPANY
INCOME STATEMENT
FOR THE YEAR ENDED DECEMBER 31, 20X1

Sales revenue	$1,950,000
Less: Cost of goods sold	1,120,000
Gross margin	$ 830,000
Selling and administrative expenses	190,000
Income before taxes	$ 640,000
Income tax expense (at 35%)	224,000
Net income	$ 416,000

4. In the electronic version of the solutions manual, press the CTRL key and click on the following link: 10E - BUILD A SPREADSHEET 02-28.XLS

EXERCISE 2-29 (30 MINUTES)

Job-shop production is well suited to The Boeing Company's operations, because of the individual-unit or small batch size in which commercial aircraft are produced.

EXERCISE 2-30 (15 MINUTES)

	Number of Muffler Replacements		
	300	400	500
Total costs:			
Fixed costs	(a) $40,000	$40,000	(b) $40,000
Variable costs	(c) 15,000	20,000	(d) 25,000
Total costs	(e) $55,000	$60,000	(f) $65,000
Cost per muffler replacement:			
Fixed cost	(g) $ 133.33 *	(h) $100	(i) $ 80
Variable cost	(j) 50.00	(k) 50	(l) 50
Total cost per muffler replacement	(m) $183.33	(n) $150	(o) $130

*Rounded.

EXERCISE 2-30 (CONTINUED)

Explanatory Notes:

(a) Total fixed costs do not vary with activity.

(c) Variable cost per replacement = $28,000/700 = $40

Total variable cost for 600 replacements = $40 × 600 = $24,000

(g) Fixed cost per replacement = $56,000/600 = $93.33 (rounded)

(j) Variable cost per replacement = $24,000/600 = $40

EXERCISE 2-31 (5 MINUTES)

Thomas Cleverly's expenditure is a *sunk* cost. It is irrelevant to any future decision Cleverly may make about the land.

EXERCISE 2-32 (15 MINUTES)

1.	**Phone bill, January: $200 + ($.15 × 7,000)**	**$1,250**	
	Phone bill, February: $200 + ($.15 × 8,000)	**$1,400**	
2.	**Cost per call, January: $1,250/7000**	**$ .179**	**(rounded)**
	Cost per call, February: $1,400/8000	**$ .175**	
3.	**Fixed component, January**	**$ 200**	
	Variable component, January: $.15 × 7,000	**1,050**	
	Total	**$1,250**	

4. Since each phone call costs $.15, the marginal cost of making the 7,001st call is $.15.

5. The average cost of a phone call in January (rounded) is $.179 ($1,250/7,000).

EXERCISE 2-33 (5 MINUTES)

1. The $12,500 is the *opportunity cost* associated with using the computer in the Department of Education for work in the governor's office.

2. The $12,500 leasing cost should be assigned to the governor's office. It was incurred as a result of activity in that office.

EXERCISE 2-34 (10 MINUTES)

1. Your decision to see the game really cost you $100, the amount forgone when you refused to sell the ticket. A convenient way to think about this is as follows: You could have sold the ticket for $100, thereby resulting in a profit on the deal of $25 ($100 sales proceeds minus $75 out-of-pocket purchase cost). Instead, you went to the game, which left you relieved of your $75 out-of-pocket cost. The difference between the $75 *reduction* in your wealth and the $25 *profit* you could have had is $100. Thus, $100 is the true cost of going to the game.

2. The $100 is an *opportunity cost.* At the time you made the decision to attend the game, the $75 you actually had paid for the ticket is a *sunk cost.* It is not relevant to any future decision.

EXERCISE 2-35 (5 MINUTES)

Annual cost using European component: $9,100 × 15	**$136,500**
Annual cost using Part A200: ($4,900 + $650) × 15	**83,250**
Annual differential cost	**$ 53,250**

EXERCISE 2-36 (15 MINUTES)

1. The marginal cost of a flight would include the aircraft fuel, wages of the flight crew and airport maintenance personnel, and the food and beverages consumed by the passengers and crew.

2. The marginal cost would include the additional wages or commissions earned by the agency employees and the additional electricity used for light, heat, and computer equipment.

3. The marginal cost of the skis would include the direct material. It is unlikely that labor and other costs would change with the addition of only one more product unit.

EXERCISE 2-36 (CONTINUED)

4. The marginal cost would include any food and beverages consumed by the passenger and perhaps an imperceptible increase in fuel costs.

5. In most cases, only the cost of the food and beverage consumed by the customer would be a marginal cost. It is unlikely that the restaurant would need to employ additional service personnel, dishwashers, and so on.

SOLUTIONS TO PROBLEMS

PROBLEM 2-37 (25 MINUTES)

1. a. Total prime costs:

Direct material	$ 950,000
Direct labor:	
Wages	310,000
Fringe benefits	50,000
Total prime costs	$ 1,310,000

b. Total manufacturing overhead:

Depreciation on factory building	$ 61,000
Indirect labor: wages	80,000
Production supervisor's salary	30,000
Service department costs	40,000
Indirect labor: fringe benefits	20,000
Fringe benefits for production supervisor	5,000
Total overtime premiums paid	35,000
Cost of idle time: production employees	22,000
Total manufacturing overhead	$ 293,000

c. Total conversion costs:

Direct labor ($310,000 + $50,000)	$ 360,000
Manufacturing overhead	293,000
Total conversion costs	$ 653,000

d. Total product costs:

Direct material	$ 950,000
Direct labor	360,000
Manufacturing overhead	293,000
Total product costs	$1,603,000

PROBLEM 2-37 (CONTINUED)

e. Total period costs:

Advertising expense	$ 43,000
Administrative costs	81,000
Rental of office space for sales personnel	8,000
Sales commissions	3,000
Product promotion costs	7,000
Total period costs	$ 142,000

2. The $8,000 in rental cost for sales office space is an opportunity cost. It measures the opportunity cost of using the former sales office space for raw-material storage.

PROBLEM 2-38 (15 MINUTES)

1.	Regular hours: 40 × $16	$640
	Overtime hours: 13 × $21	273
	Total cost of wages	$913
2.	a. Direct labor: 43 × $16	$688
	b. Manufacturing overhead (idle time): 3 × $16	48
	c. Manufacturing overhead (overtime premium): 13 × ($21 – $16)	65
	d. Manufacturing overhead (indirect labor): 7 × $16	112
	Total cost of wages	$913

PROBLEM 2-39 (20 MINUTES)

1. These costs would appear on the following statements or schedules.

1. Income statement
2. Cost-of-goods-manufactured schedule
3. Cost of-goods-manufactured schedule
4. Balance sheet, cost-of-goods-manufactured schedule
5. Income statement
6. Income statement
7. Income statement
8. Balance sheet
9. Income statement
10. Income statement
11. Cost-of-goods-manufactured schedule

2. The asset that differs among these businesses is inventory. Service businesses typically carry no (or very little) inventory. Retailers and wholesalers normally stock considerable inventory. Manufacturers also carry significant inventories, typically subdivided into three categories: raw material, work in process, and finished goods.

3. The income statements of service businesses normally have separate sections for operating revenues, operating expenses, and other income (expenses). In contrast, those of retailers, wholesalers, and manufacturers disclose sales revenue, followed immediately by cost of goods sold and gross margin. Operating expenses are listed next followed by other income (expenses).

4. The basic difference falls in the area of inventory. Traditional manufacturers produce finished goods, which are then placed in warehouses awaiting sale. In contrast, with a direct-sales, mass-customization firm, the receipt of a sales order triggers the manufacturing process as well as the purchasing system, the latter to acquire needed raw materials. Finished-goods and raw-material inventories (along with work in process) of mass-customizers are, therefore, much lower than the inventories carried by traditional firms.

PROBLEM 2-40 (10 MINUTES)

Cost Item Number	Product Cost or Period Cost
1.	Product
2.	Period*
3.	Product
4.	Period*
5.	Product
6.	Period*
7.	Product
8.	Product
9.	Product

***Service industry and retail firms typically treat all costs as operating expenses which are period expenses. Such firms do not inventory costs.**

PROBLEM 2-41 (10 MINUTES)

Cost Item Number	Direct or Indirect	Partially Controllable by Department Supervisor
1.	direct	yes
2.	direct	no
3.	direct	yes
4.	indirect	no
5.	indirect	no

PROBLEM 2-42 (20 MINUTES)

1. **3 hours × ($14 + $4) = $54**

   Notice that the overtime premium on the flight is not a direct cost of the flight.

2. **3 hours × $14 × .5 = $21**

   This is the overtime premium, which is part of Gaines' overall compensation.

3. **The overtime premium should be included in overhead and allocated across all of the company's flights.**

PROBLEM 2-42 (CONTINUED)

4. The $87 is an opportunity cost of using Gaines on the flight departing from San Diego on August 11. The cost should be assigned to the August 11 flight departing from San Diego.

PROBLEM 2-43 (35 MINUTES)

1.

LAREDO LUGGAGE COMPANY
SCHEDULE OF COST OF GOODS MANUFACTURED
FOR THE YEAR ENDED DECEMBER 31, 20X2

Direct material:		
Raw-material inventory, January 1	$ 30,000	
Add: Purchases of raw material	110,000	
Raw material available for use	$140,000	
Deduct: Raw-material inventory, December 31	15,000	
Raw material used		$125,000
Direct labor		120,000
Manufacturing overhead:		
Indirect material	$ 8,000	
Indirect labor	9,000	
Utilities: plant	22,000	
Depreciation: plant and equipment	35,000	
Other	50,000	
Total manufacturing overhead		124,000
Total manufacturing costs		$369,000
Add: Work-in-process inventory, January 1		30,000
Subtotal		$399,000
Deduct: Work-in-process inventory, December 31		22,000
Cost of goods manufactured		$377,000

2.

LAREDO LUGGAGE COMPANY
SCHEDULE OF COST OF GOODS SOLD
FOR THE YEAR ENDED DECEMBER 31, 20X2

Finished goods inventory, January 1	$ 15,000
Add: Cost of goods manufactured	377,000
Cost of goods available for sale	$392,000
Deduct: Finished-goods inventory, December 31	22,000
Cost of goods sold	$370,000

PROBLEM 2-43 (CONTINUED)

3.

LAREDO LUGGAGE COMPANY
INCOME STATEMENT
FOR THE YEAR ENDED DECEMBER 31, 20X2

Sales revenue	$580,000
Less: Cost of goods sold	370,000
Gross margin	$210,000
Selling and administrative expenses	80,000
Income before taxes	$130,000
Income tax expense	55,000
Net income	$ 75,000

4. In the electronic version of the solutions manual, press the CTRL key and click on the following link: 10E - BUILD A SPREADSHEET 02-43.XLS

PROBLEM 2-44 (30 MINUTES)

1. Manufacturing overhead:

Indirect labor	$ 230,000
Building depreciation ($200,000 x 75%)	150,000
Other factory costs	700,000
Total	$1,080,000

2. Cost of goods manufactured:

Direct material:		
Raw-material inventory, Jan. 1	$ 33,000	
Add: Purchases of raw material	400,000	
Raw material available for use	$433,000	
Deduct: Raw-material inventory, Dec. 31	38,000	
Raw material used		$ 395,000
Direct labor		525,000
Manufacturing overhead		1,080,000
Total manufacturing costs		$2,000,000
Add: Work-in-process inventory, Jan. 1		85,000
Subtotal		$1,915,000
Deduct: Work-in-process inventory, Dec. 31		135,000
Cost of goods manufactured		$1,780,000

PROBLEM 2-44 (CONTINUED)

3. Cost of goods sold:

Finished-goods inventory, Jan. 1……..	$ 222,000
Add: Cost of goods manufactured……	1,780,000
Cost of goods available for sale…….	$2,000,000
Deduct: Finished-goods inventory, Dec. 31…	191,200
Cost of goods sold…….	$1,808,800

4. Net income:

Sales revenue……..		$3,250,000
Less: Cost of goods sold…….		1,808,800
Gross margin……...		$1,441,200
Selling and administrative expenses:		
Salaries……...	$270,000	
Building depreciation ($200,000 × 25%)…..	50,000	
Other……	420,000	740,000
Income before taxes……..		$ 701,200
Income tax expense ($701,200 × 40%)……..		280,480
Net income……...		$ 420,720

5. Surgical Products, Inc. sold 10,000 units during the year ($3,250,000 ÷ $325). Since 180 of the units came from finished-goods inventory (1,375 – 1,195), the company would have manufactured 9,820 units (10,000 – 180).

6. In the electronic version of the solutions manual, press the CTRL key and click on the following link: 10E - BUILD A SPREADSHEET 02-44.XLS

PROBLEM 2-45 (40 MINUTES)

	Case A	Case B	Case C
Sales	$2,000,000*	$1,700,000*	$300,000
Beginning inventory, raw material	150,000*	70,000	8,000
Ending inventory, raw material	200,000	40,000*	17,000
Purchases of raw material	300,000	270,000	40,000*
Direct material used	250,000	300,000	31,000*
Direct labor	500,000*	320,000	65,000
Manufacturing overhead	600,000	500,000*	90,000
Total manufacturing costs	1,350,000	1,120,000	186,000
Beginning inventory, work in process	90,000	70,000	9,000*
Ending inventory, work in process	80,000*	110,000	3,000
Cost of goods manufactured	1,360,000	1,080,000*	192,000
Beginning inventory, finished goods	150,000	140,000	15,000*
Cost of goods available for sale	1,510,000*	1,120,000*	207,000
Ending inventory, finished goods	80,000*	130,000*	14,000
Cost of goods sold	1,430,000	990,000	193,000*
Gross margin	570,000	710,000	107,000*
Selling and administrative expenses	230,000*	240,000	25,000*
Income before taxes	340,000	470,000*	82,000
Income tax expense	90,000	222,000	32,000*
Net income	250,000*	248,000*	50,000

*Amount missing in problem.

PROBLEM 2-46 (25 MINUTES)

1. Fixed manufacturing overhead per unit:
$1,200,000 ÷ 24,000 units produced = $50

Average unit manufacturing cost:

Direct material……..	$ 40
Direct labor……	74
Variable manufacturing overhead..	96
Fixed manufacturing overhead……	50
Average unit cost……..	$260

Production……	24,000 units
Sales……	20,000 units
Ending finished-goods inventory…	4,000 units

Cost of December 31 finished-goods inventory:
4,000 units x $260 = $1,040,000

2. Net income:

Sales revenue (20,000 units x $370)……	$7,400,000
Cost of goods sold (20,000 units x $260)…..	5,200,000
Gross margin…….	$2,200,000
Selling and administrative expenses……..	1,720,000
Income before taxes……	$ 480,000
Income tax expense ($480,000 x 40%)……	192,000
Net income…….	$ 288,000

3. (a) No change. Direct labor is a variable cost, and the cost per unit will remain constant.

(b) No change. Despite the decrease in the number of units produced, this is a fixed cost, which remains the same in total.

(c) No change. Selling and administrative costs move more closely with changes in sales than with units produced. Additionally, this is a fixed cost.

(d) Increase. The average unit cost of production will change because of the per-unit fixed manufacturing overhead. A reduced production volume will be divided into the fixed dollar amount, which increases the cost per unit.

PROBLEM 2-47 (25 MINUTES)

Since Fresno Furniture's gross margin equals 30% of sales, cost of goods sold equals 70% of sales, or $371,000 ($530,000 × 70%). Thus, the finished goods destroyed by the fire cost $59,000, computed as follows:

Finished-goods inventory, Jan. 1 (given)……..	$ 60,000
Add: Cost of goods manufactured……	370,000*
Cost of goods available for sale (given)……	$430,000
Deduct: Finished-goods inventory, May 10……	59,000*
Cost of goods sold (calculated above)……..	$371,000

***Fill in these blanks, given the other numbers in this table.**

Direct material used:

Direct material averages 25% of prime costs (i.e., direct material + direct labor).
Thus: Let X = direct material used

$$X = (X + \$210,000) \times 25\%$$
$$.75X = \$52,500$$
$$X = \$70,000$$

Manufacturing overhead:

Manufacturing overhead equals 50% of total production costs.
Thus: Let Y = manufacturing overhead

$$Y = (\text{direct material used} + \text{direct labor} + \text{manufacturing overhead}) \times 50\%$$
$$Y = (\$70,000 + \$210,000 + Y) \times 50\%$$
$$.50Y = \$140,000$$
$$Y = \$280,000$$

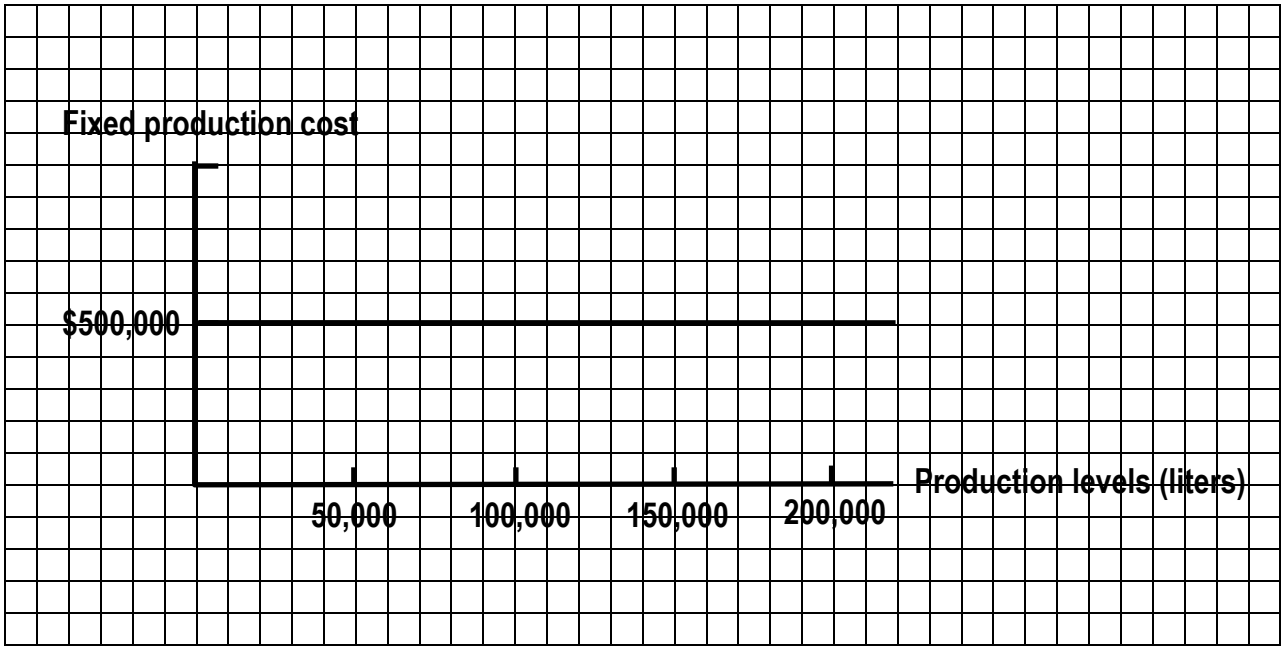
The work in process destroyed by the fire cost $224,000, computed as follows:

Direct material……	$ 70,000
Direct labor (given)……	210,000
Manufacturing overhead……..	280,000
Total manufacturing costs……...	$560,000
Add: Work-in-process inventory, Jan. 1 (given)…	34,000
Subtotal……..	$594,000
Deduct: Work-in-process inventory, May 10*…….	224,000
Cost of goods manufactured (from above)…….	$370,000

***$224,000 = $594,000 – $370,000**

PROBLEM 2-48 (25 MINUTES)

1. Graph of fixed production cost:

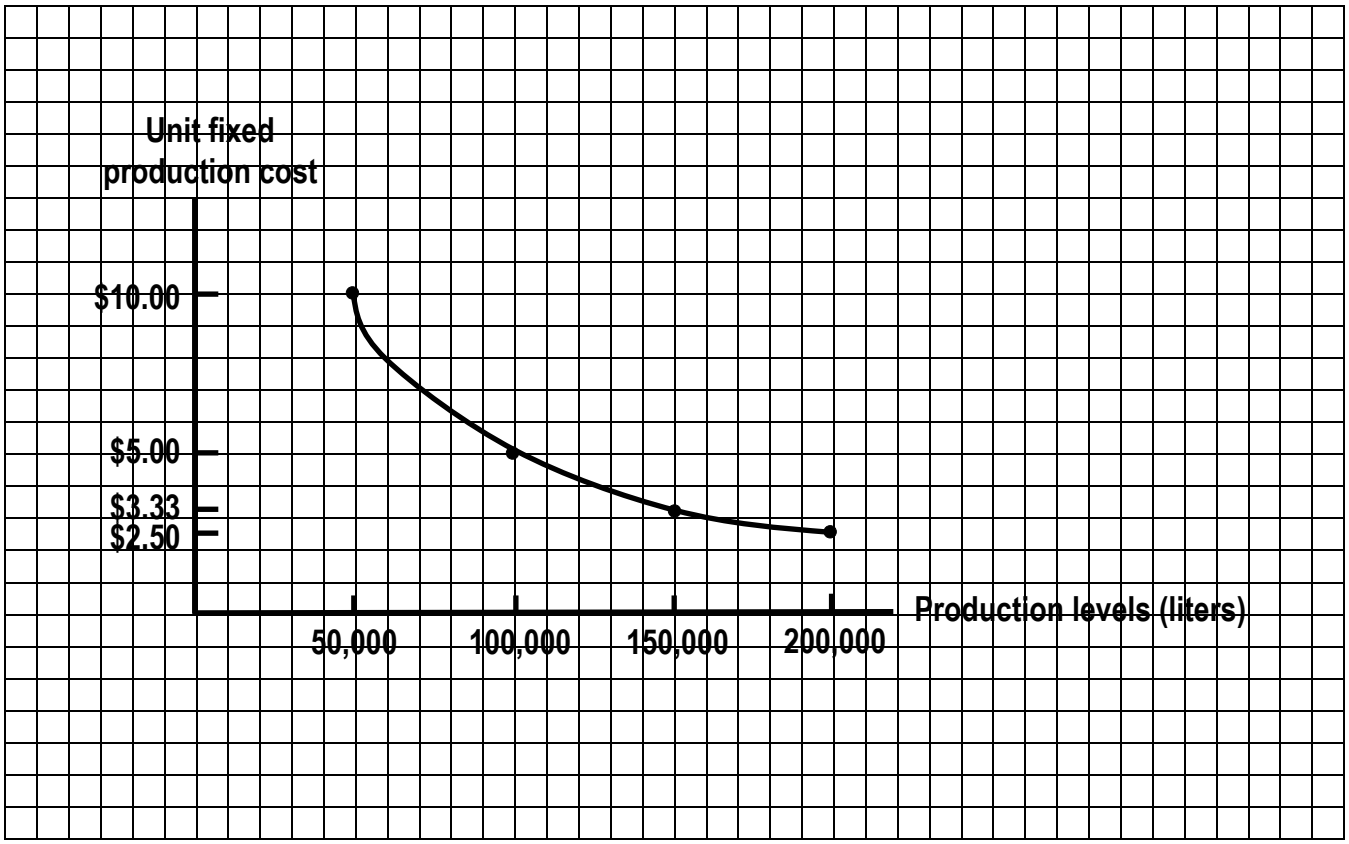


2.

Production Level in Liters	Unit Fixed Cost	Total Fixed Cost
1	$500,000 per liter	$500,000
50	$10,000 per liter	$500,000
50,000	$10 per liter	$500,000
200,000	$2.50 per liter	$500,000

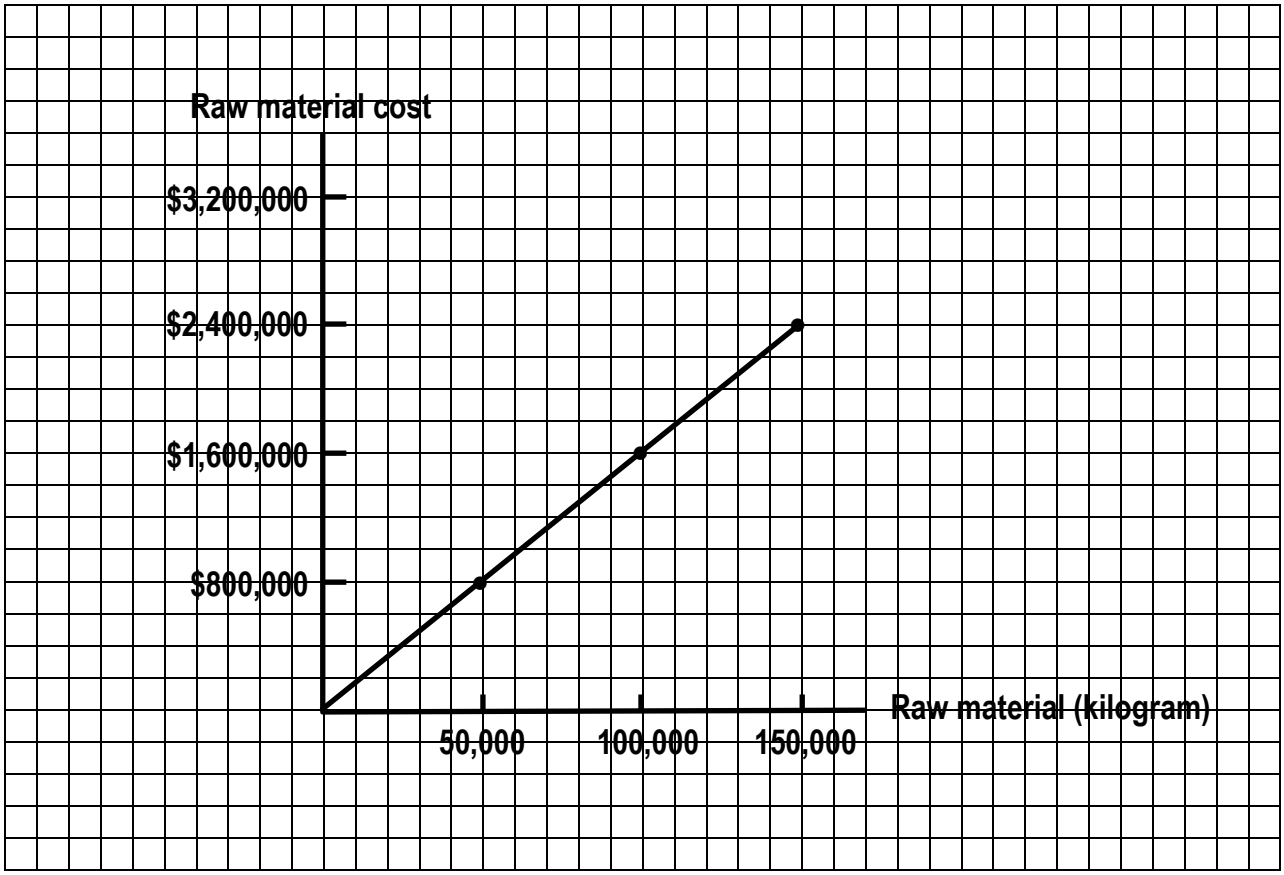
PROBLEM 2-48 (CONTINUED)

3. Graph of unit fixed production cost:



PROBLEM 2-49 (15 MINUTES)

1. Graph of raw-material cost:



2.

Production Level in Kilograms	Unit Cost	Total Cost
1	$16 per kilogram	$16
50	$16 per kilogram	$800
5,000	$16 per kilogram	$80,000

PROBLEM 2-50 (20 MINUTES)

1. a, d, g, j

2. b, c, f

3. b, d, g, k

4. b, c and d*, e and f and g*, k*

*The building is used for several purposes.

5. b, c, f

6. b, c, h

7. b, c, f

8. b, c, e

9. b, c and d†, e and f and g†, k†

†The building heated by the furnace is used for several purposes.

10. a, d, g, j

11. a, d, g, i

12. a, d, g, j

13. b, c**, f

**The sign will be depreciated as a period cost.

14. b, d, g, k

15. a, d, g, k

PROBLEM 2-51 (40 MINUTES)

1. Caterpillar is a manufacturing firm. Its income statement highlights the firm's cost-of-goods-sold expense, which is the cost of all of the heavy equipment sold during the year. Cost of goods sold is subtracted from sales revenue to arrive at the gross profit. The company's other operating expenses then are subtracted from the gross profit.

Wal-Mart Stores, Inc. is a retail firm. Its income statement also shows the firm's cost of sales, which is another name for cost of goods sold. The cost of sales includes all of the costs of acquiring merchandise for resale. The company's other operating expenses are identified separately from cost of sales.

Southwest Airlines Company is an airline, which is a service industry firm. The company does not sell an inventoriable product, but rather provides air transportation service. Therefore, the company's income statement does not list any cost-of-goods-sold expense. All of its expenses are operating expenses.

2. Cost-accounting data are used to measure all of the costs on all three companies' income statements. For example, the cost-accounting system at Caterpillar measures the cost of direct labor, direct material, and manufacturing overhead incurred in the manufacturing process. Wal-Mart Stores' cost-accounting system measures the cost of acquiring merchandise for resale. Southwest Airlines' cost-accounting system measures the cost of aviation fuel consumed.

3. The ticket agents' salaries would be included in salaries, wages, and benefits. Depreciation of the airline's computer equipment would be included in depreciation.

4. Wal-Mart Stores' cost of newspaper advertising would be included in selling expenses. The cost of merchandise sold would be included in cost of sales (same as cost of goods sold).

5. The salary for a Caterpillar brand manager would be included in selling expenses. Production employees' salaries are product costs, so they are part of the cost of goods sold. Similarly, raw-material costs are product costs, and they are included in cost of goods sold.

PROBLEM 2-52 (25 MINUTES)

1. **a, c, i, j, l**

2. **e**

3. **a, c, i, j, l**

4. **f**

5. **b, d, k, m**

6. **a, c, i, j, m**

7. **b, c, i, j, l**

8. **a, c, i, j, l**

9. **b, c, g, j, l**

10. **b, c, i, j, l**

11. **b, c, i, j, l**

12. **b, c, g, h, j, m**

13. **a, c, i, j, l**

14. **b, d, i, j, m**

15. **a, d, i, j, l**

PROBLEM 2-53 (15 MINUTES)

	Variable or Fixed	20x5 Forecast	Explanation
Direct material	V	$6,500,000	$5,000,000 × 1.30
Direct labor	V	4,550,000	$3,500,000 × 1.30
Manufacturing overhead			
Utilities (primarily electricity)	V	325,000	$250,000 × 1.30
Depreciation on plant and equipment	F	350,000	same
Insurance	F	260,000	same
Supervisory salaries	F	470,000	same
Property taxes	F	330,000	same
Selling costs			
Advertising	F	315,000	same
Sales commissions	V	195,000	$150,000 × 1.30
Administrative costs			
Salaries of top management and staff	F	580,000	same
Office supplies	F	70,000	same
Depreciation on building and equipment	F	140,000	same

PROBLEM 2-54 (20 MINUTES)

1. a, d, e, k

2. a, d, e, k

3. j

4. g (The $200 cost savings is a differential cost.)

5. a, c, e

6. b, d, e, k

7. d, e, k

8. b, d*, e, k

   *Unless the dishwasher has been used improperly.

9. b, d, e, k

PROBLEM 2-54 (CONTINUED)

10. a, c, e, k

11. h

12. a, d, e*, j

***The hotel general manager may have some control over the total space allocated to the kitchen.**

13. d, e, i, j

14. i

15. d, e, i

PROBLEM 2-55 (10 MINUTES)

1. $600 ($1,275 – $675)

2. $495 ($2,310 – $1,815)

3. $465 ($2,775 – $2,310)

4. $637.50 ($1,275/2)

5. $577.50 ($2,310/4)

6. $555 ($2,775/5)

PROBLEM 2-56 (15 MINUTES)

1.	a	Opportunity cost	5.	f	Average cost
2.	d	Differential cost	6.	e	Marginal cost
3.	b	Out-of-pocket cost	7.	c	Sunk cost
4.	e	Marginal cost			

PROBLEM 2-57 (15 MINUTES)

1. If the company buys 40,000 units of Part JR63, at a price of $*X* per unit, its total cost will be:

$$(40{,}000 \times \$X) + \$45{,}000$$

If the company manufactures the parts, its total cost will be:

$$(40{,}000 \times \$12) + \$165{,}000$$

By equating these two expressions for total cost, we can solve for the price, *X,* at which the total cost is the same under the two alternatives:

$$\begin{aligned} 40{,}000X + 45{,}000 &= (40{,}000)(12) + 165{,}000 \\ 40{,}000X &= 600{,}000 \\ X &= 15 \end{aligned}$$

Thus the firm will realize a net benefit by purchasing Part JR63 if the outside supplier charges a price less than $15.

2. If the firm buys *Y* units of Part JR63 at a unit price of $14, the total cost will be:

$$(\$14 \times Y) + \$45{,}000$$

If the company manufactures *Y* units of Part JR63, the total cost will be:

$$(\$12 \times Y) + \$165{,}000$$

If we equate these expressions, we can solve for the number of parts, *Y,* at which the firm will be indifferent between making and buying Part JR63.

$$\begin{aligned} 14Y + 45{,}000 &= 12Y + 165{,}000 \\ 2Y &= 120{,}000 \\ Y &= 60{,}000 \end{aligned}$$

Thus, the company will be indifferent between the two alternatives if it requires 60,000 units of Part JR63 each month.

PROBLEM 2-58 (25 MINUTES)

1.

Output (.75 liter bottles)	Calculation	Unit Cost
10,000	$243,000/10,000	$24.30
15,000	$267,000/15,000	$17.80
20,000	$291,000/20,000	$14.55

The unit cost is minimized at a sales volume of 20,000 bottles.

2.

Output (.75 liter bottles)	Sales Revenue	Total Costs	Profit
10,000	$250,000	$243,000	$ 7,000
15,000	285,000	267,000	18,000
20,000	300,000	291,000	9,000

Profit is maximized at a production level of 15,000 bottles of wine.

3. The 15,000-bottle level is best for the company, since it maximizes profit.

4. The unit cost decreases as output increases, because the fixed cost per unit declines as production and sales increase.

A lower price is required to motivate consumers to purchase a larger amount of wine.

SOLUTIONS TO CASES

CASE 2-59 (50 MINUTES)

1. a. The previous purchase price of the endor on hand, $10.00 per gallon, and the average cost of the endor inventory, $9.50 per gallon, are sunk costs. These costs were incurred in the past and will have no impact on future costs. They cannot be changed by any future action and are irrelevant to any future decision. Although the current price of endor is $11.00 per gallon, no endor will be purchased at this price. Thus, it too is irrelevant to the current special order. If the order is accepted, the required 900 gallons of endor will be replaced at a cost of $11.50 per gallon. Therefore, the real cost of endor for the special order is $10,350 (900 × $11.50).

b. The $40,000 paid by Alderon for its stock of tatooine is a sunk cost. It was incurred in the past and is irrelevant to any future decision. The current market price of $22 per kilogram is irrelevant, since no more tatooine will be purchased. If the special order is accepted, Alderon will use 1,400 kilograms of its tatooine stock, thereby losing the opportunity to sell its entire 1,900-kilogram stock for $28,000. Thus, the $28,000 is an opportunity cost of using the tatooine in production instead of selling it to Solo Industries. Moreover, if Alderon uses 1,400 kilograms of tatooine in production, it will have to pay $2,000 for its remaining 500 kilograms to be disposed of at a hazardous waste facility. This $2,000 disposal cost is an out-of-pocket cost.

The real cost of using the tatooine in the special order is $30,000 ($28,000 opportunity cost + $2,000 out-of-pocket cost).

CASE 2-59 (CONTINUED)

2. a. CopyFast Company would be indifferent to acquiring either the small-volume copier, 1500S, or the medium-volume copier, 1500M, at the point where the costs for 1500S and 1500M are equal. This point may be calculated using the following formula, where *X* equals the number of copies:

$$(\text{Variable cost}_S \times X) + \text{fixed cost}_S = (\text{variable cost}_M \times X) + \text{fixed cost}_M$$

1500S		1500M
$.07X + $4,000	=	$.045X + $5,500
$.025X	=	$1,500
X	=	60,000 copies

The conclusion is that the company would be indifferent to acquiring either the 1500S or 1500M machine at an annual volume of 60,000 copies.

b. A decision rule for selecting the most profitable copier, when the volume can be estimated, would establish the points where management is indifferent to each machine. The volume where the costs are equal between alternatives can be calculated using the following formula, where *X* equals the number of copies:

$$(\text{Variable cost}_S \times X) + \text{fixed cost}_S = (\text{variable cost}_M \times X) + \text{fixed cost}_M$$

For the 1500S machine compared to the 1500M machine:

1500S		1500M
$.07X + $4,000	=	$.045X + $5,500
$.025X	=	$1,500
X	=	60,000 copies

For the 1500M machine compared to the 1500L machine:

1500M		1500L
$.045X + $5,500	=	$.025X + $10,000
$.02X	=	$4,500
X	=	225,000 copies

CASE 2-59 (CONTINUED)

The decision rule is to select the alternative as shown in the following chart.

Anticipated Annual Volume	Optimal Model Choice
0–60,000	1500S
60,000–225,000	1500M
225,000 and higher	1500L

3. The projected donations from the wildlife show amount to $200,000 (10 percent of the TV audience at $20,000 per 1 percent of the viewership). The projected donations from the manufacturing series amount to $150,000 (15 percent of the TV audience at $10,000 per 1 percent of the viewership). Therefore, the differential revenue is $50,000, with the advantage going to the wildlife show. However, if the manufacturing show is aired, the station will be able to sell the wildlife show to network TV. Therefore, airing the wildlife show will result in the incurrence of a $50,000 opportunity cost.

The conclusion, then, is that the station's management should be indifferent between the two shows, since each would generate revenue of $200,000.

Wildlife show (10 × $20,000)	$200,000	donation
Manufacturing show (15 × $10,000)	$150,000	donation
Manufacturing show (sell wildlife show)	50,000	sales proceeds
	$200,000	total revenue

CASE 2-60 (30 MINUTES)

1. **MEMORANDUM**

Date: **Today**

To: **James Cassanitti**

From: **I. M. Student**

Subject: **Costs related to Printer Case Department**

The $30,100 building rental cost allocated to the Printer Case Department is part of larger rental costs for the entire building. Even if the Printer Case Department is closed down, Pinellas Printer Company still will occupy the entire building. Therefore, the entire rental cost, including the $30,100 portion allocated to the Printer Case Department, will be incurred whether or not the department closes.

The real cost of the space occupied by the Printer Case Department is the $41,000 the company is paying to rent warehouse space. This cost would be avoided if the Printer Case Department were closed, since the storage operation could be moved into the company's main building. The $41,000 rental cost is the *opportunity cost* of using space in the main building for the Printer Case Department.

The supervisor of the Printer Case Department will be retained by the company regardless of the decision about the Printer Case Department. However, if the Printer Case Department is kept in operation, the company will have to hire a new supervisor for the Assembly Department. The salary of that new supervisor is a relevant cost of continuing to operate the Printer Case Department.

Another way of looking at the situation is to realize that with the Printer Case Department in operation, the company will need two supervisors: the current Printer Case Department supervisor and a new supervisor for the Assembly Department. Alternatively, if the Printer Case Department is closed, only the current Printer Case Department supervisor will be needed. He or she will move to the Assembly Department. The difference, then, between the two alternatives is the cost of compensation for the new Assembly Department supervisor if the Printer Case Department is not closed.

CASE 2-60 (CONTINUED)

2. The controller has an ethical obligation to state accurately the projected cost savings from closing the Printer Case Department. The production manager and other decision makers have a right to know the financial implications of closing the department. Several of the ethical standards for management accountants (listed in Chapter 1) apply, including the following:

Competence:

- **Prepare complete and clear reports and recommendations after appropriate analyses of relevant and reliable information.**

Credibility:

- **Communicate information fairly and objectively.**
- **Disclose fully all relevant information that could reasonably be expected to influence an intended user's understanding of the reports, comments, and recommendations presented.**

FOCUS ON ETHICS (See page 57 in the text.)

Was WorldCom's controller just following orders?

The WorldCom controller allegedly did not perform his professional duties in accordance with relevant laws, regulations, and ethical standards for practitioners of managerial accounting and financial management. The justification that the controller makes for this alleged unethical duping of investors, that he was ordered to do so by senior management, is an insufficient defense of his actions. He was legally and ethically obliged to find and correct accounting errors, and to make an accurate representation of the firm's financial position to his fellow managers, the board of directors, and the investing public. Sometimes, because of negligence or conflicts of interest, senior management may accidentally or purposely give unethical instructions. The controller is obliged under these circumstances to uphold his professional integrity and insist on an appropriate treatment of the accounting information.