

## **CHAPTER 2**

# **Basic Cost Management Concepts**

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### **ANSWERS TO REVIEW QUESTIONS**

- 2-1** Product costs are costs that are associated with manufactured goods. They are assets 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 regards 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** The five types of production processes are as follows:
- **Job shop:** Low production volume; little standardization; one-of-a-kind products. Examples include custom home construction, movie production, and ship building.
  - **Batch:** Multiple products; low volume. Examples include construction equipment, tractor trailers, and cabin cruisers.
  - **Assembly line:** A few major products; higher volume. Examples include kitchen appliances and automobile assembly.
  - **Mass customization:** High production volume; many standardized components; customized combination of components. Examples include the computer industry and custom textbooks.
  - **Continuous flow:** High production volume; highly standardized commodity products. Examples include food processing, textiles, lumber, and chemicals.

- 2-5** The term mass customization is used to describe an industry such as the computer industry, where large numbers of identical components are mass produced, and then these components are combined in a customized way to customer specifications. For example, when a customer places an order for a Dell computer via the internet, the company assembles just the components requested by the customer, loads the requested software, and ships the customized computer system. Viewed in this light, the term mass customization is not internally inconsistent.
- 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. An 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 only to 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** A city 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 or more 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. 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** (a) 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. (b) The manager is exhibiting a common behavioural 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 (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
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Using this formula, we can find the missing amounts as follows:

	Case		
	I	II	III
Beginning inventory of finished goods.....	\$ 84,000*	\$12,000	7,000
Add: Cost of goods manufactured .....	419,000	95,000	318,000*
Subtract: Ending inventory of finished goods ...	<u>98,000</u>	<u>8,000</u>	<u>21,000</u>
Cost of goods sold .....	<u>\$405,000</u>	<u>\$99,000*</u>	<u>\$304,000</u>

\*Amount missing in exercise.

### EXERCISE 2-25 (10 MINUTES)

1.	Hours worked .....	40
	Wage rate .....	× \$ 18
	Total compensation .....	<u>\$720</u>

#### 2. Classification:

Direct labour (36 hours × \$18) .....	\$648
Overhead (idle time: 4 hours × \$18) .....	<u>72</u>
Total compensation .....	<u>\$720</u>

### 2-26 (10 MINUTES)

1.	Regular wages (40 hours × \$16) .....	\$ 640
	Overtime wages (5 hours × \$20) .....	<u>100</u>
	Total compensation .....	<u>\$ 740</u>

**EXERCISE 2-26 (CONTINUED)**

2.	Overtime hours.....	5 hrs.
	Overtime premium per hour (\$20 – \$16).....	× \$ 4
	Total overtime premium.....	<u>\$ 20</u>
3.	Classification:	
	Direct labour (45 hours × \$16).....	\$ 720
	Overhead (overtime premium: 5 hours × \$4).....	<u>20</u>
	Total compensation.....	<u>\$ 740</u>

**EXERCISE 2-27 (30 MINUTES)**

Mass customization is well suited to Dell Computer's operations because of the company's direct-selling approach, in which customers order customized computer systems, often via the internet. Then Dell orders just the components necessary to assemble the computer systems that have been ordered, and delivery is made in a relatively short period of time.

**EXERCISE 2-28 (20 MINUTES)**

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

**EXERCISE 2-29 (25 MINUTES)**

1.

**ALEXANDRA ALUMINUM COMPANY  
SCHEDULE OF COST OF GOODS MANUFACTURED  
FOR THE YEAR ENDED DECEMBER 31, 20X1**

<b>Direct material:</b>		
Raw-material inventory, January 1 .....	\$ 60,000	
Add: Purchases of raw material .....	<u>250,000</u>	
Raw material available for use .....	\$310,000	
Deduct: Raw-material inventory, December 31 .....	<u>70,000</u>	
Raw material used .....		\$240,000
Direct labour .....		400,000
<b>Manufacturing overhead:</b>		
Indirect material .....	\$ 10,000	
Indirect labour .....	25,000	
Depreciation on plant and equipment .....	100,000	
Utilities .....	25,000	
Other .....	<u>30,000</u>	
Total manufacturing overhead .....		<u>190,000</u>
Total manufacturing costs .....		\$830,000
Add: Work-in-process inventory, January 1 .....		<u>120,000</u>
Subtotal .....		\$950,000
Deduct: Work-in-process inventory, December 31 .....		<u>115,000</u>
Cost of goods manufactured .....		<u>\$835,000</u>

2.

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

Finished-goods inventory, January 1 .....		\$150,000
Add: Cost of goods manufactured .....		<u>835,000</u>
Cost of goods available for sale .....		\$985,000
Deduct: Finished-goods inventory, December 31 .....		<u>165,000</u>
Cost of goods sold .....		<u>\$820,000</u>

**EXERCISE 2-29 (CONTINUED)**

3. **ALEXANDRA ALUMINUM COMPANY**  
**INCOME STATEMENT**  
**FOR THE YEAR ENDED DECEMBER 31, 20X1**

Sales revenue .....	\$1,105,000
Less: Cost of goods sold .....	<u>820,000</u>
Gross margin .....	\$ 285,000
Selling and administrative expenses .....	<u>110,000</u>
Income before taxes .....	\$ 175,000
Income tax expense .....	<u>70,000</u>
Net income .....	<u>\$ 105,000</u>

4. In the electronic version of the solutions manual, press the CTRL key and click on the following link: [Build a Spreadsheet 02-29.xls](#)

**EXERCISE 2-30 (15 MINUTES)**

	Number of Muffler Replacements		
	500	600	700
<b>Total costs:</b>			
Fixed costs .....	(a) \$42,000	\$42,000	(b) \$42,000
Variable costs .....	(c) <u>25,000</u>	<u>30,000</u>	(d) <u>35,000</u>
Total costs .....	(e) <u>\$67,000</u>	<u>\$72,000</u>	(f) <u>\$77,000</u>
<b>Cost per muffler replacement:</b>			
Fixed cost .....	(g) \$ 84	(h) \$ 70	(i) \$ 60
Variable cost .....	(j) <u>50</u>	(k) <u>50</u>	(l) <u>50</u>
Total cost per muffler replacement .....	(m) <u>\$134</u>	(n) <u>\$120</u>	(o) <u>\$110</u>

**Explanatory Notes:**

- (a) Total fixed costs do not vary with activity.
- (c) Variable cost per replacement =  $\$30,000/600 = \$50$   
Total variable cost for 500 replacements =  $\$50 \times 500 = \$25,000$
- (g) Fixed cost per replacement =  $\$42,000/500 = \$84$
- (j) Variable cost per replacement =  $\$25,000/500 = \$50$



**EXERCISE 2-31 (15 MINUTES)**

- |    |  |                |           |
|----|--|----------------|-----------|
| 1. | Phone bill, January: $\$100 + (\$.25 \times 6,000)$ .....  | \$1,600        |           |
|    | Phone bill, February: $\$100 + (\$.25 \times 5,000)$ ..... | \$1,350        |           |
| 2. | Cost per call, January: $\$1,600/6,000$ .....              | \$ .267        | (rounded) |
|    | Cost per call, February: $\$1,350/5,000$ .....             | \$ .27         |           |
| 3. | Fixed component, January .....                             | \$ 100         |           |
|    | Variable component, January: $\$.25 \times 6,000$ .....    | <u>1,500</u>   |           |
|    | Total.....   | <u>\$1,600</u> |           |
- Since each phone call costs \$.25, the marginal cost of making the 6,001st call is \$.25.
  - The average cost of a phone call in January (rounded) is \$.267 ( $\$1,600/6,000$ ).

**EXERCISE 2-32 (5 MINUTES)**

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

**EXERCISE 2-33 (5 MINUTES)**

Annual cost using European component: $\$8,900 \times 10$ .....	\$89,000
Annual cost using Part A200: $(\$5,100 + \$500) \times 10$ .....	<u>56,000</u>
Annual differential cost .....	<u>\$33,000</u>

**EXERCISE 2-34 (5 MINUTES)**

- The \$14,000 is the *opportunity cost* associated with using the computer in the Ministry of Education for work in the premier's office.
- The \$14,000 leasing cost should be assigned to the premier's office. It was incurred as a result of activity in that office.

### EXERCISE 2-35 (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 \$40 (\$100 sales proceeds minus \$60 out-of-pocket purchase cost). Instead, you went to the game, which left you relieved of your \$60 out-of-pocket cost. The difference between the \$60 *reduction* in your wealth and the \$40 *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 \$60 you actually had paid for the ticket is a *sunk cost*. It is not relevant to any future decision.

### EXERCISE 2-36 (15 MINUTES)

1. The marginal cost would include any food and beverages consumed by the passenger and perhaps an imperceptible increase in fuel costs.
2. 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.
3. 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.
4. The marginal cost would include the additional wages or commissions earned by the branch bank employees and the additional electricity used for light, heat, and computer equipment.
5. The marginal cost of the skis would include the direct material. It is unlikely that labour and other costs would change with the addition of only one more product unit.

**SOLUTIONS TO PROBLEMS****PROBLEM 2-37 (20 MINUTES)**

1.
  1. Income statement
  2. Balance sheet
  3. Income statement
  4. Income statement
  5. Cost-of-goods-manufactured schedule
  6. Income statement
  7. Cost-of-goods-manufactured schedule
  8. Cost of-goods-manufactured schedule
  9. Balance sheet, cost-of-goods-manufactured schedule
  10. Income statement
  11. Income statement
  
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, income statements 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 2-38 (30 MINUTES)**

1.	Manufacturing overhead:	
	Indirect	\$109,000
	labour.....	
	Building depreciation (\$80,000 x 75%)..	60,000
	Other factory costs.....	<u>344,000</u>
	Total.....	<u>\$513,000</u>

## PROBLEM 2-38 (CONTINUED)

## 2. Cost of goods manufactured:

## Direct material:

Raw-material inventory, Jan. 1.....	\$ 15,800	
Add: Purchases of raw material.....	<u>175,000</u>	
Raw material available for use.....	\$190,800	
Deduct: Raw-material inventory, Dec. 31....	<u>18,200</u>	
Raw material used.....		\$172,600

Direct labour..... 254,000

Manufacturing overhead..... 513,000

Total manufacturing costs..... \$939,600

Add: Work-in-process inventory, Jan. 1..... 35,700

Subtotal..... \$975,300

Deduct: Work-in-process inventory, Dec. 31.... 62,100

Cost of goods manufactured..... \$913,200

## 3. Cost of goods sold:

Finished-goods inventory, Jan. 1.....	\$ 111,100
Add: Cost of goods manufactured.....	<u>913,200</u>
Cost of goods available for sale.....	\$1,024,300
Deduct: Finished-goods inventory, Dec. 31...	<u>97,900</u>
Cost of goods sold.....	<u>\$ 926,400</u>

## 4. Net income:

Sales revenue..... \$1,495,000

Less: Cost of goods sold..... 926,400

Gross margin..... \$ 568,600

## Selling and administrative expenses:

Salaries..... \$133,000

Building depreciation (\$80,000 x 25%)..... 20,000

Other..... 195,000 348,000

Income before taxes..... \$ 220,600

Income tax expense (\$220,600 x 30%)..... 66,180

Net income..... \$ 154,420

5. The company sold 11,500 units during the year ( $\$1,495,000 \div \$130$ ). Since 160 of the units came from finished-goods inventory ( $1,350 - 1,190$ ), the company would have manufactured 11,340 units ( $11,500 - 160$ ).

6. In the electronic version of the solutions manual, press the CTRL key and click on the following link: [Build a Spreadsheet 02-38.xls](#)

**PROBLEM 2-39 (25 MINUTES)**

Since gross margin equals 30% of sales, cost of goods sold equals 70% of sales, or \$231,000 (\$330,000 x 70%). Thus, the finished goods destroyed by the fire cost \$44,000, computed as follows:

Finished-goods inventory, Jan. 1 (given).....	\$ 37,000
Add: Cost of goods manufactured*.....	<u>238,000</u>
Cost of goods available for sale (given).....	\$275,000
Deduct: Finished-goods inventory, Apr. 12*.....	<u>44,000</u>
Cost of goods sold (calculated above).....	<u>\$231,000</u>

\*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 labour).

Thus: Let X = direct material used

$$X = (X + \$120,000) \times 25\%$$

$$X = 0.25X + \$30,000$$

$$0.75X = \$30,000$$

$$X = \$40,000$$

Manufacturing overhead:

Manufacturing overhead equals 50% of total production costs.

Thus: Let Y = manufacturing overhead

$$Y = (\text{direct material used} + \text{direct labour} + \text{manufacturing overhead}) \times 50\%$$

$$Y = (\$40,000 + \$120,000 + Y) \times 50\%$$

$$Y = \$20,000 + \$60,000 + 0.50Y$$

$$0.50Y = \$80,000$$

$$Y = \$160,000$$

The work in process destroyed by the fire cost \$103,000, computed as follows:

Direct material.....	\$ 40,000
Direct labour (given).....	120,000
Manufacturing overhead.....	<u>160,000</u>
Total manufacturing costs.....	\$320,000
Add: Work-in-process inventory, Jan. 1 (given)...	<u>21,000</u>
Subtotal.....	\$341,000
Deduct: Work-in-process inventory, Apr. 12*.....	<u>103,000</u>
Cost of goods manufactured (from above).....	<u>\$238,000</u>

**\*\$103,000 = \$341,000 – \$238,000**

**PROBLEM 2-40 (25 MINUTES)**

1. **Fixed manufacturing overhead per unit:**  
 $\$600,000 \div 24,000 \text{ units produced} = \$25$

**Average unit manufacturing cost:**

Direct material.....	\$ 20
Direct labour.....	37
Variable manufacturing overhead..	48
Fixed manufacturing overhead.....	<u>25</u>
<b>Average unit cost.....</b>	<b><u>\$130</u></b>
Production.....	24,000 units
Sales.....	<u>20,000 units</u>
Ending finished-goods inventory...	<u>4,000 units</u>

**Cost of December 31 finished-goods inventory:**  
 4,000 units x \$130 = \$520,000

2. **Net income:**
- |  |                          |
|--|--------------------------|
| Sales revenue (20,000 units x \$185).....      | \$3,700,000              |
| Cost of goods sold (20,000 units x \$130)..... | <u>2,600,000</u>         |
| Gross margin.....                              | \$1,100,000              |
| Selling and administrative expenses.....       | <u>860,000</u>           |
| Income before taxes.....                       | \$ 240,000               |
| Income tax expense (\$240,000 x 30%).....      | <u>72,000</u>            |
| <b>Net income.....</b>                         | <b><u>\$ 168,000</u></b> |

3. (a) **No change. Direct labour 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 2-41 (40 MINUTES)**

	Case A	Case B	Case C
Beginning inventory, raw material .....	\$60,000*	\$ 20,000	\$ 15,000
Ending inventory, raw material .....	90,000	10,000*	30,000
Purchases of raw material .....	100,000	85,000	70,000*
Direct material used.....	70,000	95,000	55,000*
Direct labour.....	200,000*	100,000	125,000
Manufacturing overhead .....	250,000	150,000*	160,000
Total manufacturing costs .....	520,000	345,000	340,000
Beginning inventory, work in process .....	35,000	20,000	15,000*
Ending inventory, work in process .....	30,000*	35,000	5,000
Cost of goods manufactured .....	525,000	330,000*	350,000
Beginning inventory, finished goods .....	50,000	40,000	20,000*
Cost of goods available for sale .....	575,000*	370,000*	370,000
Ending inventory, finished goods .....	30,000*	40,000*	25,000
Cost of goods sold .....	545,000	330,000	345,000*
Sales .....	800,000*	500,000*	480,000
Gross margin .....	255,000	170,000	135,000*
Selling and administrative expenses .....	105,000*	75,000	45,000*
Income before taxes .....	150,000	95,000*	90,000
Income tax expense .....	40,000	45,000	35,000*
Net income .....	110,000*	50,000*	55,000

\*Amount missing in problem.

**PROBLEM 2-42 (25 MINUTES)**

1. a. Total prime costs:

Direct material.....	\$ 2,100,000
Direct labour:	
Wages .....	485,000
Fringe benefits .....	95,000
Total prime costs .....	<u>\$ 2,680,000</u>

**PROBLEM 2-42 (CONTINUED)****b. Total manufacturing overhead:**

Depreciation on factory building .....	\$ 115,000
Indirect labour: wages.....	140,000
Production supervisor's salary .....	45,000
Service department costs .....	100,000
Indirect labour: fringe benefits .....	30,000
Fringe benefits for production supervisor .....	9,000
Total overtime premiums paid.....	55,000
Cost of idle time: production employees.....	40,000
<b>Total manufacturing overhead .....</b>	<b><u>\$ 534,000</u></b>

**c. Total conversion costs:**

Direct labour (\$485,000 + \$95,000) .....	\$ 580,000
Manufacturing overhead .....	534,000
<b>Total conversion costs.....</b>	<b><u>\$1,114,000</u></b>

**d. Total product costs:**

Direct material.....	\$2,100,000
Direct labour .....	580,000
Manufacturing overhead .....	534,000
<b>Total product costs .....</b>	<b><u>\$3,214,000</u></b>

**e. Total period costs:**

Advertising expense.....	\$ 99,000
Administrative costs .....	150,000
Rental of office space for sales personnel .....	15,000
Sales commissions .....	5,000
Product promotion costs .....	10,000
<b>Total period costs.....</b>	<b><u>\$ 279,000</u></b>

2. The \$15,000 in rental cost for sales office space rental is an opportunity cost. It measures the opportunity cost of using the former sales office space for raw-material storage.



**PROBLEM 2-43 (35 MINUTES)**

1.

**ATELIER ALEXANDRE  
SCHEDULE OF COST OF GOODS MANUFACTURED  
FOR THE YEAR ENDED DECEMBER 31, 20X2**

<b>Direct material:</b>		
Raw-material inventory, January 1 .....	\$ 40,000	
Add: Purchases of raw material .....	<u>180,000</u>	
Raw material available for use .....	\$220,000	
Deduct: Raw-material inventory, December 31 .....	<u>25,000</u>	
Raw material used .....		\$195,000
Direct labour .....		200,000
<b>Manufacturing overhead:</b>		
Indirect material .....	\$ 10,000	
Indirect labour .....	15,000	
Utilities: plant .....	40,000	
Depreciation: plant and equipment .....	60,000	
Other manufacturing overhead .....	<u>80,000</u>	
Total manufacturing overhead .....		<u>205,000</u>
Total manufacturing costs .....		\$600,000
Add: Work-in-process inventory, January 1 .....		<u>40,000</u>
Subtotal .....		\$640,000
Deduct: Work-in-process inventory, December 31 .....		<u>30,000</u>
Cost of goods manufactured .....		<u>\$610,000</u>

2.

**ATELIER ALEXANDRE  
SCHEDULE OF COST OF GOODS SOLD  
FOR THE YEAR ENDED DECEMBER 31, 20X2**

Finished goods inventory, January 1 .....	\$ 20,000
Add: Cost of goods manufactured .....	<u>610,000</u>
Cost of goods available for sale .....	\$630,000
Deduct: Finished-goods inventory, December 31 .....	<u>50,000</u>
Cost of goods sold .....	<u>\$580,000</u>

**PROBLEM 2-43 (CONTINUED)**

3.

**ATELIER ALEXANDRE  
INCOME STATEMENT  
FOR THE YEAR ENDED DECEMBER 31, 20X2**

Sales revenue .....	\$950,000
Less: Cost of goods sold .....	<u>580,000</u>
Gross margin .....	\$370,000
Selling and administrative expenses .....	<u>150,000</u>
Income before taxes .....	\$220,000
Income tax expense .....	<u>90,000</u>
Net income .....	<u><u>\$130,000</u></u>

4. In the electronic version of the solutions manual, press the CTRL key and click on the following link: [Build a Spreadsheet 02-43.xls](#)

**PROBLEM 2-44 (15 MINUTES)**

1.	Regular hours: $40 \times \$12$ .....	\$480
	Overtime hours: $8 \times \$16$ .....	<u>128</u>
	Total cost of wages .....	<u>\$608</u>
2.	a. Direct labour: $38 \times \$12$ .....	\$456
	b. Manufacturing overhead (idle time): $1 \times \$12$ .....	12
	c. Manufacturing overhead (overtime premium): $8 \times (\$16 - \$12)$ .....	32
	d. Manufacturing overhead (indirect labour): $9 \times \$12$ .....	<u>108</u>
	Total cost of wages .....	<u>\$608</u>

**PROBLEM 2-45 (20 MINUTES)**

1. a, d, g, i
2. a, d, g, j
3. b, f
4. b, d, g, k
5. a, d, g, k

**PROBLEM 2-45 (CONTINUED)**

6. a, d, g, j
7. b, c, f
8. b, d, g, k
9. b, c and d\*, e and f and g\*, k\*

\*The building is used for several purposes.

10. b, c, f
11. b, c, h
12. b, c, f
13. b, c, e
14. b, c and d<sup>=</sup>, e and f and g<sup>=</sup>, k<sup>=</sup>

<sup>=</sup>The building that the furnace heats is used for several purposes.

15. b, d, g, k

**PROBLEM 2-46 (20 MINUTES)**

1.  $1.5 \text{ hours} \times (\$12 + \$3) = \$22.50$

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

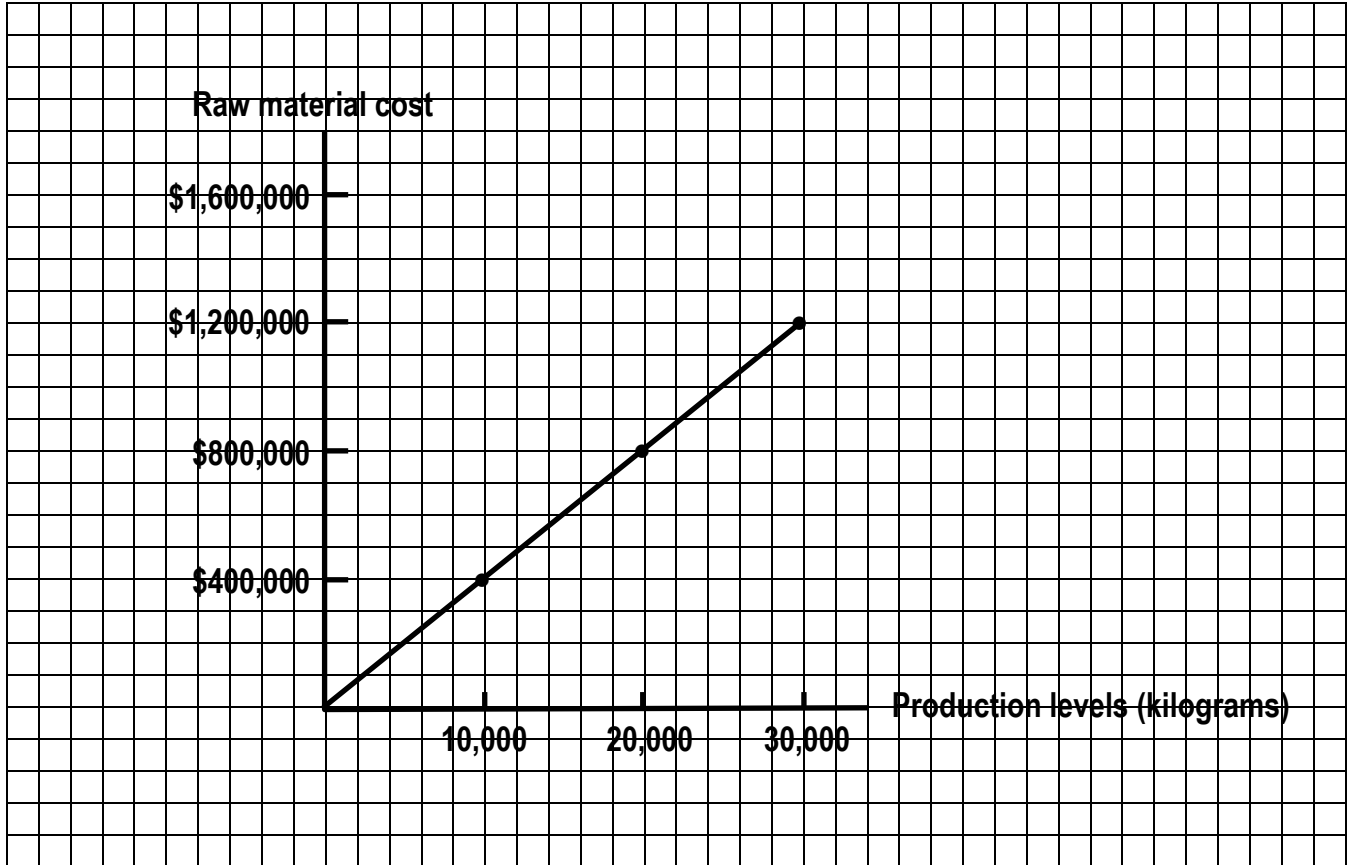
2.  $1.5 \text{ hours} \times \$12 \times .5 = \$9$

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.
4. The \$82 is an opportunity cost of using Gaines on the flight departing from Thunder Bay on August 11. The cost should be assigned to the August 11 flight departing from Thunder Bay.

**PROBLEM 2-47 (15 MINUTES)**

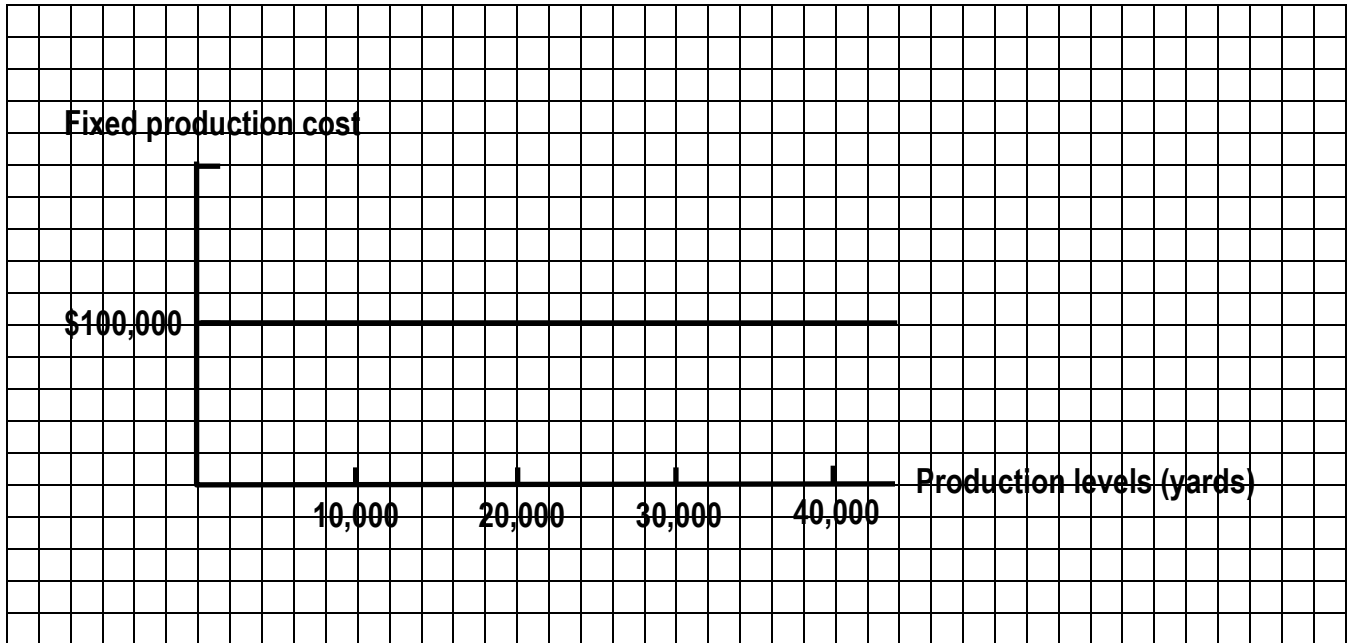
1. **Graph of raw-material cost:**



2.	Production Level in Kilograms	Unit Cost	Total Cost
	1	\$40 per kilogram	\$40
	10	\$40 per kilogram	\$400
	1,000	\$40 per kilogram	\$40,000

**PROBLEM 2-48 (25 MINUTES)**

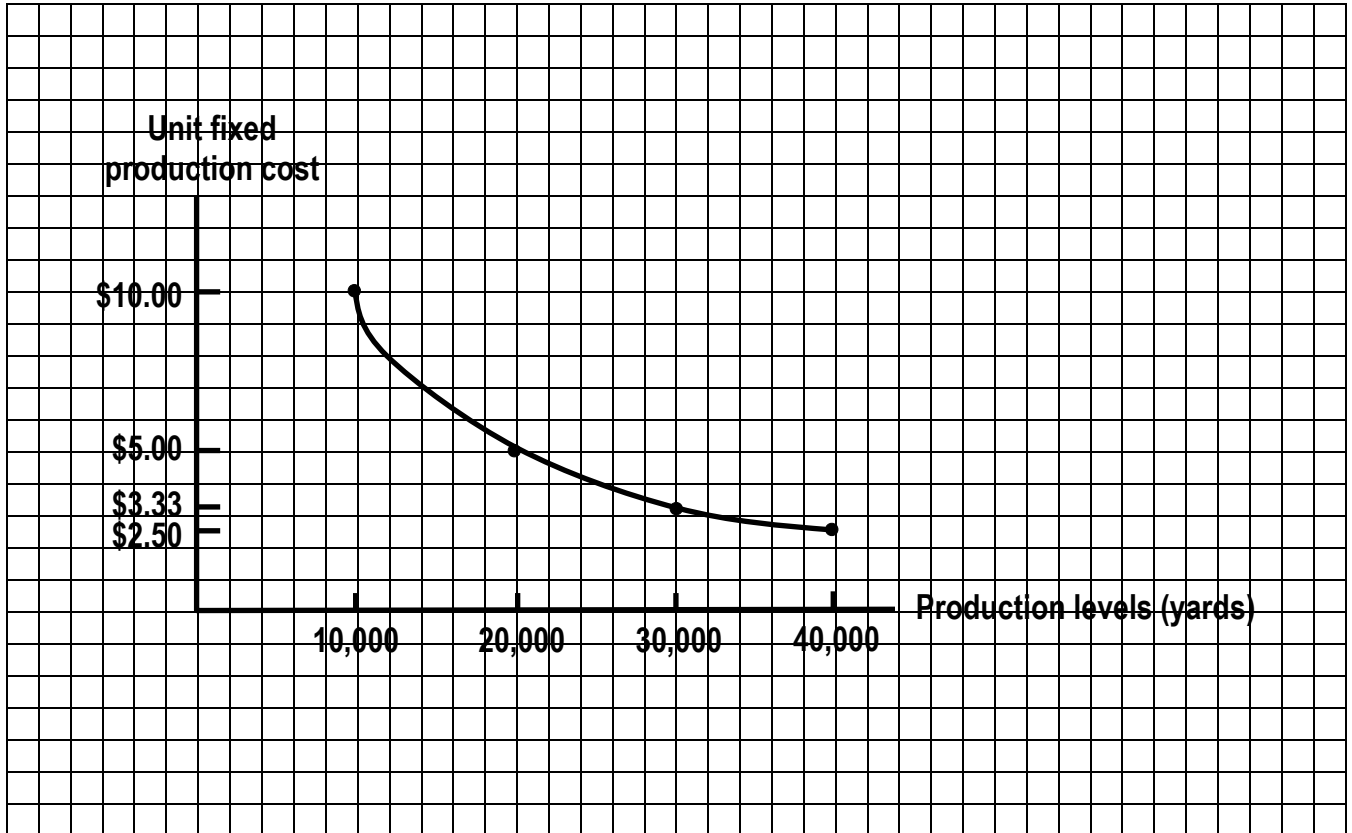
**1. Graph of fixed production cost:**



2.	Production Level in Yards	Unit Fixed Cost	Total Fixed Cost
	1	\$100,000 per yard	\$100,000
	10	\$10,000 per yard	\$100,000
	10,000	\$10 per yard	\$100,000
	40,000	\$2.50 per yard	\$100,000

**PROBLEM 2-48 (CONTINUED)**

3. Graph of unit fixed production cost:



**PROBLEM 2-49 (10 MINUTES)**

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

**PROBLEM 2-50 (10 MINUTES)**

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

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

**PROBLEM 2-51 (15 MINUTES)**

	Variable or Fixed	20x2 Forecast	Explanation
<b>Direct material</b>	V	\$3,600,000	\$3,000,000 × 1.20
<b>Direct labour</b>	V	2,640,000	\$2,200,000 × 1.20
<b>Manufacturing overhead</b>			
Utilities (primarily electricity)	V	168,000	\$140,000 × 1.20
Depreciation on plant and equipment	F	230,000	same
Insurance	F	160,000	same
Supervisory salaries	F	300,000	same
Property taxes	F	210,000	same
<b>Selling costs</b>			
Advertising	F	195,000	same
Sales commissions	V	108,000	\$90,000 × 1.20
<b>Administrative costs</b>			
Salaries of top management and staff	F	372,000	same
Office supplies	F	40,000	same
Depreciation on building and equipment	F	80,000	same

**PROBLEM 2-52 (15 MINUTES)**

1. f, average cost
2. e, marginal cost
3. c, sunk cost
4. a, opportunity cost
5. d, differential cost
6. b, out-of-pocket cost
7. e, marginal cost

**PROBLEM 2-53 (20 MINUTES)**

1. b, d, e, k
2. a, c, e, k
3. h
4. a, d, e\*, j

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

5. d, e, i
6. i
7. d, e, i
8. a, d, e, k
9. a, d, e, k
10. j
11. g (The \$300 cost savings is a differential cost.)
12. a, c, e



**PROBLEM 2-53 (CONTINUED)**

- 13. d, e, k
- 14. e, k
- 15. b, d\*, e, k

\*Unless the dishwasher has been used improperly.

**PROBLEM 2-54 (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.

WestJet Airlines Company is an airline, which is a service industry firm. The company does not sell an inventorable 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 labour, direct material, and manufacturing overhead incurred in the manufacturing process. Wal-Mart Stores' cost-accounting system measures the cost of acquiring merchandise for resale. WestJet Airlines' cost-accounting system measures the cost of aviation fuel consumed.
3. The ticket agents' salaries would be included in salaries, wages, and benefits. The costs of the computer equipment used to keep track of reservations 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).

**PROBLEM 2-54 (CONTINUED)**

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 2-55 (10 MINUTES)**

1. \$400 (\$850 – \$450)
2. \$330 (\$1,540 – \$1,210)
3. \$310 (\$1,850 – \$1,540)
4. \$425 (\$850/2)
5. \$385 (\$1,540/4)
6. \$370 (\$1,850/5)

**PROBLEM 2-56 (25 MINUTES)**

1. b, c, g, h, j, m
2. a, c, i, j, l
3. b, d, i, j, m
4. a, d, i, j, l
5. a, c, i, j, l
6. e
7. a, c, i, j, l
8. f
9. b, d, k, m

10. a, c, i, j, m  
 11. b, c, i, j, l  
 12. a, c, i, j, l  
 13. b, c, g, j, l  
 14. b, d, i, j, l  
 15. b, c, i, j, l

**PROBLEM 2-57 (25 minutes)**

1.

Output (.75 litre bottles)	Calculation	Unit Cost
10,000	\$177,000/10,000	\$17.70
15,000	\$195,500/15,000	\$13.03 (rounded)
20,000	\$214,000/20,000	\$10.70

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

2.

Output (.75 litre bottles)	Sales Revenue	Total Costs	Profit
10,000	\$180,000	\$177,000	\$ 3,000
15,000	225,000	195,500	29,500
20,000	240,000	214,000	26,000

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.

**PROBLEM 2-58 (15 MINUTES)**

1. If the company buys 30,000 units of Part MR24, at a price of \$X per unit, its total cost will be:

$$(30,000 \times \$X) + \$60,000$$

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

$$(30,000 \times \$11) + \$150,000$$

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:

$$30,000X + 60,000 = (30,000)(11) + 150,000$$

$$30,000X = 420,000$$

$$X = 14$$

Thus the firm will realize a net benefit by purchasing Part MR24 if the outside supplier charges a price less than \$14.

2. If the firm buys Y units of Part MR24 at a price of \$12.875 per unit, the total cost will be:

$$(\$12.875 \times Y) + \$60,000$$

If the company manufactures Y units of Part MR24, the total cost will be:

$$(\$11 \times Y) + \$150,000$$

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 MR24.

$$12.875Y + 60,000 = 11Y + 150,000$$

$$1.875Y = 90,000$$

$$Y = 48,000$$

Thus, the company will be indifferent between the two alternatives if it requires 48,000 units of Part MR24 each month.

## SOLUTIONS TO CASES

### CASE 2-59 (30 MINUTES)

1. **MEMORANDUM**

**Date:** Today  
**To:** James Cassanitti  
**From:** I. M. Student  
**Subject:** Costs related to Printer Case Department

The \$29,500 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, CompTech still will occupy the entire building. Therefore, the entire rental cost, including the \$29,500 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 \$39,000 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 \$39,000 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 2-59 (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:*

- Maintain an appropriate level of professional expertise by continually developing knowledge and skills.
- Perform professional duties in accordance with relevant laws, regulations, and technical standards.
- Provide decision support information and recommendations that are accurate, clear, concise, and timely.
- Recognize and communicate professional limitations or other constraints that would preclude responsible judgment or successful performance of an activity.

### *Credibility:*

- Communicate information fairly and objectively.
- Disclose all relevant information that could reasonably be expected to influence an intended user's understanding of the reports, analyses, or recommendations.
- Disclose delays or deficiencies in information, timeliness, processing, or internal controls in conformance with organization policy and/or applicable law.

**CASE 2-60 (50 MINUTES)**

1. a. SpeedyQ Company would be indifferent to acquiring either the small-volume copier, 1024S, or the medium-volume copier, 1024M, at the point where the costs for 1024S and 1024M are equal. This point may be calculated using the following formula, where  $X$  equals the number of copies:

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

1024S	1024M
$\$.14X + \$8,000$	$= \$.09X + \$11,000$
$\$.05X$	$= \$3,000$
$X$	$= 60,000 \text{ copies}$

The conclusion is that SpeedyQ Company would be indifferent to acquiring either the 1024S or 1024M 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 SpeedyQ Company 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:

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

For the 1024S machine compared to the 1024M machine:

1024S	1024M
$\$.14X + \$8,000$	$= \$.09X + \$11,000$
$\$.05X$	$= \$3,000$
$X$	$= 60,000 \text{ copies}$

**CASE 2-60 (CONTINUED)**

For the 1024M machine compared to the 1024G machine:

$$\begin{aligned}
 & \qquad \qquad \qquad 1024M \qquad 1024G \\
 & \$0.09X + \$11,000 = \$0.05X + \$20,000 \\
 & \qquad \qquad \qquad \$0.04X = \$9,000 \\
 & \qquad \qquad \qquad X = 225,000 \text{ copies}
 \end{aligned}$$

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

Anticipated Annual Volume	Optimal Model Choice
0–60,000	1024S
60,000–225,000	1024M
225,000 and higher	1024G

2. a. The previous purchase price of the endor on hand, \$5.00 per litre, and the average cost of the endor inventory, \$4.75 per litre, 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 \$5.50 per litre, 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 9,800 litres of endor will be replaced at a cost of \$5.75 per litre. Therefore, the real cost of endor for the special order is \$56,350 (9,800 × \$5.75).
- b. The \$20,000 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 \$11 per kilogram is irrelevant, since no more tatooine will be purchased. If the special order is accepted, Alderon will use 1,500 kilograms of its tatooine stock, thereby losing the opportunity to sell its entire 2,000-kilogram stock for \$14,000. Thus, the \$14,000 is an opportunity cost of using the tatooine in production instead of selling it to Solo Industries. Moreover, if Alderon uses 1,500 kilograms of tatooine in production, it will have to pay \$1,000 for its remaining 500 kilograms to be disposed of at a hazardous waste facility. This \$1,000 disposal cost is an out-of-pocket cost.

The real cost of using the tatooine in the special order is \$15,000 (\$14,000 opportunity cost + \$1,000 out-of-pocket cost).



**CASE 2-60 (CONTINUED)**

3. The projected revenues from the wildlife show amount to \$100,000 (10 percent of the TV audience at \$10,000 per 1 percent of the viewership). The projected revenues from the manufacturing series amount to \$75,000 (15 percent of the TV audience at \$5,000 per 1 percent of the viewership). Therefore, the differential revenue is \$25,000, 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 \$25,000 opportunity cost.

The conclusion, then, is that the station's management should be indifferent between the two shows, since each would generate revenue of \$100,000.

Wildlife show (10 × \$10,000)	<u>\$100,000</u>	revenues
Manufacturing show (15 × \$5,000)	\$ 75,000	revenues
Manufacturing show (sell wildlife show)	<u>25,000</u>	sales proceeds
	<u>\$100,000</u>	total revenue

**FOCUS ON ETHICS (See page 50 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 defence 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.