

## Chapter 2

### Product Costing: Manufacturing Processes, Cost Terminology, and Cost Flows

#### Concept Questions

1. (LO1—Inventory accounts—raw materials, WIP, and finished goods)

Raw materials inventory is the inventory of materials needed for the manufacturing process but not yet put into production. Work in process inventory is the inventory of unfinished (partially finished) products. Finished-goods inventory is the inventory of goods that have been completed and are waiting to be sold.

2. (LO1, 2—Comparison of traditional manufacturing environment and JIT)

JIT systems are called pull systems because they start with the customer order and products are pulled through the manufacturing process. In contrast, traditional systems are called push systems because raw materials, work in process, and finished goods are pushed through the manufacturing process regardless of whether a customer has been identified for the finished product.

3. (LO2—Description of JIT system)

A JIT system is a system in which a customer order starts the manufacturing process, raw materials are purchased just in time to be used in production, and goods are completed just in time to be shipped to customers.

4. (LO2—JIT and lean production benefits)

Advantages of JIT and lean production manufacturing are likely to include the following:

1. A reduction in waste and scrap
2. An improvement in the quality of products
3. A reduction in overall production costs (although the costs of raw materials may increase in some cases)
4. A reduction in labor costs
5. A reduction in inventory
6. A reduction in processing time
7. An increase in manufacturing flexibility

5. (LO2—Applying lean production to a service company)

A bank might apply lean production techniques in an effort to reduce the time that customers wait in line to make deposits or conduct other business with a bank teller. This approach might include changing the process for counting money and checks and reconfiguring the work space so that tellers and other bank personnel can work more efficiently. Banks might also apply lean production techniques in an effort to reduce the amount of time it takes for customers to complete loan applications and for loans to be approved. This approach might include allowing customers to complete application forms online and streamlining the approval process to reduce the time from application to approval.

6. (LO3—Direct versus indirect costs)

Direct costs, such as the costs of direct materials and direct labor, can be directly and conveniently traced to a particular product or cost object and become an integral part of the finished product. Indirect costs, such as the costs of indirect materials and indirect labor, while required in the manufacture of a product or provision of a service, cannot be conveniently and easily traced to the product or cost object.

7. (LO3—Manufacturing costs)

The three components of manufacturing costs are direct materials, direct labor, and manufacturing overhead. Manufacturing overhead comprises the costs of indirect materials used in the manufacturing process, indirect labor, and other costs associated with manufacturing a product, including, but not limited to, the costs of repairs and maintenance, supplies, utilities, rent, and items such as insurance, taxes, and depreciation on the manufacturing plant and equipment.

8. (LO3—Nonmanufacturing costs)

Nonmanufacturing costs include all costs incurred outside the factory and are categorized as selling and administrative costs. Nonmanufacturing costs are also called period costs. Students should note that the same types of costs classified as manufacturing costs can be classified as nonmanufacturing costs. For example, the costs of repairs and maintenance, supplies, utilities, rent, insurance, taxes, and depreciation incurred outside the factory or plant would be classified as nonmanufacturing costs.

9. (LO4—Cost flows in a manufacturing environment)

Manufacturing costs (that is, the costs of direct materials, direct labor, and manufacturing overhead) are combined in the production process in such a way as to become work in process inventory. After the production process is completed, the work in process inventory is transformed into finished-goods

inventory and is available to be sold to customers. Upon sale, the cost of finished-goods inventory becomes part of the cost of goods sold for the period.

10. (LO5—Cost versus expense)

Although often used interchangeably, *cost* and *expense* are not synonymous terms. Costs can be classified in a number of ways, including manufacturing costs (product costs) and nonmanufacturing costs (period costs). Costs are incurred any time resources are used up in providing goods and services. For example, direct material and direct labor costs are incurred when cash is spent to purchase materials or hire workers. By contrast, expenses can be thought of as expired or used-up costs. As you will recall, product costs are expensed (as cost of goods sold) only when the product is sold. In contrast, period costs are expensed in the period in which they are incurred.

11. (LO5—Product versus period costs)

Manufacturing costs are called product costs because they attach to the product and are expensed only when the product is sold. Nonmanufacturing costs are called period costs because they are expensed in the period in which they are incurred.

12. (LO5—The need for product costing)

Companies need to identify accurate product costs in order to determine whether products should be produced and, if so, what price should be charged for those products. Costing information is also used to help determine how much of a product to make and in forecasting cash disbursements.

## Brief Exercises

1. (LO1—Understanding the production process)

- a. False
- b. False
- c. True
- d. True
- e. False

2. (LO2—JIT and lean production)

- a. decrease
- b. decreases
- c. increases
- d. increase

- e. decreases
  - f. increases
  - g. decreases
3. (LO3—Manufacturing versus nonmanufacturing costs)
- a. manufacturing
  - b. manufacturing
  - c. manufacturing
  - d. nonmanufacturing
  - e. manufacturing
  - f. nonmanufacturing
4. (LO2—Features of lean production)
- a. True
  - b. False
  - c. False
  - d. True
  - e. True
5. (LO3—Types of manufacturing costs)
- a. IL
  - b. DM
  - c. IL
  - d. MOH
  - e. IL
  - f. DL
  - g. IM
6. (LO3—Product costs)
- A. Total product costs are \$90,000 and include direct materials used of \$41,000, direct labor of \$28,000, factory rent of \$12,000, and factory depreciation of \$9,000.
  - B. The product cost per unit is \$2.00 (\$90,000/45,000 units).

## Exercises

7. (LO3—Product costs)
- A. The cost of direct labor for each desk is \$60 (4 direct labor hours per desk  $\times$  \$15 per hour).

- B. The total overhead costs were \$2,620 and included factory rent, indirect materials, and indirect labor.
- C. The total product costs were \$41,620, broken down as follows:

Direct material (500 units × \$18 per unit)	\$ 9,000
Direct labor (500 units × \$60 per unit)	30,000
Manufacturing overhead	<u>2,620</u>
Total product costs	<u>\$41,620</u>

8. (LO3—Direct and indirect labor)

Machine operators and fabric cutters would be considered direct labor. Total direct labor costs are therefore \$125,000. Quality control supervisors and the factory janitor would be considered indirect labor and part of manufacturing overhead. Total indirect labor costs are therefore \$58,000. The salary of the company president would be a nonmanufacturing (period) cost.

9. (LO3—Raw material used)

$$10,000 \text{ boards} \times 0.80 \text{ pound/board} = 8,000 \text{ pounds} \times \$1.24/\text{pound} = \$9,920$$

10. (LO4—Cost flows: Raw materials used)

Beginning raw materials inventory	\$ 25,000
Plus: Raw materials purchased	+120,000
Less: Ending raw materials inventory	<u>- 32,000</u>
Raw materials used in production	<u>\$113,000</u>

11. (LO4—Cost of goods manufactured)

The cost of goods manufactured is broken down as follows:

Beginning inventory of work in process	\$ 25,000
Plus: Raw materials used in production	95,000 **
Plus: Direct labor	30,000
Plus: Manufacturing overhead	<u>50,000</u>
Subtotal	\$200,000
Less: Ending work in process	<u>(15,000)</u>
Cost of goods manufactured	<u>\$185,000</u>

\*\* Calculation of raw materials used in production:

Beginning inventory of raw materials	\$ 40,000
Plus: Raw materials purchased	<u>75,000</u>
Raw material available for use	\$115,000
Less: Ending inventory of raw materials	<u>(20,000)</u>
Raw materials used in production	<u>\$ 95,000</u>

## 12. (LO4—Cost of goods manufactured)

The cost of goods manufactured is \$185,000, broken down as follows:

Beginning inventory of work in process	\$ 20,000	
Plus: Raw materials used in production	90,000	**
Plus: Direct labor	30,000	
Plus: Manufacturing overhead	<u>60,000</u>	
Subtotal	\$200,000	
Less: Ending work in process	<u>(15,000)</u>	
Cost of goods manufactured	<u>\$185,000</u>	

\*\* Calculation of raw materials used in production:

Beginning inventory of raw materials	\$ 30,000
Plus: Raw materials purchased	<u>80,000</u>
Raw material available for use	\$110,000
Less: Ending inventory of raw materials	<u>(20,000)</u>
Raw materials used in production	<u>\$ 90,000</u>

## 13. (LO4—Cost of goods sold)

The manufacturing cost per unit is \$2.38, calculated as follows:

$$[(24,000 + 22,000 + 6,000 + 7,500)/25,000 \text{ units produced}] = \$2.38$$

Therefore, the cost of goods sold is \$57,120 (24,000 units sold  $\times$  \$2.38)

## 14. (LO4—Basic cost flows: Raw materials used)

Chateo, Inc., started the month with raw materials of \$54,000 and purchased an additional \$38,000 of materials, giving the company \$92,000 of materials available for production. If \$63,000 of materials were used during the month, the ending raw material balance must be \$29,000 (\$92,000 – \$63,000).

## 15. (LO5—Calculation of net income)

Sales (5,300 units × \$25 per unit)	\$132,500
Less: Cost of goods sold	
(\$128,000/8,000 = \$16 per unit × 5,300)	<u>84,800</u>
Gross profit	\$ 47,700
Less: Marketing and administrative expenses	<u>(18,900)</u>
Net income	<u>\$ 28,800</u>

The cost of goods manufactured is \$128,000, broken down as follows:

Beginning inventory of work in process	\$ 0
Plus: Raw materials used in production	56,000
Plus: Direct labor	38,000
Plus: Manufacturing overhead	<u>34,000</u>
Subtotal	\$128,000
Less: Ending work in process	<u>(0)</u>
Cost of goods manufactured	<u>\$128,000</u>

The cost of each unit produced would be \$128,000/8,000 units, or \$160 per unit

The cost of goods sold is \$84,800, calculated as follows:

Beginning inventory	\$ 0
Plus: Cost of goods manufactured	<u>128,000</u>
Cost of goods available for sale	\$ 128,000
Less: Ending Inventory (2,700 units × \$160)	<u>(43,200)</u>
Cost of goods sold	<u>\$ 84,800</u>

## 16. (LO4—Basic cost flows: Raw materials used)

Beginning raw materials inventory	\$ 20,000
Plus: Raw material purchased	+140,000
Less: Ending raw materials inventory	<u>– 37,000</u>
Raw materials used in production	<u>\$123,000</u>

## 17. (LO4—Cost of goods sold)

The manufacturing cost per unit is \$2.575, calculated as follows:

$$[(18,000 + 21,000 + 5,000 + 7,500)/20,000 \text{ units produced}] = \$2.575$$

Therefore, the cost of goods sold is \$46,350 (18,000 units sold  $\times$  \$2.575)

## 18. (LO4—Cost of goods sold and merchandise available for sale in a merchandising company)

A. The cost of goods sold is \$489,000, calculated as follows:

Beginning inventory	\$ 514,000
Plus: Cost of goods purchased	<u>463,000</u>
Cost of goods available for sale	\$ 977,000
Less: Ending inventory	<u>(488,000)</u>
Cost of goods sold	<u>\$ 489,000</u>

B. The pool of merchandise available for sale totaled \$977,000 (see part A).

## 19. (LO4—Cost of goods sold and sales for a merchandising company)

A. The cost of goods sold is calculated as follows:

Beginning inventory	\$ 155,000
Plus: Cost of goods purchased	<u>350,000</u>
Cost of goods available for sale	\$ 505,000
Less: Ending inventory	<u>(95,000)</u>
Cost of goods sold	<u>\$ 410,000</u>

B. In order to calculate sales, you must first calculate the cost of goods sold (see Requirement A). If the cost of goods sold is \$410,000, sales must have been \$635,500 ( $\$410,000 \times 1.55 = \$635,500$ ).

## 20. (LO5—Calculation of net income)

The corrected income statement is as follows:

Sales (55,000 units $\times$ \$11 per unit)	\$605,000
Less: Cost of goods sold (55,000 units $\times$ \$7 per unit)	<u>385,000</u>
Gross profit	\$220,000
Less: Selling and administrative expenses	<u>75,000</u>
Net income	<u>\$145,000</u>



21. (LO5—Product versus period cost)

- A. Product cost:  $\$21,000/3 \text{ years} = \$7,000 \text{ per year} \times 75\% = \$5,250$
- B. Period cost:  $\$21,000/3 \text{ years} = \$7,000 \text{ per year} \times 25\% = \$1,750$

## Problems

22. (LO3, 4, and 5—Cost of goods manufactured, cost of goods sold, and impact on financial statements)

- A. The cost of goods manufactured is \$305,000, broken down as follows:

Beginning inventory of work in process	\$ 20,000
Plus: Raw materials used in production	118,000 <sup>1</sup>
Plus: Direct labor	75,000
Plus: Manufacturing overhead	123,000 <sup>2</sup>
Less: Ending work in process	<u>(31,000)</u>
Cost of goods manufactured	<u><u>\$305,000</u></u>

<sup>1</sup>Raw materials used in production:

Beginning inventory of raw materials	\$ 10,000
Plus: Raw materials purchased	<u>125,000</u>
Raw material available for use	\$135,000
Less: Ending inventory of raw materials	<u>17,000</u>
Raw materials used in production	<u><u>\$118,000</u></u>

<sup>2</sup>Manufacturing overhead:

Indirect labor	\$ 40,000
Equipment maintenance	10,000
Factory insurance	12,000
Factory rent	30,000
Factory depreciation	20,000
Factory supplies	<u>11,000</u>
Total manufacturing overhead	<u><u>\$123,000</u></u>

- B. The cost of goods sold is equal to \$310,000, calculated as follows:

Cost of goods sold equals:

Beginning finished goods inventory	\$ 30,000
Plus: Cost of goods manufactured	305,000
Less: Ending finished goods inventory	<u>(25,000)</u>
Cost of goods sold	<u><u>\$310,000</u></u>

- C. Advertising, selling, and administrative expenses are period or nonmanufacturing costs. Therefore, they are excluded from the calculations of cost of goods manufactured and cost of goods sold.

- D. If raw materials and work in process inventories had decreased during the year, then the financial statements would be different. A decrease in the raw materials inventory would mean that more materials had been used than was previously calculated. More materials used means higher total manufacturing costs for the period and, ultimately, a higher cost of goods sold. A decrease in work in process inventory would increase the cost of goods manufactured as well as the cost of goods sold.

23. (LO3, 4—Cost of goods manufactured and cost of goods sold)

- A. The cost of goods manufactured is \$265,000, broken down as follows:

Beginning inventory of work in process	\$ 20,000
Plus: Raw materials used in production	97,000 <sup>1</sup>
Plus: Direct labor	50,000
Plus: Manufacturing overhead	127,000 <sup>2</sup>
Less: Ending work in process	<u>(29,000)</u>
Cost of goods manufactured	<u>\$265,000</u>

<sup>1</sup>Raw materials used in production:

Beginning inventory of raw materials	\$ 15,000
Plus: Raw material purchased	<u>100,000</u>
Raw material available for use	\$ 115,000
Less: Ending inventory of raw materials	<u>18,000</u>
Raw materials used in production	<u>\$ 97,000</u>

<sup>2</sup>Manufacturing overhead:

Indirect labor	\$ 35,000
Equipment maintenance	9,000
Factory insurance	11,000
Factory rent	40,000
Factory depreciation	20,000
Factory supplies	<u>12,000</u>
Total manufacturing overhead	<u>\$ 127,000</u>

- B. The cost of goods sold is equal to \$270,000, calculated as follows:

Cost of goods sold equals:

Beginning finished goods inventory	\$ 35,000
Plus: Cost of goods manufactured	<u>265,000</u>
Less: Ending finished goods inventory	<u>(30,000)</u>
Cost of goods sold	<u>\$270,000</u>

- C. Gross margin is equal to \$80,000, and operating income is equal to \$37,000, calculated as follows:

Net revenue	\$ 350,000
Cost of revenue	<u>270,000</u>
Gross margin	<u>\$ 80,000</u>

Operating expenses:	
Advertising expenses	18,000
Selling and administrative expenses	<u>25,000</u>
Total operating expenses	<u>\$ 43,000</u>
Operating Income	<u>\$ 37,000</u>

24. (LO3, 4, and 5—Decision focus: Impact on financial statements)

B&B Manufacturing  
Income Statement  
For the Month Ended May 31

Sales	\$ 325,000
Less: Cost of goods sold	<u>239,500<sup>1</sup></u>
Gross margin	\$ 85,500
Less: Operating expenses	<u>75,500<sup>2</sup></u>
Net Operating Income	<u>\$ 10,000</u>

<sup>1</sup>B&B Manufacturing  
Statement of Cost of Goods Sold  
For the Month Ended May 31

Beginning finished-goods inventory	\$ 50,000
Add: Cost of goods manufactured	259,500 <sup>3</sup>
Deduct: Ending finished-goods inventory	<u>(70,000)</u>
Cost of goods sold	<u>\$ 239,500</u>

<sup>2</sup> Selling and administrative expenses:	
Utilities (\$25,000 × 25%)	\$ 6,250
Depreciation (\$30,000 × 25%)	7,500
Insurance (\$15,000 × 25%)	3,750
Rent (\$12,000 × 25%)	3,000
Other selling, general and administrative	30,000
Advertising	<u>25,000</u>
Total selling and administrative expense	<u>\$ 75,500</u>

<sup>3</sup>B&B Manufacturing  
Statement of Cost of Goods Manufactured  
For the Month Ended May 31

Beginning inventory of work in process	\$ 15,000
Plus: Raw materials used in production	120,000 <sup>1</sup>
Plus: Direct labor	75,000
Plus: Manufacturing overhead	71,500 <sup>2</sup>
Less: Ending work in process	<u>(22,000)</u>
Cost of goods manufactured	<u><u>\$ 259,500</u></u>

<sup>1</sup> Raw materials used in production:	
Beginning inventory of raw materials	\$ 10,000
Plus: Raw material purchased	<u>140,000</u>
Raw material available for use	\$ 150,000
Less: Ending inventory of raw materials	<u>30,000</u>
Raw materials used in production	<u><u>\$ 120,000</u></u>

<sup>2</sup> Manufacturing overhead:	
Indirect labor	\$ 10,000
Utilities (\$25,000 × 75%)	18,750
Depreciation (\$30,000 × 75%)	22,500
Insurance (\$15,000 × 75%)	11,250
Rent (\$12,000 × 75%)	<u>9,000</u>
Total manufacturing overhead	<u><u>\$ 71,500</u></u>

- B. No. The company is profitable. The investors should be willing to continue financing the company.
- C. The previous controller incorrectly expensed all manufacturing costs even though some of the costs should still be shown on the balance sheet as inventory. These costs will not appear on the income statement until all the finished goods are sold.

25. (LO3, 5—Decision focus: Service company)

- A. Wages for tax preparation staff (\$35/hour × 10 hours) \$350  
Wages for clerical staff (\$12/hour × 2 hours) 24  
Total labor cost \$374
- B. Cost reduction could be achieved by hiring lower paid preparers or by delegating more of the work to clerical staff. It could also be achieved by hiring more efficient preparers who complete the returns in less time. A fourth option would be to automate more of the return preparation process, thereby reducing direct labor costs. The first two options might increase overall costs if the quality of the completed returns is affected. Option three would reduce costs unless the more efficient preparers also

required a higher salary. Option four would likely reduce direct labor costs but increase overhead costs.

- C. Labor costs would be reduced to \$153 per return:

Wages for tax preparation staff (\$35/hour × 3 hours)	\$105
Wages for clerical staff (\$12/hr × 4 hours)	<u>48</u>
Total labor cost	<u>\$153</u>

**Students may note that the \$5,000 cost of the software would likely be allocated to returns, resulting in an additional cost of \$5 per return (\$5,000/1,000 returns).**

- D. Yes. The firm would save \$221 in direct labor cost per return. The \$5,000 investment in software would be recovered after the preparation of only 23 returns (\$5,000/\$221). However, the firm would likely incur other costs, including the cost of training the professional and clerical staff to use the software and the cost of additional computer hardware and software. Another management problem would be the future utilization of those professional hours now available.
- E. The primary qualitative consideration is likely to be one of tax return quality. Returns prepared with the use of computer software are likely to have fewer mathematical errors than returns prepared manually. However, because the professional tax preparation staff is spending less time on return preparation, returns might have more substantive errors due to incorrect application of the tax law.

26. (LO4, 5—Basic cost flows, income statement)

- A. Company #1:

Direct materials used	\$ 9,000
Direct labor	4,000
Manufacturing	<u>11,000</u>
Total manufacturing costs	<u>\$24,000</u>

Beginning WIP + TMC – Ending WIP = Cost of goods manufactured

Let  $x$  = Beginning work in process:

$$\begin{aligned} x + \$24,000 - \$6,000 &= \$21,000 \\ x + \$18,000 &= \$21,000 \\ x &= \$3,000 \end{aligned}$$

Beginning FG Inventory + CGM = Goods available for sale:

$$\$7,000 + \$21,000 = \$28,000$$

Goods available for sale – Ending FG inventory = CGS:

$$\$28,000 - \$10,000 = \$18,000$$

Sales – Cost of goods sold = Gross margin:

$$\$35,000 - \$18,000 = \$17,000$$

Gross margin – Operating expense = Net operating income:

$$\$17,000 - \$7,000 = \$10,000$$

### Company #2

DM + DL + MOH = TMC

Let x = Manufacturing overhead:

$$\$19,000 + \$14,000 + x = \$35,000$$

$$\$33,000 + x = \$35,000$$

$$x = \$2,000$$

CGM = Beginning WIP + Total manufacturing costs – Ending WIP

Let x = Cost of goods manufactured (CGM):

$$x = \$11,000 + \$35,000 - \$13,500$$

$$x = \$32,500$$

Ending FG inventory = Beginning FG inventory + CGM – CGS:

Let x = Beginning finished-goods inventory:

$$\$14,000 = x + \$32,500 - \$25,500$$

$$x = \$7,000$$

Goods available for sale = Beginning FG inventory + CGM:

$$\text{Goods available for sale} = \$7,000 + \$32,500$$

$$\text{Goods available for sale} = \$39,500$$

Gross margin = Sales – Cost of goods sold:

$$\text{Gross margin} = \$50,000 - \$25,500$$

$$\text{Gross margin} = \$24,500$$

Net operating income = Gross margin – Operating expenses:  
 $\$15,500 = \$24,500 - \text{Operating expenses}$   
 Operating expenses = \$9,000

B. Company #1:

Company #1  
 Income Statement  
 For the Period Ended December 31

Sales	\$35,000
Less: Cost of goods sold	<u>18,000</u>
Gross margin	\$17,000
Less: Operating expenses	<u>7,000</u>
Net operating income	<u>\$10,000</u>

Company #2:

Company #2  
 Income Statement  
 For the Period Ended December 31

Sales	\$50,000
Less: Cost of goods sold	<u>25,500</u>
Gross margin	\$24,500
Less: Operating expenses	<u>9,000</u>
Net operating income	<u>\$15,500</u>

27. (LO4, 5—Basic cost flows)

A. Direct materials transferred to work in process:

	<u>Raw Materials Inventory</u>	
Beginning balance	\$ 10,000	X = Amount transferred to WIP
+ Purchases	<u>350,000</u>	
Ending balance	\$ 15,000	

$$\$10,000 + \$350,000 - \$15,000 = \$345,000$$

B. Total manufacturing costs (TMC) for the year:

TMC = Direct materials + Direct labor + Manufacturing overhead:

$$\text{TMC} = \$345,000 + \$200,000 + \$175,000$$

$$\text{TMC} = \$720,000$$

C. Cost of goods manufactured:

	<u>Work in Process Inventory</u>	
Beginning balance	\$ 15,000	X = Cost of goods manufactured
+ Manuf. costs	720,000	
Ending balance	\$ 12,000	

$$\$15,000 + \$720,000 - \$12,000 = \$723,000$$

D. Cost of goods sold:

	<u>Finished Goods Inventory</u>	
Beginning balance	\$ 30,000	X = Cost of goods sold
+ Cost of goods manufactured	723,000	
Ending balance	\$ 32,000	

$$\$30,000 + \$723,000 - \$32,000 = \$721,000$$

28. (LO4, 5—Basic cost flows, income statement)

A. Company #1:

Direct materials used	\$ 10,000
Direct labor	5,000
Manufacturing	<u>12,000</u>
Total manufacturing costs	<u>\$ 27,000</u>

$$\text{Beginning WIP} + \text{TMC} - \text{Ending WIP} = \text{Cost of goods manufactured}$$

Let  $x$  = Beginning work in process:

$$\begin{aligned} x + \$27,000 - \$6,000 &= \$23,000 \\ x + \$21,000 &= \$23,000 \\ x &= \$2,000 \end{aligned}$$

$$\text{Beginning FG inventory} + \text{CGM} = \text{Goods available for sale:}$$

$$\$10,000 + \$23,000 = \$33,000$$



Goods available for sale – Ending FG inventory = CGS:

$$\$33,000 - \$12,000 = \$21,000$$

Sales – Cost of goods sold = Gross margin:

$$\$35,000 - \$21,000 = \$14,000$$

Gross margin – Operating expense = Net operating income:

$$\$14,000 - \$9,500 = \$4,500$$

Company #2

DM + DL + MOH = TMC

Let  $x$  = Manufacturing overhead:

$$\$20,000 + \$13,000 + x = \$35,000$$

$$\$33,000 + x = \$35,000$$

$$x = \$2,000$$

CGM = Beginning WIP + Total manufacturing costs – Ending WIP

Let  $x$  = Cost of goods manufactured (CGM):

$$x = \$15,000 + \$35,000 - \$17,500$$

$$x = \$32,500$$

Ending FG inventory = Beginning FG inventory + CGM – CGS

Let  $x$  = Beginning FG inventory

$$\$15,000 = x + \$32,500 - \$26,000$$

$$x = \$8,500$$

Goods available for sale = Beginning FG inventory + CGM:

$$\text{Goods available for sale} = \$8,500 + \$32,500$$

$$\text{Goods available for sale} = \$41,000$$

Gross margin = Sales – Cost of goods sold:

$$\text{Gross margin} = \$50,000 - \$26,000$$

$$\text{Gross margin} = \$24,000$$

Net operating income = Gross margin – Operating expenses:  
 $\$17,000 = \$24,000 - \text{Operating expenses}$   
 Operating expenses =  $\$7,000$

B. Company #1:

Company #1  
 Income Statement  
 For the period ended December 31

Sales	\$35,000
Less: Cost of goods sold	<u>21,000</u>
Gross margin	\$14,000
Less: Operating expenses	<u>9,500</u>
Net operating income	<u>\$ 4,500</u>

Company #2:

Company #2  
 Income Statement  
 For the Period Ended December 31

Sales	\$50,000
Less: Cost of goods sold	<u>26,000</u>
Gross margin	\$24,000
Less: Operating expenses	<u>7,000</u>
Net operating income	<u>\$ 17,000</u>

29. (LO4, 5—Basic cost flows, income statement)

A.	Raw materials purchases	\$148,000
	Ending raw materials	9,500
	Direct labor	63,250
	Indirect labor	27,300
	Beginning work in process	18,830
	Cost of goods manufactured	\$275,650

B. Venus Corporation  
Income Statement  
For the month ended December 31, 2011

Sales	\$ 415,000
Cost of goods sold	<u>280,820**</u>
Gross profit	\$ 134,180
Selling & administrative expenses	<u>31,900</u>
Net operating income	<u>\$ 102,280</u>

\*\* Cost of goods sold:  $\$23,000 + \$275,650 - \$17,830 = \$280,820$

30. (LO4, 5—Cost flows and financial statements)

A. As follows:

- a. \$6,250: Of the 30,000 mouse pads, 2,500 are given away as an advertising gimmick and 25,000 are used in production, leaving 2,500 pads in ending raw materials inventory at a cost of \$2.50 each.
- b. \$12,500: 25,000 mouse pads are used in production, and 20,000 units are sold, leaving 5,000 units in ending finished-goods inventory at a cost of \$2.50 each.
- c. \$50,000: The cost of mouse pads that are sold is \$50,000 (20,000 units  $\times$  \$2.50 each).
- d. \$6,250: The cost of the 2,500 mouse pads used as an advertising gimmick (\$6,250) is an advertising expense.

Note that the total cost of the mouse pads purchased is \$75,000 (30,000 units  $\times$  \$2.50 per unit). At the end of the year, \$18,750 of the cost remains in inventory (\$6,250 in raw materials inventory and \$12,500 in finished-goods inventory) while \$56,250 is expensed on the income statement (\$50,000 in cost of goods sold and \$6,250 as advertising expense).

- B. Raw materials, work in process, and finished goods appear on the balance sheet. Cost of goods sold and advertising expense appear on the income statement. The location of the accounts matters because of the impact on the company's net income and asset base.

## Cases

31. (LO2, 5—JIT implementation, financial statements)

- A. Reducing inventory by such a significant amount may diminish the company's ability to deliver its products to its customers. The company will have to work closely with its suppliers to ensure a steady stream of inventory on a just-in-time basis so that customer needs can be filled quickly.
- B. The reduction will likely need to be accomplished by "consuming" the inventory by shipping it to customers as it is ordered, without simultaneously replacing the inventory in the company's warehouse. The company could arrange for some suppliers to accept returns of inventory, but this is not likely to be a successful approach with all suppliers.

## Solutions Manual

- C. The total inventory is currently valued at \$722,505. Given an interest rate of just 3.5%, the annual interest received on 80% of this balance is \$20,230.14.
  - D. If Ken's estimates are correct, there will be a decrease in sales of \$760,000 (20% of \$3,800,000) and a decrease in gross profits of \$228,000 (30% of \$760,000).
  - E. JIT is not for every company, but the techniques may work if the company is committed to them. The primary challenge will be ensuring an orderly transition to a very low inventory. The company will have to work closely with suppliers and customers to guarantee that products are available whenever needed. This will likely drive some costs higher because suppliers will almost certainly increase prices to cover the increased costs of more frequent shipments to Colt Kitchen. Still, the company may feel that the price increases will be offset by the income earned on the free cash.
32. (LO3, 5—Manufacturing costs versus nonmanufacturing costs, income statement)
- A. Advertising expense is a period expense and should be included in "selling and administrative expenses." By including the advertising in overhead, the company is able to increase product costs. Only when products are sold are their costs shown on the income statement as cost of goods sold. By including a portion of advertising expense in overhead, the company's net income is higher in the short run than it would otherwise be.
  - B. No, for the same reason that advertising expense is not validly part of overhead. Management salaries are properly categorized as a period cost and should be included in "selling and administrative expense."
  - C. See the answer to A.