

SOLUTIONS MANUAL



Chapter 3

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

Multiple Choice

1. (LO 1 – Characteristics of traditional manufacturing environment)

Answer: C

2. (LO 1 – Characteristics of traditional manufacturing environment)

Answer: A

3. (LO 2 – JIT environment)

Answer: C

4. (LO 2 – Lean manufacturing)

Answer: F

5. (LO 2 – Lean production and JIT)

Answer: D

6. (LO 2 – Manufacturing cells)

Answer: B

7. (LO 3 – Manufacturing costs: indirect labor)

Answer: B

Indirect labor includes \$100,000 for quality control supervisors and \$18,000 for the factory janitor.

8. (LO 3 – Manufacturing costs)

Answer: C

9. (LO 3 – Product cost per unit)

Answer: B

Product costs include \$31,000 of direct materials used, \$18,000 of direct labor, and \$14,000 of manufacturing overhead (\$12,000 of rent and \$2,000 of equipment depreciation in the factory). The product cost per unit is \$1.80 (\$63,000/35,000 units).

10. (LO 4 and 5 – Basic cost flows, income statement)

Answer: C

Sales (30,000 units x \$3.50 per unit)	\$105,000
Less: Cost of goods sold (30,000 units x \$1.80 per unit)	<u>54,000</u>
Gross Margin	\$ 51,000
Less: Marketing and administrative costs	<u>43,250</u>
Net income	<u><u>\$ 7,750</u></u>

11. (LO 4 – Basic cost flows: cost of goods manufactured)

Answer: C

12. (LO 4 – Basic cost flows)

Answer: A

13. (LO2 and 4 – Cost flows in a JIT environment)

Answer: A

With no WIP or finished goods inventory, the cost of goods sold is equal to the cost of goods manufactured (the sum of direct materials used, direct labor and factory overhead).

Sales	\$800,000
- Cost of goods sold	<u>420,000</u>
Gross Margin	380,000
- Selling and Administrative expenses	<u>120,000</u>
Net operating Income	<u><u>\$260,000</u></u>

14. (LO 4 – Basic cost flows: raw materials used)

Answer: B

Beginning inventory of raw materials	\$110,000
Plus: Raw materials purchased	<u>121,000</u>
Raw materials available for use	231,000
Less: Ending inventory of raw materials	<u>(115,000)</u>
Raw materials used in production	\$116,000

15. (LO 4 and 5 – Basic cost flows: cost of goods manufactured)

Answer: A

Beginning inventory of work-in-process	\$ 55,000
Plus: Total manufacturing costs (\$116,000 + \$30,000 + \$53,000)	199,000
Subtotal	<u>254,000</u>
Less: Ending inventory work-in-process	<u>(58,000)</u>
Cost of goods manufactured	\$196,000

16. (LO 4 and 5 – Cost of goods sold)

Answer: D

Beginning inventory of finished goods	\$ 41,000
Plus: Cost of goods manufactured	<u>196,000</u>
Cost of goods available for sale	237,000
Less: Ending inventory of finished goods	<u>(37,000)</u>
Cost of goods sold	\$200,000

17. (LO 5 – Product vs. period costs)

Answer: B

Concept Questions

18. (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.

19. (LO1 and 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.

20. (LO2 – Description of JIT system)

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

21. (LO2 – JIT and lean production benefits)

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

1. A reduction in waste and scrap;
2. Improving the quality of products;
3. Lower overall production costs (although the costs of raw materials may increase in some cases);
4. Lower labor costs;
5. Inventory reduction;
6. Reduced processing time; and
7. Increased manufacturing flexibility.

22. (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 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 might include allowing customers to complete application forms online and streamlining the approval process to reduce the time from application to approval.

23. (LO 3 – Direct vs. indirect costs)

Direct costs such as 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 like 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.

24. (LO 3 – Manufacturing costs)

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

25. (LO 3 – Non-manufacturing costs)

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

26. (LO 4 – Cost flows in a manufacturing environment)

Manufacturing costs (i.e., 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.

27. (LO 5 – Cost vs. expense)

Although often used interchangeably, cost and expense are not synonymous terms. Costs can be classified in a number of ways including manufacturing (product costs) or non-manufacturing (period costs). Costs are incurred anytime 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. On the other hand, expenses can be thought of as expired or used up costs. As you will recall, product costs are only expensed (as cost of goods sold) when the product is sold. On the other hand, period costs are expensed in the period in which they are incurred.

28. (LO 5 – Product vs. period costs)

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

29. (LO 5 – The need for product costing)

Companies need to determine accurate product costs in order to determine if 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.

Exercises

30. (LO2 – The effects of JIT and lean production)

- a. decrease
- b. decreases
- c. increases
- d. increase
- e. decreases
- f. increases
- g. decreases

31. (LO2 – Key features of lean production)

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

32. (LO 3 – 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 non-manufacturing (period) cost.

33. (LO 3 – Product costs)

- A. Total product costs are \$90,000 and include direct material 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).

34. (LO 3 – Product costs)
- A. The cost of direct labor for each desk is \$60 (4 direct labor hours per desk x \$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 consisting of:

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

35. (LO 3 – Raw material used)
- 10,000 boards x .80 pounds/board = 8,000 pounds x \$1.24/pound = \$9,920

36. (LO 3 – Manufacturing vs. nonmanufacturing costs)
- manufacturing
 - manufacturing
 - manufacturing
 - nonmanufacturing
 - manufacturing
 - nonmanufacturing
 - nonmanufacturing

37. (LO 3 – Types of manufacturing costs)
- IL
 - DM
 - IL
 - MOH
 - IL
 - DL
 - IM

38. (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 it \$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).

39. (LO4 – Basic cost flows: raw materials used)

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

40. (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	\$123,000

41. (LO 4 – Cost of goods manufactured)

The cost of goods manufactured is \$185,000 as shown below:

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	\$185,000	

** 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	\$90,000

42. (LO4 – Cost of Goods Manufactured)

The cost of goods manufactured is

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	\$185,000	

** 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	\$95,000

43. (LO 4 – 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, cost of goods sold is \$57,120 (24,000 units sold x \$2.38)

44. (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, cost of goods sold is \$46,350 (18,000 units sold x \$2.575)

45. (LO 4 – Cost of goods sold and merchandise available for sale in a merchandising company)

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

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	\$489,000

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

46. (LO 4 – Cost of goods sold and sales for a merchandising company)

A. 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	\$410,000

- 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 ($\$410,000 \times 1.55 = \$635,500$).

47. (LO 5 – Net income)

The corrected income statement is as follows:

Sales (55,000 units x \$11 per unit)	\$ 605,000
Less: Cost of goods sold	
(55,000 units x \$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>

48. (LO 5 – Product vs. period cost)

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

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

49. (LO 5 – Calculation of net income)

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

Problems

50. (LO 2 – JIT system)

A. The current facility is a traditional manufacturing layout with similar machines and related employees grouped together. The company may feel it is more efficient to have this layout because similar machines may be easily calibrated for the production process and employees may be available to assist one another.

B. Student answers will vary, but here are a few suggestions. Similarly topped pizzas could be made together. Each employee could make an entire pizza and be responsible for all manufacturing steps. Each employee could be responsible for partially completing the pizza (e.g., preparing dough, sauce and cheese).

C. Student answers will vary, but here are a few suggestions. Ingredients (i.e., raw materials) should be purchased as needed. The manufacturing layout should be possibly changed to group employees in manufacturing cells to increase production efficiency. All employees should carefully “inspect” their own processes to ensure the quality of each pizza. Pizzas should be shipped as soon as they are manufactured.

51. (LO 3, 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 as shown below:

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

¹Raw Materials Used in Production

Beginning inventory of raw materials	\$ 10,000
Plus: Raw Material 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>\$ 118,000</u>

²Manufacturing 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>\$ 123,000</u>

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

Cost of goods sold equals:

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

C. Advertising, selling, and administrative expenses are period or non-manufacturing 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 previously calculated. More materials used means higher total manufacturing costs for the period and ultimately higher cost of goods sold. A decrease in work-in-process inventory would increase the cost of goods manufactured and cost of goods sold as well.

52. (LO 3, 4 – Cost of goods manufactured, and cost of goods sold)

- A. The cost of goods manufactured is \$265,000 as shown below:

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

¹Raw 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	\$ 97,000

²Manufacturing 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	\$ 127,000

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

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	\$270,000

- C. Gross Margin is equal to \$80,000 and Operating Income is equal to \$37,000 as calculated below.

Net Revenue	\$350,000
Cost of Revenue	<u>270,000</u>
Gross Margin	80,000
Operating Expenses:	
Advertising expenses	18,000
Selling and Administrative expenses	<u>25,000</u>
Total operating expenses	<u>43,000</u>
Operating Income	37,000

53. (LO 3, 4, and 5 – Direct vs. indirect costs, impact on financial statements)

- A. Wood and springs would be direct materials while glue and stain are indirect materials. An argument could be made that the springs are also indirect materials.
- B. The finished goods inventory balance at the end of June is \$11,600 calculated as follows:

The cost of materials for 500 chairs is transferred from raw materials inventory to work-in-process:

Total material costs in WIP:	
Springs [(\$15,000/1,500 springs) x 2 springs per chair x 500 chairs]	\$10,000
Glue	1,500
Stain	500
Wood (\$5,000/1,000 x 500 chairs)	<u>2,500</u>
Total material costs	\$14,500

80 percent of the chairs are finished (400/500) and their cost is transferred out of work in process and into finished goods

$\$14,500 \times .80 = \$11,600$ transferred from work in process to finished goods. The cost of each finished chair is \$29 ($\$11,600/400$ chairs)

As chairs are sold, the cost of those chairs is transferred to cost of goods sold.

C. If 380 of the chairs are sold, the cost of goods sold is \$11,020 ($\29×380 chairs).

D. Balance in June 30 Work-in-process:

Beginning inventory, June 1	\$ 0
Add: Total manufacturing costs	14,500
Less: Cost of goods manufactured	<u>(11,600)</u>
Ending inventory, June 30	\$ 2,900

54. (LO 3, 4, and 5 – Decision focus: Using cost to determine sales price)

A. This question is intended to get students to think about the problems in product costing and the problems in using cost information to set prices. Students should realize that they need to know selling and administrative expenses in order to set a “fair” sales price and that they might want to consider other life-cycle costs in setting a sales price for the games. They may also want to consider whether cost information is even relevant for the new game or whether pricing should be based on the perceived value of the game to the consumer.

B. Some qualitative factors include whether sales of the new game will displace sales of the present game. Another factor to be considered would be the public’s receptiveness to a much more expensive game that is very similar to the present game.

55. (LO 3 and 5 – Decision focus: service company)

A. Wages for tax preparation staff ($\$35/\text{hour} \times 10$ hours)	\$350
Wages for clerical staff ($\$12/\text{hour} \times 2$ hours)	<u>24</u>
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 reducing direct labor costs. The first two options might increase overall costs if the quality of 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 x 3 hours)	\$105
Wages for clerical staff (\$12/hr x 4 hours)	<u>48</u>
Total labor cost	\$153

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 preparation of only 23 returns (\$5,000/\$221). However, the firm would likely incur other costs including training the professional and clerical staff to use the software, the cost of additional computer hardware and software, etc. 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 using computer software are likely to have fewer mathematical errors than returns prepared manually. However, since 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.

56. (LO 3, 4, and 5 – Decision focus: impact on financial statements)

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

Sales	\$325,000
Less: Cost of goods sold	<u>239,500¹</u>
Gross margin	85,500
Less: Operating expenses	<u>75,500²</u>
Net Income	<u>\$ 10,000</u>

¹B & B Manufacturing
Statement of Cost of Goods Sold
For the Month Ended May 31

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

² Selling and Administrative Expenses	
Utilities (\$25,000 x 25%)	\$ 6,250
Depreciation (\$30,000 x 25%)	7,500
Insurance (\$15,000 x 25%)	3,750
Rent (\$12,000 x 25%)	3,000
Other Selling, general and admin.	30,000
Advertising	<u>25,000</u>
Total Selling and Administrative Expense	\$75,500

³B & 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 ¹
Plus: Direct labor	75,000
Plus: Manufacturing overhead	71,500 ²
Less: Ending Work-in-process	<u>(22,000)</u>
Cost of goods manufactured	\$ 259,500

¹ 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	\$ 120,000

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

- 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.

57. (LO 4 and 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	350,000	
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

TMC = \$345,000 + \$200,000 + \$175,000

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	

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

58. (LO 4 and 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	\$24,000

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 income

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

Company #2

$$DM + DL + MOH = TMC$$

Let x = Manufacturing Overhead:

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

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

$$x = \$2,000$$

$$CGM = \text{Beginning WIP} + \text{Total Manufacturing Costs} - \text{Ending WIP}$$

Let x = Cost of Goods Manufactured (CGM)

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

$$x = \$32,500$$

$$\text{Ending FG Inventory} = \text{Beginning FG Inventory} + CGM - CGS$$

Let x = Beginning Finished Goods Inventory

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

$$x = \$7,000$$

$$\text{Goods Available for Sale} = \text{Beginning FG Inventory} + CGM$$

$$\text{Goods Available for Sale} = \$7,000 + \$32,500$$

$$\text{Goods Available for Sale} = \$39,500$$

$$\text{Gross Margin} = \text{Sales} - \text{Cost of Goods Sold}$$

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

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

$$\text{Net Income} = \text{Gross Margin} - \text{Operating Expenses}$$

$$\$15,500 = \$24,500 - \text{Operating Expenses}$$

$$\text{Operating Expenses} = \$9,000$$

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 income	<u><u>\$10,000</u></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 Income	<u><u>\$15,500</u></u>

59. (LO 4 and 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	\$27,000

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

Let x = Beginning work-in-process:

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

Beginning FG Inventory + CGM = 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 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 Finished Goods 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 Income = Gross Margin – Operating Expenses

$$\$17,000 = \$24,000 - \text{Operating Expenses}$$

$$\text{Operating Expenses} = \$7,000$$

B. Company #1:

Company #1
Income Statement
For the period ended December 31

Sales	\$35,000
Less: Cost of goods sold	<u>18,000</u>
Gross Margin	\$17,000
Less: Operating expenses	<u>9,500</u>
Net income	<u>\$7,500</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 Income	<u>\$17,000</u>

60. (LO 4 and 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, 2009

Sales	\$415,000
Cost of Goods Sold	<u>280,820</u> **
Gross Profit	134,180
Selling & administrative expenses	<u>31,900</u>
Net Income	<u>\$ 102,280</u>

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

61. (LO 4 and 5 – Cost flows and financial statements)
- A.
- 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.
 - b. \$12,500: 25,000 mouse pads are transferred to work-in-process inventory. Of these, 20,000 (80 percent) are transferred out of work-in-process and into finished goods inventory leaving 5,000 mouse pads in ending work-in-process.
 - c. \$5,000: Of the 20,000 mouse pads transferred into finished goods inventory, 18,000 (90 percent) are finished and transferred into cost of goods sold.
 - d. \$45,000: The cost of goods sold is \$45,000.
 - e. \$6,250: The cost of the 2,500 mouse pads used as an advertising gimmick (\$6,250) is an 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

62. (LO 2 and 5 – JIT implementation, financial statements)
- A. Reducing inventory by such a significant amount may negatively affect the company's ability to deliver 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. It is possible that 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.
- C. The total inventory is currently valued at \$722,505. Assuming an interest rate of just 3.5%, the annual interest received on 80 percent 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 ensure 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. On the other hand, the company may feel that the price increases will be offset by the income earned on the free cash.
63. (LO 3 and 5 – Manufacturing costs vs. non-manufacturing 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 which become assets. 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 as 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 above.

Group and Internet Exercises

64. (LO 2 – Lean production and service companies)

Retail stores might implement lean techniques in order to reduce the time that customers wait at check-out and to manage the inventory that is available in the store. Restaurants might use lean production techniques to reduce waste associated with purchasing and holding too much food, by reducing the amount of movement required by the wait staff by automating the order taking process, and by moving the kitchen closer to the seating area to reduce the amount of time that prepared food sits before it is served.

65. (LO 5 – Product costs and financial statements)

Student responses will vary. You may wish to assign the same companies to the entire class in an effort to have more control over the outcome of this assignment. You could pick a company with which you are familiar and for which you could determine an "answer."