Managerial Accounting Creating Value in a Dynamic Business Environment 11th edition Hilton Solutions Manual

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CHAPTER 2
Basic Cost Management Concepts

FOCUS ON ETHICS (Located before the Chapter Summary in the text.)

Was WorldCom's controller just following orders?

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

ANSWERS TO REVIEW QUESTIONS

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

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

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

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

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

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

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

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

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

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

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

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2-11 **The fixed cost per unit declines as the level of activity (or cost driver) increases. Specifically, it declines at a decreasing rate: going from one unit produced to two divides the fixed cost per unit in half; going from two units to three divides it into thirds; three to four into fourths, etc. 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.**

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2-17 **a. Uncontrollable cost**

b. Controllable cost

c. Uncontrollable cost

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

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

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

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

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

2-23 **a. Direct cost**

b. Direct cost

c. Indirect cost

d. Indirect cost

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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

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	98,000	8,000	21,000
Cost of goods sold	$405,000	$99,000*	$304,000

*Amount missing in exercise.

EXERCISE 2-25 (10 MINUTES)

1. Hours worked 40
   Wage rate ..... × $ 18
   Total compensation $720

2. Classification:

   Direct labor (36 hours × $18) $648
   Overhead (idle time: 4 hours × $18) 72
   Total compensation $720

EXERCISE 2-26 (10 MINUTES)

1. Regular wages (40 hours × $16) ..... $ 640
   Overtime wages (5 hours × $24) 120
   Total compensation ..... $ 760

2. Overtime hours ..... 5 hrs.
   Overtime premium per hour ($24 – $16) ..... × $ 8
   Total overtime premium ..... $ 40

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EXERCISE 2-26 (CONTINUED)

3. Classification:

Direct labor (45 hours × $16)	$ 720
Overhead (overtime premium: 5 hours × $8)	40
Total compensation	$ 760

EXERCISE 2-27 (30 MINUTES)

Mass customization is a production process that allows set modifications to a standardized product in order to better match the product to customer needs. As a production process, it combines the standardization of mass production with a limited form of the customization of a job shop.

The technique seems well suited to Falcon Northwest's computer-manufacturing operation for high-end gaming computers because of the company's direct-selling approach, in which most customers order customized computer systems on-line. This allows Falcon to order limited quantities of the components necessary to assemble the customized computer systems that have been ordered, and delivery is made in a relatively short period of time.

Under this approach, raw-materials and finished-goods inventory levels would be lower. Manufacturing overhead costs would likely be somewhat higher in order to support the process of specifying, ordering, receiving and transporting smaller lots of production components. Direct materials costs should be comparable to other manufacturing techniques, as long as care is taken to negotiate supply contracts that cover the needs of a long period of time (so that renegotiations do not have to take place frequently for small quantities for components), but with slightly higher delivery costs because requirements are spread over more deliveries. Direct labor cost would likely be higher because the customization work would be less routinized.

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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 (indirect material) depending on how significant the cost is**

4. **Wages of security guards: Product cost, fixed (with respect to amount produced) or variable (with respect to hours worked) [either answer is acceptable], 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 labor**

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. **LED costs: Product cost, variable, direct material**

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EXERCISE 2-29 (25 MINUTES)

1.

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

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

2.

ALEXANDRIA 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	835,000
Cost of goods available for sale	$985,000
Deduct: Finished-goods inventory, December 31	165,000
Cost of goods sold	$820,000

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EXERCISE 2-29 (CONTINUED)

3.

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

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

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
Total costs:			
Fixed costs	(a) $42,000	$42,000	(b) $42,000
Variable costs	(c) 25,000	30,000	(d) 35,000
Total costs	(e) $67,000	$72,000	(f) $77,000
Cost per muffler replacement:			
Fixed cost	(g) $ 84	(h) $ 70	(i) $ 60
Variable cost	(j) 50	(k) 50	(l) 50
Total cost per muffler replacement	(m) $134	(n) $120	(o) $110

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 × 500 = $25,000

(g) Fixed cost per replacement = $42,000/500 = $84

(j) Variable cost per replacement = $25,000/500 = $50

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EXERCISE 2-31 (15 MINUTES)

1.	Phone bill, January: $100 + ($.25 × 6,000)	$1,600	
	Phone bill, February: $100 + ($.25 × 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 × 6,000	1,500	
	Total	$1,600	

4. Since each phone call costs $.25, the marginal cost of making the 6,001st call is $.25.

5. 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 × 10	$89,000
Annual cost using Part A200: ($5,100 + $500) × 10	56,000
Annual differential cost	$33,000

EXERCISE 2-34 (5 MINUTES)

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

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EXERCISE 2-35 (10 MINUTES)

1. **Your decision to see the game really cost you $400, 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 $400, thereby resulting in a profit on the deal of $250 ($400 sales proceeds minus $150 out-of-pocket purchase cost). Instead, you went to the game, which left you relieved of your $150 out-of-pocket cost. The difference between the $150 *reduction* in your wealth and the $250 *profit* you could have had is $400. Thus, $400 is the true cost of going to the game.**
2. **The $400 is an *opportunity cost.* At the time you made the decision to attend the game, the $150 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 the (almost 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. **For certain, the marginal cost of an extra flight would include the aircraft fuel, wages of the flight crew, and the food and beverages consumed by the passengers and crew. There might also be additional costs for ground, maintenance and baggage personnel, but it would depend on whether those services are contracted on a per-flight basis or the airline hires employees for those purposes at the airport (and those employees have excess capacity). Both models are used.**
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 snowboard would include the direct material. It is unlikely that labor and other costs would change with the addition of only one more product unit.**

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

PROBLEM 2-38 (30 MINUTES)

1. Manufacturing overhead:

Indirect labor…….	$109,000
Building depreciation ($80,000 x 75%)..	60,000
Other factory costs……..	344,000
Total……...	$513,000

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PROBLEM 2-38 (CONTINUED)

2. **Cost of goods manufactured:**

Direct material:		
Raw-material inventory, Jan. 1	$ 15,800	
Add: Purchases of raw material	175,000	
Raw material available for use	$190,800	
Deduct: Raw-material inventory, Dec. 31	18,200	
Raw material used		$172,600
Direct labor		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	913,200
Cost of goods available for sale	$1,024,300
Deduct: Finished-goods inventory, Dec. 31	97,900
Cost of goods sold	$ 926,400

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 ÷ $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**

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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*……	238,000
Cost of goods available for sale (given)……	$275,000
Deduct: Finished-goods inventory, Apr. 12*……	44,000
Cost of goods sold (calculated above)……..	$231,000

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

Direct material used:

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

Let X = direct material used

X = (X + $120,000) x 25%

0.75X = $30,000

X = $40,000

Manufacturing overhead:

Manufacturing overhead equals 50% of total production costs.

Thus: Let Y = manufacturing overhead

Y = (direct material used + direct labor + manufacturing overhead) x 50%

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

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 labor (given)……	120,000
Manufacturing overhead……...	160,000
Total manufacturing costs……...	$320,000
Add: Work-in-process inventory, Jan. 1 (given)…	21,000
Subtotal……..	$341,000
Deduct: Work-in-process inventory, Apr. 12*…….	103,000
Cost of goods manufactured (from above)…….	$238,000

***$103,000 = $341,000 – $238,000**

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PROBLEM 2-40 (25 MINUTES)

1. **Fixed manufacturing overhead per unit:**

   $600,000 ÷ 24,000 units produced = $25

   Average unit manufacturing cost:

Direct material……..	$ 20
Direct labor……	37
Variable manufacturing overhead..	48
Fixed manufacturing overhead……	25
Average unit cost……..	$130

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

   Cost of December 31 finished-goods inventory:

   4,000 units x $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)…..	2,600,000
Gross margin……	$1,100,000
Selling and administrative expenses……..	860,000
Income before taxes……	$ 240,000
Income tax expense ($240,000 x 30%)……	72,000
Net income……	$ 168,000

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

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

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

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

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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 labor	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 labor:	
Wages	485,000
Fringe benefits	95,000
Total prime costs	$ 2,680,000

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PROBLEM 2-42 (CONTINUED)

b. Total manufacturing overhead:

Depreciation on factory building	$ 115,000
Indirect labor: wages	140,000
Production supervisor's salary	45,000
Service department costs	100,000
Indirect labor: 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
Total manufacturing overhead	$ 534,000

c. Total conversion costs:

Direct labor ($485,000 + $95,000)	$ 580,000
Manufacturing overhead	534,000
Total conversion costs	$1,114,000

d. Total product costs:

Direct material	$2,100,000
Direct labor	580,000
Manufacturing overhead	534,000
Total product costs	$3,214,000

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
Total period costs	$ 279,000

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.

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PROBLEM 2-43 (35 MINUTES)

1.

SAN FERNANDO FASHIONS COMPANY
SCHEDULE OF COST OF GOODS MANUFACTURED
FOR THE YEAR ENDED DECEMBER 31, 20X2

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

2.

SAN FERNANDO FASHIONS COMPANY
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	610,000
Cost of goods available for sale	$630,000
Deduct: Finished-goods inventory, December 31	50,000
Cost of goods sold	$580,000

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PROBLEM 2-43 (CONTINUED)

3.

SAN FERNANDO FASHIONS COMPANY
INCOME STATEMENT
FOR THE YEAR ENDED DECEMBER 31, 20X2

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

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 × $12	$480
Overtime hours: 8 × $18	144
Total cost of wages	$624

2.

a. Direct labor: 38 × $12	$456
b. Manufacturing overhead (idle time): 1 × $12	12
c. Manufacturing overhead (overtime premium): 8 × ($18 – $12)	48
d. Manufacturing overhead (indirect labor): 9 × $12	108
Total cost of wages	$624

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

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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[=], e and f and g[=], k[=]

    [=]The building that the furnace heats is used for several purposes.
15. b, d, g, k

PROBLEM 2-46 (20 MINUTES)

1. 3 hours × ($12 + $3) = $45

   Notice that the overtime premium on the flight is not a direct cost of the flight.
2. 3 hours × ($12 × .5) = $18

   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 Topeka on August 11. The cost should be assigned to the August 11 flight departing from Topeka.

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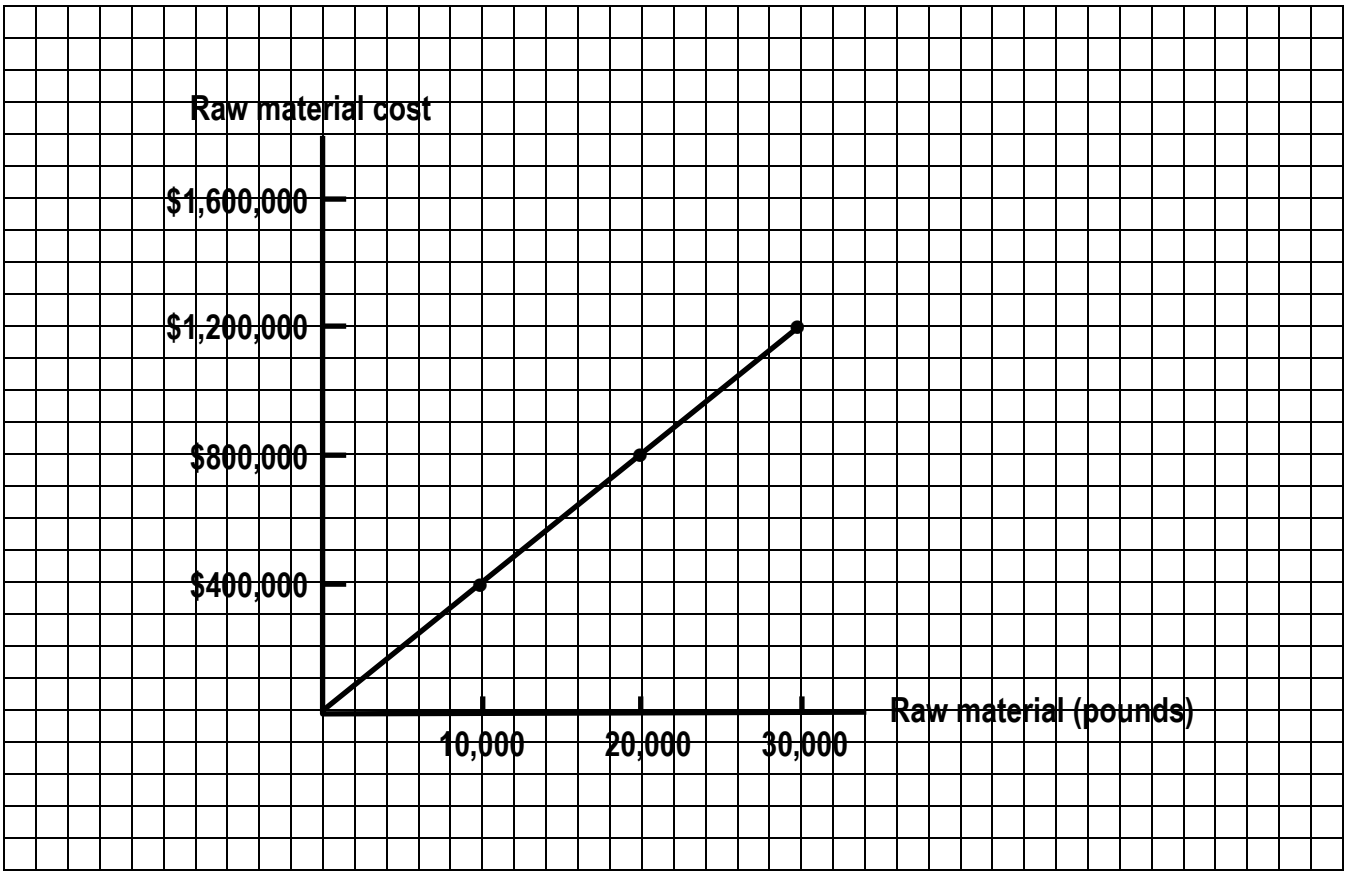
PROBLEM 2-47 (15 MINUTES)

1. Graph of raw-material cost:



2.

Production Level in Pounds	Unit Cost	Total Cost
1	$40 per pound	$40
10	$40 per pound	$400
1,000	$40 per pound	$40,000

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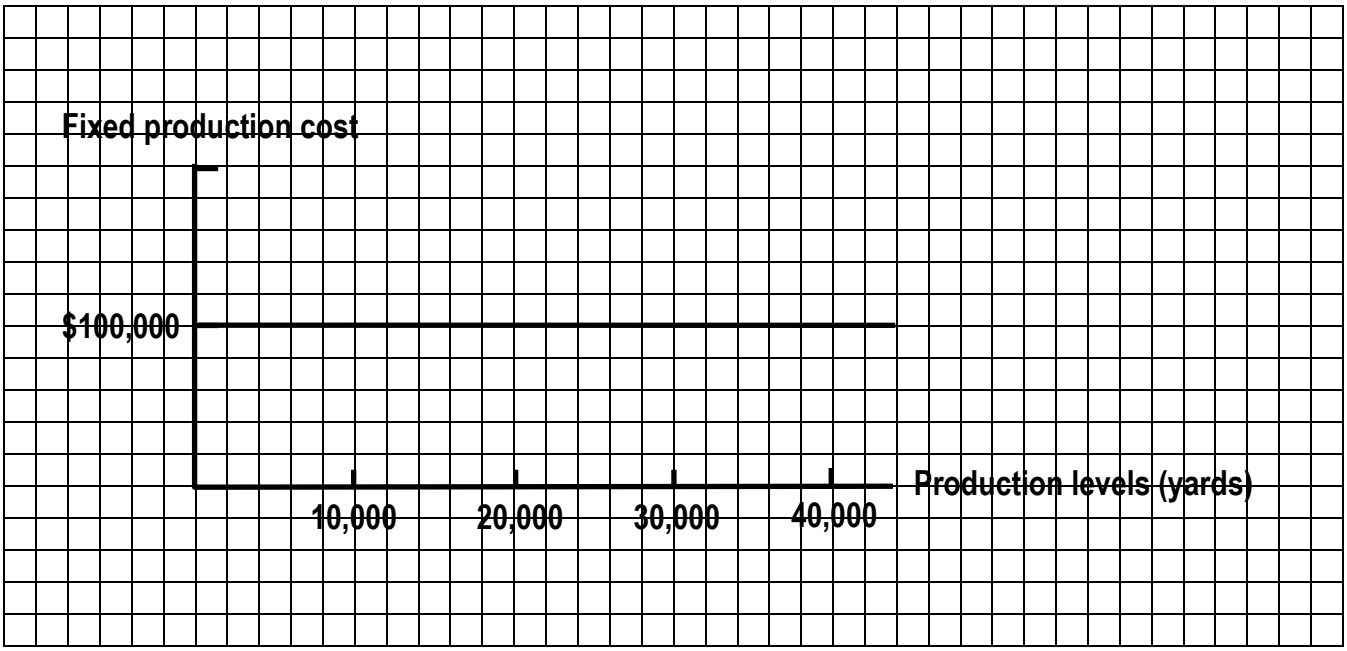
PROBLEM 2-48 (25 MINUTES)

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

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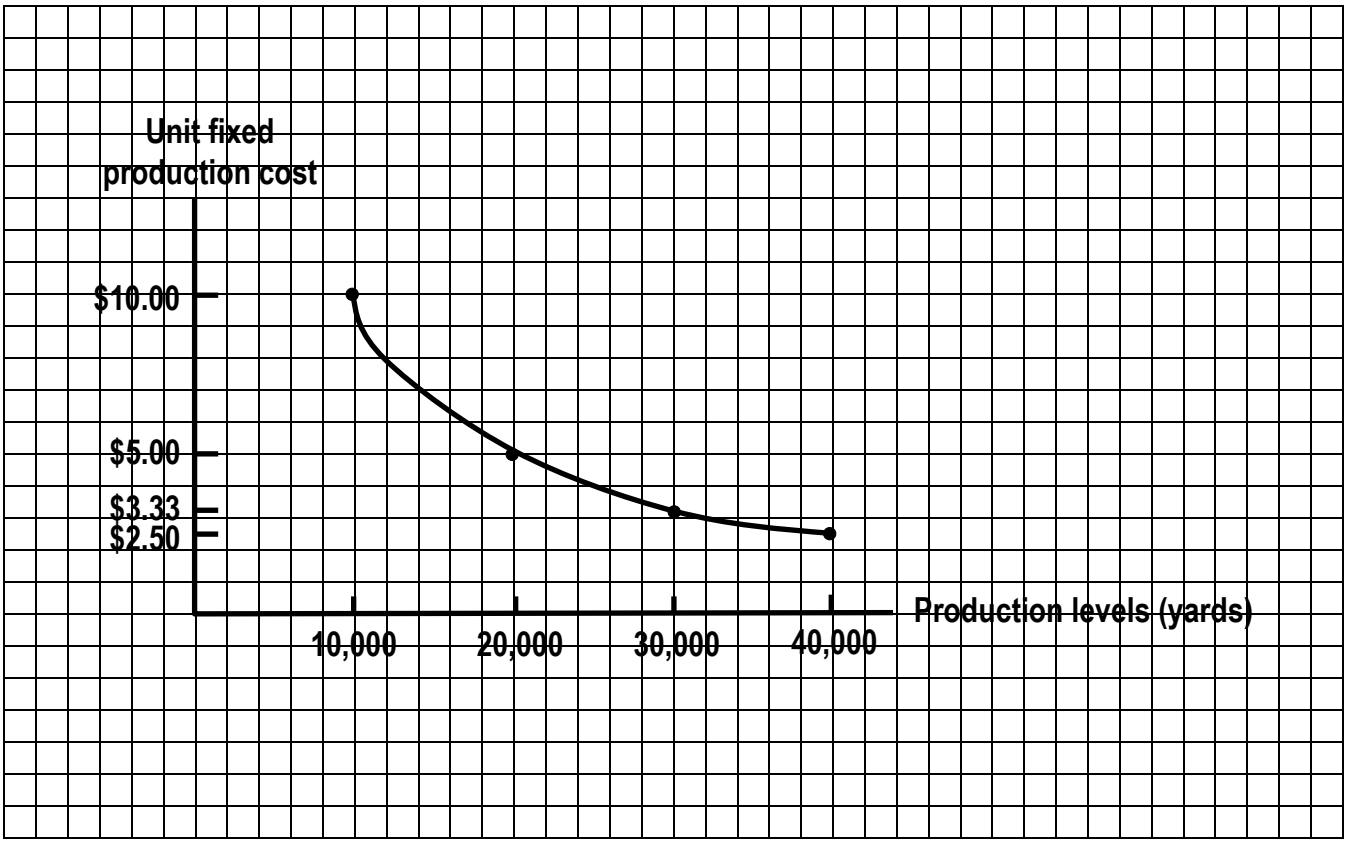
PROBLEM 2-48 (CONTINUED)

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

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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 because they usually have nothing of significance in inventory.

PROBLEM 2-51 (15 MINUTES)

	Variable or Fixed	20x2 Forecast	Explanation
Direct material	V	$3,600,000	$3,000,000 × 1.20
Direct labor	V	2,640,000	$2,200,000 × 1.20
Manufacturing overhead			
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
Selling costs			
Advertising	F	195,000	same
Sales commissions	V	108,000	$90,000 × 1.20
Administrative costs			
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

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

    *Unless the dishwasher has been used improperly.

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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 processed food products sold during the year. Cost of goods sold is subtracted from net sales to arrive at the gross profit. The company's other operating expenses then are subtracted from the gross profit.**

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

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

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

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

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

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

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

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PROBLEM 2-57 (25 MINUTES)

1.

Output (.75 liter 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 liter 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.

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

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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.

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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.

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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.**

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CASE 2-60 (50 MINUTES)

1. a. **FastQ 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
$.14*X* + $8,000	=	$.09*X* + $11,000
$.05*X*	=	$3,000
X	=	60,000 copies

The conclusion is that FastQ 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 FastQ 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
$.14*X* + $8,000	=	$.09*X* + $11,000
$.05*X*	=	$3,000
X	=	60,000 copies

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CASE 2-60 (CONTINUED)

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

$$\begin{aligned} \text{1024M} \quad & \quad \text{1024G} \\ \$.09X + \$11{,}000 &= \$.05X + \$20{,}000 \\ \$.04X &= \$9{,}000 \\ X &= 225{,}000 \text{ copies} \end{aligned}$$

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 gallon, and the average cost of the endor inventory, $4.75 per gallon, are sunk costs. These costs were incurred in the past and will have no impact on future costs. They cannot be changed by any future action and are irrelevant to any future decision. Although the current price of endor is $5.50 per gallon, no endor will be purchased at this price. Thus, it too is irrelevant to the current special order. If the order is accepted, the required 800 gallons of endor will be replaced at a cost of $5.75 per gallon. Therefore, the real cost of endor for the special order is $4,600 (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).

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CASE 2-60 (CONTINUED)

3. The projected donations 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 donations 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)	**$100,000**	**donation**
Manufacturing show (15 × $5,000)	**$ 75,000**	**donation**
Manufacturing show (sell wildlife show)	**25,000**	**sales proceeds**
	$100,000	**total revenue**

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CHAPTER 2

BASIC COST MANAGEMENT CONCEPTS

Learning Objectives

2-1. Explain what is meant by the word *cost*.

2-2. Distinguish among product costs, period costs, and expenses.

2-3. Describe the role of costs in published financial statements.

2-4 List and describe four types of manufacturing processes.

2-5 Give examples of three types of manufacturing costs.

2-6 Prepare a schedule of cost of goods manufactured, a schedule of cost of goods sold, and an income statement for a manufacturer.

2-7 Understand the importance of identifying an organization's cost drivers.

2-8 Describe the behavior of variable and fixed costs, in total and on a per-unit basis.

2-9 Distinguish among direct, indirect, controllable, and uncontrollable costs.

2-10 Define and give examples of an opportunity cost, an out-of-pocket cost, a sunk cost, a differential cost, a marginal cost, and an average cost.

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Chapter Overview

I What Do We Mean by a Cost?
- A. Costs at the most basic level
- B. Product costs, period costs, and expenses

II. Costs on Financial Statements
- A. Income statement
  - 1. Operating Expenses
  - 2. Gross Profit and Operating Income
  - 3. Costs of manufactured inventory
- B. Balance sheet
  - 1. Raw-materials inventory
  - 2. Work-in-process inventory
  - 3. Finished-goods inventory

III. Manufacturing Operations and Manufacturing Costs
- A. Job shop, batch, assembly line, continuous flow
- B. Assembly manufacturing
- C. Manufacturing costs
  - 1. Direct material
  - 2. Direct labor
  - 3. Manufacturing overhead
  - 4. Indirect material
  - 5. Indirect labor
  - 6. Other manufacturing costs
    - i. Service Departments
    - ii. Support Departments
    - iii. Overtime Premium
    - iv. Idle time
  - 7. Total Manufacturing Costs, Conversion costs, prime costs

IV. Manufacturing Cost Flows
- A. Cost of goods manufactured
- B. Cost of Goods Sold

V. Non-Manufacturing Production Costs
- A. Service Firms
- B. Non-profit organizations

VI. Basic Cost Management Concepts: Different Costs for Different Purposes
- A. Cost Drivers

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B. Variable and Fixed Costs
   1. Variable costs
   2. Fixed Costs
   3. Graphical Perspectives
   4. Management Accounting Practice: Health Care Industry
      a. Affordable Care Act
C. Cost Accountability
   1. Direct and indirect costs
   2. Controllable and Uncontrollable costs
D. Economic Cost Concepts
   1. Opportunity costs
   2. Out-of-pocket costs
   3. Sunk costs
   4. Differential and incremental costs
   5. Marginal and Average Costs
E. Costs and Benefits of Information

VII. Costs in the Service Industry
   A. Product and period costs
   B. Variable and fixed costs
   C. Direct and Indirect
   D. Controllable and uncontrollable costs
   D. Opportunity, out-of-pocket, and sunk costs
   E. Differential, marginal, and average costs

Key Lecture Concepts

I. What Do We Mean by a Cost?

- A **cost** is the sacrifice made to achieve a particular purpose.

- There are different costs for different purposes, with costs that are appropriate for one use being totally inappropriate for others (e.g., a cost that is used to determine inventory valuation may be irrelevant in deciding whether or not to manufacture that same product).

- An **expense** is defined as the cost incurred when an asset is used up or sold for the purpose of generating revenue. The terms "product cost" and "period cost" are used to describe the timing with which expenses are recognized.

  - **Product costs** are the costs of goods manufactured or the cost of goods purchased for resale. These costs are inventoried until the

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goods are sold.

- **Period costs** are all other non-product costs in an organization (e.g., selling and administrative). Such costs are not inventoried but are expensed as time passes.

II. Costs on Financial Statements

- Product costs are shown as cost of goods sold on the income statement when goods are sold. Income statements of service enterprises lack a cost-of-goods-sold section and instead reveal a firm's operating expenses.

- Product costs, housed on the balance sheet until sale, are found in three inventory accounts:

  - **Raw materials—**materials that await production

  - **Work in process—**partially completed production

  - **Finished goods—**completed production that awaits sale

III. Manufacturing Operations and Manufacturing Costs

- There are various types of production processes; for example:

  - *Job shop* – low production volume, little standardization; one-of-a-kind products

  - *Batch* – multiple products; low volume

  - *Assembly line* – a few major products; higher volume

  - *Continuous flow* – high volume; highly standardized commodity products

- **Direct materials—**materials easily traced to a finished product (e.g., the seat on a bicycle)

- **Direct labor—**the wages of anyone who works directly on the product (e.g., the assembly-line wages of the bicycle manufacturer)

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- **Manufacturing overhead—**all other manufacturing costs such as:
  - **Indirect materials—**materials and supplies other than those classified as direct materials.
  - **Indirect labor—**personnel who do not work directly on the product (e.g., manufacturing supervisors), and
  - Other manufacturing costs not easily traceable to a finished good (insurance, property taxes, depreciation, utilities, and service/support department costs). Overtime premiums and the cost of idle time are also accounted for as overhead.
  - **Idle time –** time that is not spent productively by an employee due to such events as equipment breakdowns or new setups of production runs.
- **Conversion cost** (the cost to convert direct materials into finished product): direct labor + manufacturing overhead
- **Prime cost:** direct material + direct labor

IV. Manufacturing Cost Flows

- Manufacturing costs (direct materials, direct labor, and manufacturing overhead) are "put in process" and attached to work-in-process inventory. The goods are completed (finished goods), and the costs are then passed along to cost of goods sold upon sale.
- **Cost of goods manufactured:** Direct materials used + direct labor + manufacturing overhead + beginning work-in-process inventory - ending work-in-process inventory
  - This amount is transferred from work-in-process inventory to finished-goods inventory when goods are completed.
- Product costs and cost of goods sold for a manufacturer:

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Beginning Inventory, Finished Goods	+	Cost of Goods Manufactured to Completion	-	Ending Inventory, Finished Goods	=	Cost of Goods Sold
Beginning Finished Goods		**Cost of Goods Manu.**		**Ending Finished Goods**		**Cost of Goods Sold**
Supported by the prior year's balance sheet		A schedule of production costs		Current balance sheet		Income statement

- Production-cost concepts are applicable to service businesses and nonprofit organizations. For example, the direct-materials concept can be applied to the food consumed in a restaurant or the jet fuel used by an airline. Similarly, direct labor would be equivalent to the cooks in a restaurant and the flight crews of an airline.

V. Production costs in service industry firms and nonprofit organizations

- The same classifications apply. Service firms can have direct material and direct labor costs just as manufacturing firms do. But they are not product costs, but rather period costs that are recorded in the accounting period of the expenditure.

- Service cannot be inventoried for a future sale.

VI. Basic Cost Management Concepts: Different Costs for Different Purposes

- A **cost driver** is any event or activity that causes costs to be incurred. Cost driver examples include labor hours in manual assembly work and machine hours in automated production settings.

  - The higher the degree of correlation between a cost-pool increase and the increase in its cost driver, the better the cost management information.

- Variable and fixed costs

  - **Variable costs** move in direct proportion to a change in activity.

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For example, in the manufacture of bicycles, the total cost of bicycle seats goes up in proportion to the number of bicycles produced. However, the cost per unit (i.e., per seat) remains constant.

- **Fixed costs** remain constant in total as the level of activity changes. For instance, straight-line depreciation of a bicycle plant remains the same whether 100 bicycles or 1,000 bicycles are produced. However, the depreciation cost per unit fluctuates because this constant total is spread over a smaller or greater volume.

- Direct and indirect costs
  - An entity (e.g., a specific product, service, or department) to which a cost is assigned is commonly known as a **cost object.**
  - A **direct cost** is one that can be easily traced to a cost object.
    - If a college department has been defined as the cost object, professors' salaries and administrative assistants' salaries are direct costs of the department (just as assembly workers' wages are direct costs of a manufacturing department).
  - An **indirect cost** is a cost that cannot be easily traced to a cost object.
    - For example, the costs of a university's controller, president, campus security, and groundskeeper cannot be directly traceable to a specific department, as these individuals service the entire university. (Similarly, a factory guard's salary is not traceable to only one department and is, thus, considered indirect to all departments.)
  - A cost management system strives to trace costs to the objects that caused them so that managers can isolate responsibility for spending and objectively evaluate operations.

Teaching Tip: When discussing indirect costs, you may want to cite a hospital's medical and surgical supplies as an example. Such items do not appear to be a primary target for trimming; however, these indirect costs often account for a sizable portion of a hospital's operating costs. Understanding indirect costs has become more valuable in a managed-care environment because it helps hospitals negotiate fixed-fee contracts.

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- Controllable and uncontrollable costs
  - **Controllable costs—**costs over which a manager has influence (e.g., direct materials)
  - **Uncontrollable costs—**costs over which a manager has no influence (e.g., the salary of a firm's CEO from the production manager's viewpoint)
- **Opportunity cost—**the benefit forgone by choosing an alternative course of action (e.g., the wages forgone when a student decides to attend college full-time rather than be employed)
- **Out-of-pocket cost—**a cost that requires a cash outlay
- **Sunk cost—**a cost incurred in the past that cannot be changed by future action (e.g., the cost of existing inventory or equipment)
  - Such costs are not relevant for decision making.
- **Differential cost—**the net difference in cost between two alternative courses of action
  - **Incremental cost—**the increase in cost from one alternative to another
- **Marginal cost—**the extra cost incurred when one additional unit is produced
- **Average cost per unit—**total cost divided by the units of activity
- Accountants must weigh the benefits of providing information against the costs of generating, communicating, and using that information. The goal is to use information effectively and avoid information overload.

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VII. Costs in the Service Industry

- The preceding costs are relevant in service providers as well as for manufacturing entities.

Teaching Overview

The main purpose of Chapter 2 is to expand the way in which costs are defined and viewed. After completing a course in financial accounting, students are very much geared into thinking about functional costs (depreciation, utilities, and commissions) for an entire organization. While this is useful information to an outside creditor or investor, it is insufficient with respect to helping internal managers do their jobs effectively. Managers must also consider cost behavior, controllability, costs incurred by smaller segments, and so on. An initial reminder of these facts generally opens a discussion of additional ways of viewing financial information. It is worthwhile to spend a few extra minutes in the area of cost behavior since it is so fundamental to later topics.

Before discussing manufacturing costs, I ask for a show of hands from students who have actually visited a manufacturing plant. The typical, small number of hands serves as a reminder that many students have little idea of what a factory "looks like" and does. Pictures and videos are helpful in providing a context for the concepts being discussed—even a field trip to a local manufacturer is a good idea. This is also an excellent time to point out that even if a student does not plan to work in production management, he or she may well work in accounting, finance, or marketing for a company that makes a product. Therefore, being conversant in the language and concepts of cost accounting will be useful. Accounting techniques in manufacturing are frequently transferable to the service sector, and this fact should be emphasized in class.

In summary, Chapter 2 discusses the many ways that costs can be categorized. Chapter 3 then follows with a discussion of a system to track product costs and answers the age-old question, “How much does this cost?

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Homework Grid

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2-25	5	10	
2-26	5	10	
2-27	4	30	C
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2-29	1, 3, 6	25	
2-30	1, 8	15	
2-31	1, 8, 10	15	
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2-33	1, 10	5	
2-34	1, 9, 10	5	
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Problems:			
2-37	3, 4	20	
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2-42	2, 5, 10	25	
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2-47	8, 9	15	
2-48	8, 9	25	
2-49	1, 3, 9	10	
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2-53	1, 3, 9, 10	20	
2-54	1, 3	40	W
2-55	7, 10	10	

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2-56	3, 8, 9, 10	25	
2-57	7, 8, 10	25	
2-58	8, 10	15	
Cases:			
2-59	1, 9, 10	30	E, W
2-60	7, 8, 10	50	W, G

* W = Written response E = Ethical issue G = Group work
I = International C = Internet use S = Spreadsheet

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FIFO Method of Process Costing

In this supplement to *Managerial Accounting* we will illustrate the first-in, first-out (FIFO) method of process costing using the data for MVP Sports Equipment Company, which was given in Exhibit 4–4 in Chapter 4 of the text. Unlike the weighted-average method, the FIFO method does not commingle costs from two or more accounting periods. As the illustration will show, the costs from each period are treated separately.

Step 1: Analysis of Physical Flow of Units The *physical* flow of units is unaffected by the process-costing method used. Therefore, step 1 is identical under the weighted-average and FIFO methods. See Exhibit 4–5 in the text.

Step 2: Calculation of Equivalent Units A table of equivalent units, under FIFO process costing, is presented in Exhibit 4–A.* It is identical to the table prepared under the weighted-average method except for one important difference. Under the FIFO method, the equivalent units of direct material and conversion represented by the March 1 work-in-process inventory are subtracted in the last row of the table. By subtracting the equivalent units in the beginning work in process, we are able to determine the *new equivalent units of activity accomplished in March only*. The 20,000 physical units in the March 1 work in process have all of their materials, so they represent 20,000 equivalent units of direct material. However, these units are only 10 percent complete with respect to conversion, so they represent only 2,000 equivalent units of conversion activity (20,000 physical units × 10% complete).

Step 3: Computation of Unit Costs The calculation of unit costs is presented in Exhibit 4–B. The cost per equivalent unit for direct material is computed by dividing the direct-material cost incurred *during March only* by the new equivalent units of direct material added *during March only*. An analogous procedure is used for conversion costs. Note that the costs for direct material and conversion assigned to the beginning inventory are *not* added to the costs incurred during March for the purpose of calculating unit costs.

Step 4: Analysis of Total Costs To complete the process-costing procedure, we determine the total cost to be transferred out of the Cutting Department's Work-in-Process Inventory account and into the Stitching Department's Work-in-Process

Exhibit 4–A

Step 2: Calculation of Equivalent Units—Cutting Department (FIFO method)

	Physical Units	Percentage of Completion with Respect to Conversion	Equivalent Units	
			Direct Material	Conversion
Work in process, March 1	20,000	10%		
Units started during March	30,000			
Total units to account for	50,000			
Units completed and transferred out during March	40,000	100%	40,000	40,000
Work in process, March 31	10,000	50%	10,000	5,000
Total units accounted for	50,000			
Total equivalent units			50,000	45,000
Less: equivalent units represented in March 1 work in process			20,000	2,000
New equivalent units accomplished in March only			30,000	43,000

*Numerically designated exhibits are in Chapter 4 of the text (e.g., Exhibit 4–4). Alphanumerically designated exhibits are in this supplement (e.g., Exhibit 4–A).

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Exhibit 4–B

Step 3: Computation of Unit Costs—Cutting Department (FIFO method)

	Direct Material	Conversion	Total
Work in process, March 1 (from Exhibit 4–4)	These costs were incurred during February. They are not included in the unit-cost calculation for March.		$ 57,200
Costs incurred during March (from Exhibit 4–4) . . .	$90,000	$193,500	283,500
Total costs to account for			$340,700
Equivalent units for March only (from step 2, Exhibit 4–A)	30,000	43,000	
Costs per equivalent unit	$ 3.00	$ 4.50	$ 7.50
	↑	↑	↑
	$90,000 / 30,000	$193,500 / 43,000	$3.00 + $4.50

Inventory account. Exhibit 4–C presents this analysis of total costs. The calculations from step 3 are repeated in Exhibit 4–C for convenient reference.

Calculating the cost of goods completed and transferred out is more complicated under the FIFO method than under the weighted-average method. FIFO (first-in, first-out) implies that the units in the March 1 work-in-process inventory are completed and transferred out first. Under the FIFO method, the costs assigned to the March 1 work in process are not mingled with those incurred during March. Instead, these costs are kept separate and transferred out first. The units in the March 1 work in process need to be completed during March. Since 90 percent of the conversion remains to be done, 18,000 equivalent units of conversion is applied during March to the March 1 work in process. These equivalent units of conversion cost $4.50 per unit since they are accomplished during March. The remainder of the 40,000 units completed and transferred out during March had to be *started and completed* during March. Thus, the remaining 20,000 units (40,000 units completed minus 20,000 units in the beginning work in process) cost $7.50 each during March.

The calculations in Exhibit 4–C are used as the basis for the following journal entry to transfer the cost of goods completed and transferred out to the Stitching Department.

Work-in-Process Inventory: Stitching Department	288,200	
Work-in-Process Inventory: Cutting Department		288,200

On March 31, the Cutting Department's Work-in-Process Inventory account appears as follows:

Work-in-Process Inventory: Cutting Department			
March 1 balance	57,200		
March cost of direct material, direct labor, and applied manufacturing overhead	283,500	288,200	Cost of goods completed and transferred out of Cutting Department
March 31 balance	52,500		

The March 31 balance in the account agrees with that calculated in Exhibit 4–C. Note that the March 31 balance in the Cutting Department's Work-in-Process Inventory account differs under the FIFO and weighted-average methods of process costing.

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Exhibit 4–C

Step 4: Analysis of Total Costs—Cutting Department (FIFO method)

	Direct Material	Conversion	Total
Work in process, March 1 (from Exhibit 4–4)	These costs were incurred during February. They are not included in the unit-cost calculation for March.		$ 57,200
Costs incurred during March (from Exhibit 4–4)	$90,000	$193,500	283,500
Total costs to account for			$340,700
Equivalent units for March only (from step 2, Exhibit 4–A)	30,000	43,000	
Costs per equivalent unit	$ 3.00	$ 4.50	$ 7.50
	$90,000 / 30,000	$193,500 / 43,000	$3.00 + $4.50
Cost of goods completed and transferred out of the Cutting Department during March:			
Cost of March 1 work-in-process inventory, which is transferred out first			$ 57,200
Cost incurred to finish the March 1 work-in-process inventory: (Number of units) × (Percentage of conversion remaining) × (Cost per equivalent unit of conversion)		20,000 × .90 × $4.50	81,000
Cost incurred to produce units that were both started and completed during March: (Number of units) × (Total cost per equivalent unit)		20,000* × $7.50	150,000
Total cost of goods completed and transferred out			$288,200
Cost remaining in March 31 work-in-process inventory in the Cutting Department:			
Direct material: (Number of equivalent units of direct material) × (Direct-material cost per equivalent unit)		10,000 × $3.00	$ 30,000
Conversion: (Number of equivalent units of conversion) × (Conversion cost per equivalent unit)		5,000 × $4.50	22,500
Total cost of March 31 work-in-process inventory			$ 52,500

*Units started and completed during March: 40,000 units completed and transferred out minus 20,000 units in the March 1 work-in-process inventory.

Check:		
	Cost of goods completed and transferred out	$288,200
	Cost of March 31 work-in-process inventory	52,500
	Total costs accounted for	$340,700

Departmental Production Report The tables presented in Exhibits 4–A and 4–C can now be combined to form a production report for the Cutting Department. This report, which is displayed in Exhibit 4–D, provides a convenient summary of the FIFO process-costing method.

Comparison of Weighted-Average and FIFO Methods

The graph presented in Exhibit 4–E highlights the differences between the weighted-average and FIFO methods of process costing. The graph is based on the same continuing illustration; the basic data are presented in Exhibit 4–4 of the text. The graph

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Exhibit 4–D

Production Report—Cutting Department (FIFO method)

	Physical Units	Percentage of Completion with Respect to Conversion	Equivalent Units: Direct Material	Equivalent Units: Conversion
Work in process, March 1	20,000	10%		
Units started during March	30,000			
Total units to account for	50,000			
Units completed and transferred out during March	40,000	100%	40,000	40,000
Work in process, March 31	10,000	50%	10,000	5,000
Total units accounted for	50,000			
Total equivalent units			50,000	45,000
Less: equivalent units represented in March 1 work in process			20,000	2,000
New equivalent units accomplished in March only			30,000	43,000

	Direct Material	Conversion	Total
Work in process, March 1 (from Exhibit 4–4)	These costs were incurred during February. They are not included in the unit-cost calculation for March.		$ 57,200
Costs incurred during March (from Exhibit 4–4)	$90,000	$193,500	283,500
Total costs to account for			$340,700
Equivalent units for March only (from step 2, Exhibit 4–A)	30,000	43,000	
Costs per equivalent unit	$ 3.00	$ 4.50	$ 7.50
	$90,000 / 30,000	$193,500 / 43,000	$3.00 + $4.50

focuses on conversion activity, but an analogous graph could be prepared for direct material. Groups of physical units are graphed on the horizontal axis, and the percentage of conversion activity accomplished during March is graphed on the vertical axis. Area I represents the equivalent units of conversion accomplished *during February* on the March 1 work-in-process inventory. Area II represents the equivalent units of conversion required during March to complete the conversion of the beginning work-in-process inventory. Area III represents the equivalent units of conversion activity accomplished during March on the units that were *both started and completed during March*. Area IV represents the equivalent units of conversion activity accomplished during March on the March 31 work-in-process inventory.

The key difference between the weighted-average and FIFO methods lies in the treatment of area I. Under the weighted-average method, the conversion costs associated with areas I, II, III, and IV are divided by the total equivalent units of conversion activity represented by areas I, II, III, and IV. The resulting conversion cost per equivalent unit is a weighted average of some of the conversion costs incurred in February (area I) and the conversion costs incurred during March (areas II, III, and IV).

In contrast, under the FIFO method, the total conversion costs associated only with areas II, III, and IV are divided by the equivalent units of conversion activity represented by areas II, III, and IV. The resulting conversion cost per equivalent unit is a

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Exhibit 4–D

(concluded)

Cost of goods completed and transferred out of the Cutting Department during March:		
Cost of March 1 work-in-process inventory, which is transferred out first		$ 57,200
Cost incurred to finish the March 1 work-in-process inventory:		
(Number of units) × (Percentage of conversion remaining) × (Cost per equivalent unit of conversion)	20,000 × .90 × $4.50	81,000
Cost incurred to produce units that were both started and completed during March:		
(Number of units) × (Total cost per equivalent unit)	20,000* × $7.50	150,000
Total cost of goods completed and transferred out		$288,200
Cost remaining in March 31 work-in-process inventory in the Cutting Department:		
Direct material:		
(Number of equivalent units of direct material) × (Direct-material cost per equivalent unit)	10,000 × $3.00	$ 30,000
Conversion:		
(Number of equivalent units of conversion) × (Conversion cost per equivalent unit)	5,000 × $4.50	22,500
Total cost of March 31 work-in-process inventory		$ 52,500

*Units started and completed during March: 40,000 units completed and transferred out minus 20,000 units in the March 1 work-in-process inventory.

Check:	Cost of goods completed and transferred out	$288,200
	Cost of March 31 work-in-process inventory	52,500
	Total costs accounted for	$340,700

pure March unit cost, because areas II, III, and IV represent conversion costs and activity of March only.

Evaluation of Weighted-Average and FIFO The weighted-average method of process costing is more widely used than the FIFO method, probably because it is somewhat simpler. Most product costing systems were designed before the wide use of computers, when the complexity of the system was an important consideration. Nowadays, most product costing systems are computerized; operating a process costing system is equally simple when using either the weighted-average method or the FIFO method.

Behavioral Implications For purposes of cost control and performance evaluation, FIFO process costing is superior to the weighted-average method. To provide incentives for departmental managers to control costs, it is important to evaluate their performance on the basis of current-period costs only. When current-period and prior-period costs are averaged, a departmental manager's *current* performance is less clear. Moreover, performance evaluation based partially on costs incurred in prior periods is less timely. Behavioral scientists generally agree that for performance evaluation to be most effective, it should be done on a timely basis.

Just-in-Time (JIT) Inventory Methods The difference between weighted-average and FIFO process costing becomes much less significant when the firm uses the just-in-time approach to inventory and production management. Under the JIT philosophy, all inventories are kept to an absolute minimum, including work-in-process inventories. The difference that arises between weighted-average and FIFO process costing calculations is due to the different treatment of each period's beginning work-in-process

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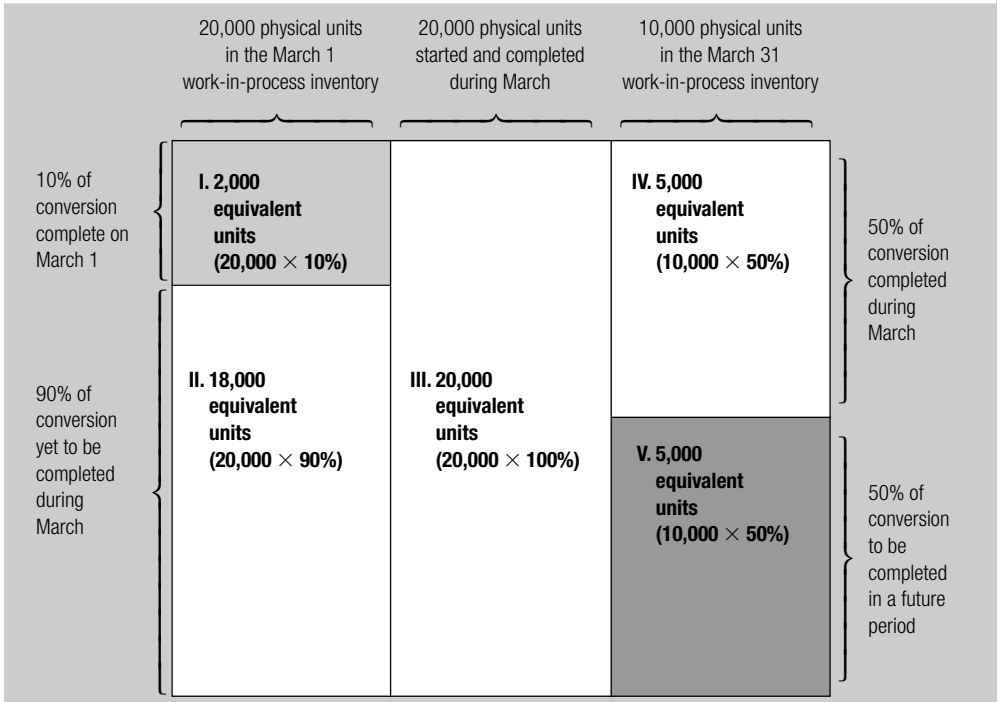
Exhibit 4–E

Comparison of Weighted-Average and FIFO Methods



Weighted-Average Method:

$$\text{Conversion cost per equivalent unit (weighted-average)} = \frac{\text{Total costs for conversion activity in areas I, II, III, IV}}{\text{Total equivalent units of conversion activity in areas I, II, III, IV}}$$

FIFO Method:

$$\text{Conversion cost per equivalent unit (March only)} = \frac{\text{Total costs for conversion activity in areas II, III, IV}}{\text{Total equivalent units of conversion activity in areas II, III, IV}}$$

inventory under the two methods. (To see this most clearly, you may wish to review Exhibit 4–C.) Since work-in-process inventories are very small or nonexistent under JIT, there will be little or no difference in the process costing calculations under the weighted-average and FIFO methods.

Sequential Production Departments

In manufacturing operations with sequential production departments, the costs assigned to the units transferred out of one department remain assigned to those units as they enter the next department. In our illustration, the partially completed baseball gloves transferred out of the Cutting Department go next to the Stitching Department. There the cut-out pieces are stitched together. Since the cost of the thread used in the stitching is very small, it is treated as an indirect-material cost and included in manufacturing overhead. At the end of the process in the Stitching Department, rawhide lacing is woven through the fingers and along some edges of each baseball glove. The rawhide lacing is treated as a direct material.

The cost of goods completed and transferred out of the Cutting Department is transferred as shown in the following display.

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Work-in-Process Inventory: Cutting Department	
Direct material	Cost of goods completed and transferred out →
Conversion:	
Direct labor	
Manufacturing overhead	

Work-in-Process Inventory: Stitching Department	
Transferred-in costs	
Direct material	
Conversion:	
Direct labor	
Manufacturing overhead	

As the T-accounts show, the Cutting Department has two cost elements: direct-material and conversion costs. However, the Stitching Department has three cost elements: direct-material, conversion, and *transferred-in costs*. Transferred-in costs are the costs assigned to the units transferred from the Cutting Department to the Stitching Department. Transferred-in costs are conceptually similar to direct-material costs. The only difference is that direct-material costs relate to raw materials, whereas transferred-in costs relate to partially completed products.

Exhibit 4–F presents the basic data for our illustration of process costing in the Stitching Department. The March 1 work-in-process inventory in the department consists of 10,000 units that received some work in the Stitching Department during February but were not completed. The $61,000 of transferred-in costs in the March 1 work-in-process inventory are costs that were transferred into the Stitching Department's Work-in-Process Inventory account during February. Note that any partially completed baseball glove in the Stitching Department must have received all of its

Exhibit 4–F

Basic Data for Illustration—Stitching Department

Work in process, March 1—10,000 units:	
Transferred-in: 100% complete, cost of	$ 61,000*
Direct material: none	–0–
Conversion: 20% complete, cost of	7,600*
Balance in work in process, March 1	$ 68,600*
Units transferred in from Cutting Department during March	40,000 units
Units completed during March and transferred out to finished-goods inventory	30,000 units
Work in process, March 31	20,000 units
Transferred in: 100% complete	
Direct material: none	
Conversion: 90% complete	
Costs incurred during March:	
Transferred in from Cutting Department (assumes that the FIFO method was used for the Cutting Department)	$288,200
Direct material	$ 7,500
Conversion costs:	
Direct labor	$115,000
Applied manufacturing overhead	115,000†
Total conversion costs	$230,000

*These costs were incurred during the prior month, February.

† $\left(\text{Predetermined overhead rate}\right) \times \left(\text{Direct-labor cost}\right) = 100\% \times \$115{,}000 = \$115{,}000$

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Exhibit 4–G

Production Report—Stitching Department (FIFO method)

STEP 1 | STEP 2

	Physical Units	Percentage of Completion with Respect to Conversion	Equivalent Units: Transferred in	Equivalent Units: Direct Material	Equivalent Units: Conversion
Work in process, March 1	10,000	20%			
Units transferred in during March	40,000				
Total units to account for	50,000				
Units completed and transferred out during March	30,000		30,000	30,000	30,000
Work in process, March 31	20,000	90%	20,000	–0–	18,000
Total units accounted for	50,000				
Total equivalent units			50,000	30,000	48,000
Less equivalent units represented in March 1 work in process			10,000	–0–	2,000
New equivalent units accomplished in March only			40,000	30,000	46,000

STEP 3

	Transferred in	Direct Material	Conversion	Total
Work in process, March 1 (from Exhibit 4–F)	These costs were incurred during February. They are not included in the unit-cost calculation for March.			$ 68,600
Costs incurred during March (from Exhibit 4–F)	$288,200*	$ 7,500	$230,000	525,700
Total costs to account for				$594,300
Equivalent units for March only	40,000	30,000	46,000	
Costs per equivalent unit	$ 7.205	$ .25	$ 5.00	$ 12.455
	↑	↑	↑	↑
	$288,200	$7,500	$230,000	$7.205
	40,000	30,000	46,000	+$.25
				+$5.00

*Cost of goods completed and transferred out of Cutting Department during March, under the FIFO method (calculated in Exhibit 4–C).

transferred-in input, or it would not have been transferred from the Cutting Department. The March 1 work-in-process inventory has not yet received any direct material in the Stitching Department, because the direct material (rawhide lacing) is not added until the end of the process.

As Exhibit 4–F shows, 40,000 units were transferred into the Stitching Department during March. This agrees with Exhibit 4–4 in the text, which shows that 40,000 units were completed and transferred out of the Cutting Department during March. The Stitching Department completed 30,000 units during March and transferred them to finished-goods inventory. This left 20,000 units in the Stitching Department's March 31 work-in-process inventory.

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Exhibit 4–G

(concluded)

STEP 4

Cost of goods completed and transferred out of the Stitching Department during March:		
Cost of March 1 work-in-process inventory, which is transferred out first		$ 68,600
Cost incurred to finish the March 1 work-in-process inventory:		
(Number of units) × (Percentage of direct material remaining) × (Cost per equivalent unit of material)	10,000 × 100% × $.25	2,500
(Number of units) × (Percentage of conversion remaining) × (Cost per equivalent unit of conversion)	10,000 × 80% × $5.00	40,000
Cost incurred to produce units that were both started and completed during March:		
(Number of units) × (Total cost per equivalent unit)	20,000† × $12.455	249,100
Total cost of goods completed and transferred out		$360,200
Cost remaining in March 31 work-in-process inventory in the Stitching Department:		
Transferred-in costs:		
(Number of equivalent units of transferred-in costs) × (Transferred-in cost per equivalent unit)	20,000 × $7.205	$144,100
Conversion:		
(Number of equivalent units of conversion) × (Conversion cost per equivalent unit)	18,000 × $5.00	90,000
Total cost of March 31 work-in-process inventory		$234,100

†Units started and completed during March: 30,000 units completed and transferred out minus 10,000 units in the March 1 work-in-process inventory.

Check:	Cost of goods completed and transferred out	$360,200
	Cost of March 31 work-in-process inventory	234,100
	Total costs accounted for	$594,300

Exhibit 4–F shows that the costs incurred in the Stitching Department during March were $7,500 for direct material, $115,000 for direct labor, and $115,000 for *applied* manufacturing overhead. The predetermined overhead rate in the Stitching Department is 100 percent of direct-labor cost. Note that the predetermined overhead rates are different in the two production departments.

The March transferred-in cost in the Stitching Department is the cost of goods completed and transferred out of the Cutting Department. The amount of this cost depends on whether the weighted-average or FIFO process-costing method is used in the Cutting Department. The amount shown in Exhibit 4–F, $288,200, assumes that the FIFO method was used in the Cutting Department. This amount comes from Exhibit 4–C.

Exhibit 4–G presents a production report for the Stitching Department using the FIFO process-costing method. Step 1 details the physical flow of units. In step 2, the calculation of equivalent units, the equivalent units in the March 1 work-in-process

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inventory are subtracted to arrive at the new equivalent units of activity for March only. This is done for transferred-in activity, direct material, and conversion.

The costs per equivalent unit are computed in step 3. Under FIFO, the cost assigned to the March 1 work-in-process inventory is *not* added to the cost incurred during March. The March transferred-in cost is *$288,200*. This is the cost of goods completed and transferred out of the Cutting Department, *computed using the FIFO method* (Exhibit 4–C).

An analysis of the total costs in the Stitching Department is presented in step 4 of Exhibit 4–G. Under the FIFO method, the cost assigned to the March 1 work-in-process inventory, $68,600, is transferred out first. Note that the cost incurred to complete the March 1 work-in-process inventory includes the cost of direct material since direct material is not added in the Stitching Department until the end of the process. The cost of the 20,000 units started and completed in the Stitching Department during March is found by multiplying 20,000 by the total cost per equivalent unit computed in step 3, $12.455. Finally, the cost remaining in the Stitching Department's Work-in-Process Inventory account on March 31 includes not only conversion costs but also transferred-in costs. The transferred-in cost per equivalent unit in March, under FIFO, is $7.205 (see step 3). The following journal entry is made to transfer the cost of the units completed to the Finished-Goods Inventory account.

Finished-Goods Inventory	360,200	
Work-in-Process Inventory: Stitching Department		360,200
To transfer the cost of goods completed, as computed under the FIFO method.		

Summary of Transferred-in Costs

When manufacturing is done in sequential production departments, the cost assigned to the units completed in each department is transferred to the next department's Work-in-Process Inventory account. This cost is termed *transferred-in cost*, and it is handled as a distinct cost element in the process-costing calculations. In this way, the final cost of the product is built up cumulatively as the product progresses through the production sequence.

Review Questions

1. JIT inventory and production management systems are coming into widespread use. What are the implications of the JIT approach for process costing?
2. Explain how the computation of equivalent units differs between the weighted-average and FIFO methods.
3. How are the costs of the beginning work-in-process inventory treated differently under the weighted-average and FIFO methods?

Exercises

Exercise 4
Physical Flow and Equivalent Units; FIFO

The Portsmouth plant of Health Foods Corporation produces low-fat salad dressing. The following data pertain to the year just ended.

		Percentage of Completion	
	Units	**Direct Material**	**Conversion**
Work in process, January 1	20,000 lb.	80%	60%
Work in process, December 31	15,000 lb.	70%	30%

During the year the company started 120,000 pounds of material in production.

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Required:

Prepare a schedule analyzing the physical flow of units and computing the equivalent units of both direct material and conversion for the year. Use FIFO process costing.

Exercise 5
Equivalent Units; FIFO

Glass Creations, Inc. manufactures decorative glass products. The firm employs a process-costing system for its manufacturing operations. All direct materials are added at the beginning of the process, and conversion costs are incurred uniformly throughout the process. The company's production schedule for October follows.

	Units
Work in process on October 1 (60% complete as to conversion)	1,000
Units started during October	5,000
Total units to account for	6,000
Units from beginning work in process, which were completed and transferred out during October	1,000
Units started and completed during October	3,000
Work in process on October 31 (20% complete as to conversion)	2,000
Total units accounted for	6,000

Required:

Calculate each of the following amounts using FIFO process costing.

1. Equivalent units of direct material during October.
2. Equivalent units of conversion activity during October.

(CMA, adapted)

Exercise 6
Equivalent Units; FIFO

Energy Resource Company refines a variety of petrochemical products. The following data are from the firm's Amarillo plant.

Work in process, November 1	2,000,000 gallons
Direct material	100% complete
Conversion	25% complete
Units started in process during November	950,000 gallons
Work in process, November 30	240,000 gallons
Direct material	100% complete
Conversion	80% complete

Required:

Compute the equivalent units of direct material and conversion for the month of November. Use the FIFO method of process costing.

Exercise 7
Cost per Equivalent Unit; FIFO

Vancouver Glass Company manufactures window glass for automobiles. The following data pertain to the Plate Glass Department.

Work in process, June 1:	
Direct material	$ 37,000
Conversion	36,750
Costs incurred during June:	
Direct material	$150,000
Conversion	230,000

The equivalent units of activity for June, under FIFO process costing, were as follows: 15,000 equivalent units of direct material, and 46,000 equivalent units of conversion activity.

Required:

Calculate the cost per equivalent unit, for both direct material and conversion, during June. Use FIFO process costing.

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Exercise 8
Cost per Equivalent Unit; FIFO

Montana Lumber Company grows, harvests, and processes timber for use in construction. The following data pertain to the firm's sawmill during November.

Work in process, November 1:	
Direct material	$ 65,000
Conversion	180,000
Costs incurred during November:	
Direct material	$425,000
Conversion	690,000

The equivalent units of activity for November, under FIFO process costing, were as follows: 4,250 equivalent units of direct material, and 1,000 equivalent units of conversion activity.

Required:

Calculate the cost per equivalent unit, for both direct material and conversion, during November. Use FIFO process costing.

Exercise 9
Analysis of Total Costs; FIFO

Richmond Textiles Company manufactures a variety of natural fabrics for the clothing industry. The following data pertain to the Weaving Department for the month of September.

Equivalent units of direct material	40,000
Equivalent units of conversion	44,000
Units completed and transferred out during September	50,000

The cost data for September are as follows:

Work in process, September 1	
Direct material	$ 94,000
Conversion	44,400
Costs incurred during September	
Direct material	$164,000
Conversion	272,800

There were 20,000 units in process in the Weaving Department on September 1 (complete as to direct material, and 40% complete as to conversion).

Required:

Compute each of the following amounts using FIFO process costing.

1. Cost of goods completed and transferred out of the Weaving Department during September.
2. Cost of the September 30 work-in-process inventory in the Weaving Department. The equivalent units in the ending work in process are 10,000 for direct material and 2,000 for conversion.

Exercise 10
Analysis of Total Costs; FIFO

The following data pertain to Birmingham Paperboard Company, a manufacturer of cardboard boxes.

Work in Process, February 1	10,000 units*
Direct material	$ 5,500
Conversion	17,000
Costs incurred during February	
Direct material	$110,000
Conversion	171,600

*Complete as to direct material; 40% complete as to conversion.

The equivalent units of activity for February were as follows:

Direct material (FIFO method)	100,000
Conversion (FIFO method)	88,000
Completed and transferred out	90,000

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Required:

Compute each of the following amounts using FIFO process costing.

1. Cost of goods completed and transferred out during February.
2. Cost of the February 28 work-in-process inventory. The equivalent units in the ending work in process are 20,000 for direct material and 2,000 for conversion.

Exercise 11
JIT; Weighted-Average versus FIFO; Journal Entry

On January 1, the Molding Department of Camden Plastics Company had no work-in-process inventory due to the implementation of a just-in-time inventory system. On January 31, the following journal entry was made to record the cost of goods completed and transferred out of the Molding Department.

Finished-Goods Inventory	$176,000	
Work-in-Process Inventory: Molding Department		$176,000

The company uses weighted-average process costing.

Required:

What would the amount in the journal entry have been if Camden Plastics Company had used the FIFO method of process costing? Why?

Problems

Problem 12
Straightforward FIFO Process Costing; Step-by-Step Approach

Moravia Company processes and packages cream cheese. The following data have been compiled for the month of April. Conversion activity occurs uniformly throughout the production process.

Work in process, April 1—10,000 units:	
Direct material: 100% complete, cost of	$ 22,000
Conversion: 20% complete, cost of	4,500
Balance in work in process, April 1	$ 26,500
Units started during April	100,000
Units completed during April and transferred out to finished-goods inventory	80,000
Work in process, April 30	
Direct material: 100% complete	
Conversion: 33⅓% complete	
Costs incurred during April:	
Direct material	$198,000
Conversion costs:	
Direct labor	$ 52,800
Applied manufacturing overhead	105,600
Total conversion costs	$158,400

Required:

Prepare schedules to accomplish each of the following process-costing steps for the month of April. Use the FIFO method of process costing.

1. Analysis of physical flow of units.
2. Calculation of equivalent units.
3. Computation of unit costs.
4. Analysis of total costs.

Problem 13
Partial Production Report; Journal Entries; FIFO Method

Neptune Corporation accumulates costs for its single product using process costing. Direct material is added at the beginning of the production process, and conversion activity occurs uniformly throughout the process. A partially completed production report for the month of May follows.

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Production Report
For the Month of May

	Physical Units	Percentage of Completion with Respect to Conversion	Equivalent Units: Direct Material	Equivalent Units: Conversion
Work in process, May 1	25,000	40%		
Units started during May	30,000			
Total units to account for	55,000			
Units completed and transferred out during May	35,000		35,000	35,000
Work in process, May 31	20,000	80%	20,000	16,000
Total units accounted for	55,000			

	Direct Material	Conversion	Total
Work in process, May 1	$143,000	$ 474,700	$ 617,700
Costs incurred during May	165,000	2,009,000	2,174,000
Total costs to account for	$308,000	$2,483,700	$2,791,700

Required:

Use FIFO process costing to complete the following requirements.

1. Prepare a schedule of equivalent units.
2. Compute the costs per equivalent unit.
3. Compute the cost of goods completed and transferred out during May.
4. Compute the cost remaining in the work-in-process inventory on May 31.
5. Prepare a journal entry to record the transfer of the cost of goods completed and transferred out during May.
6. How would the production report be different if the company used weighted-average process costing?

■ Problem 14
Partial Production Report; Journal Entries; FIFO Method

Atlantic City Taffy Company produces various kinds of candy, but salt-water taffy is by far its most important product. The company accumulates costs for its product using process costing. Direct material is added at the beginning of the production process, and conversion activity occurs uniformly throughout the process.

Production Report
For the Month of August

	Physical Units	Percentage of Completion with Respect to Conversion	Equivalent Units: Direct Material	Equivalent Units: Conversion
Work in process, August 1	40,000	80%		
Units started during August	80,000			
Total units to account for	120,000			
Units completed and transferred out during August	100,000		100,000	100,000
Work in process, August 31	20,000	30%	20,000	6,000
Total units accounted for	120,000			

	Direct Material	Conversion	Total
Work in process, August 1	$ 42,000	$ 305,280	$ 347,280
Costs incurred during August	96,000	784,400	880,400
Total costs to account for	$138,000	$1,089,680	$1,227,680

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Required:

1. Complete each of the following process-costing steps using FIFO process costing.
   a. Calculation of equivalent units.
   b. Computation of unit costs.
   c. Analysis of total costs.
2. Prepare a journal entry to record the transfer of the cost of goods completed and transferred out during August.
3. How would the production report be different if the company used weighted-average process costing?

Problem 15
Missing Data; Production Report; FIFO

The following data pertain to the Coating Department of Trenton Ceramics Company for August.

Work in process, August 1 (in units)	?
Units started during August	?
Total units to account for	?
Units completed and transferred out during August	70,000
Work in process, August 31 (in units)	50,000
Total equivalent units: direct material	?
Total equivalent units: conversion	?
New equivalent units accomplished in August: direct material	80,000
New equivalent units accomplished in August: conversion	?
Work in process, August 1: direct material	$304,000
Work in process, August 1: conversion	?
Costs incurred during August: direct material	612,000
Costs incurred during August: conversion	?
Work in process, August 1: total cost	?
Total costs incurred during August	1,493,400
Total costs to account for	1,933,400
Cost per equivalent unit: direct material	?
Cost per equivalent unit: conversion	?
Total cost per equivalent unit	?
Cost of goods completed and transferred out during August	?
Cost remaining in ending work-in-process inventory: direct material	?
Cost remaining in ending work-in-process inventory: conversion	?
Total cost of August 31 work in process	?

Additional Information:

- Direct material is added at the beginning of the production process, and conversion activity occurs uniformly throughout the process.
- Trenton Ceramics Company uses FIFO process costing.
- The August 1 work in process was 30 percent complete as to conversion.
- The August 31 work in process was 40 percent complete as to conversion.

Required:

Compute the missing amounts, and prepare the August production report for the Coating Department.

Cases

Case 16
Sequential Production Departments; FIFO; (Appendix to Chapter 4)

Garden Life Company manufactures a plant nutrient known as Garden Pride. The manufacturing process begins in the Grading Department when raw materials are started in process. Upon completion of processing in the Grading Department, the output is transferred to the Saturating Department for the final phase of production. Here the product is saturated with water and then dried again. There is no weight gain in the process, and the water is virtually cost-free. The following information is available for the month of November.

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	November 1		November 30
Work-in-Process Inventories	**Quantity (pounds)**	**Cost**	**Quantity (pounds)**
Grading Department	None	—	None
Saturating Department	1,600	$17,600*	2,000

*Includes $3,750 in Saturating Department conversion costs.

The work-in-process inventory in the Saturating Department is estimated to be 50 percent complete both at the beginning and end of November. Costs of production for November are as follows:

Costs of Production	**Materials Used**	**Conversion**
Grading Department	$265,680	$86,400
Saturating Department	—	85,920

The material used in the Grading Department weighed 36,000 pounds.

Required:

Use the FIFO method to prepare production reports for both the Grading and Saturating Departments for the month of November. In calculating unit costs, round your answer to four decimal places. The answer should include:

1. Equivalent units of production (in pounds).
2. Total manufacturing costs.
3. Cost per equivalent unit (pounds).
4. Cost of ending work-in-process inventory.
5. Cost of goods completed and transferred out.

(CPA, adapted)

■ Case 17
FIFO Process Costing; Sequential Departments; Two Types of Direct Material; Ethics (Appendix to Chapter 4)

Wood Glow Manufacturing Co. produces a wood refinishing kit that sells for $17.95. The final processing of the kits occurs in the Packaging Department. A quilted wrap is applied at the beginning of the packaging process. A compartmentalized outside box printed with instructions and the company's name and logo is added when units are 60 percent through the process. Conversion costs, consisting of direct labor and applied overhead, occur evenly throughout the packaging process. Conversion activities after the addition of the box involve package sealing, testing for leakage, and final inspection. The following data pertain to the activities of the Packaging Department during the month of October.

- Beginning work-in-process inventory was 10,000 units, 40 percent complete as to conversion.
- 40,000 units were transferred to Packaging during October.
- There were 10,000 units in ending work in process, 80 percent complete as to conversion.

The Packaging Department's October costs were as follows:

Quilted wrap	$80,000
Outside boxes	50,000
Direct labor	22,000
Applied overhead ($3.00 per direct-labor dollar)	66,000

The costs transferred in from prior processing were $3.00 per unit. The cost of goods sold for the month was $240,000, and the ending finished-goods inventory was $84,000. Wood Glow uses the first-in, first-out (FIFO) method for inventory valuation and for process costing. Wood Glow's controller, Mark Brandon, has been asked to analyze the activities of the Packaging Department for the month of October.

Required:

1. Prepare a schedule of equivalent units for the October activity in the Packaging Department. (*Hint:* You will need two columns for direct material: wrap and boxes.)
2. Determine the cost per equivalent unit of the October production.

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3. Wood Glow's production manager, Jerry Drake, has been under pressure from the company president to reduce the cost of conversion in the Packaging Department. Although Drake has initiated various changes in the process to try to bring the cost down, he has been unsuccessful. Now Drake is faced with an early November meeting with the president, at which Drake will have to discuss the packaging cost and explain his failed attempts. Drake has approached Brandon, Wood Glow's controller and a close friend, with the following request: "Mark, I've got to show some cost reduction in the Packaging Department. Even a little bit will help me get through next week's meeting. Then I can work on the problem without the president breathing down my neck. I want you to do me a favor. Let's call October's ending inventory 95 percent complete instead of 80 percent. This will increase the number of equivalent units and lower the unit costs."

By how much would Drake's proposal lower the kit's unit cost? What should Brandon do?

(CMA, adapted)

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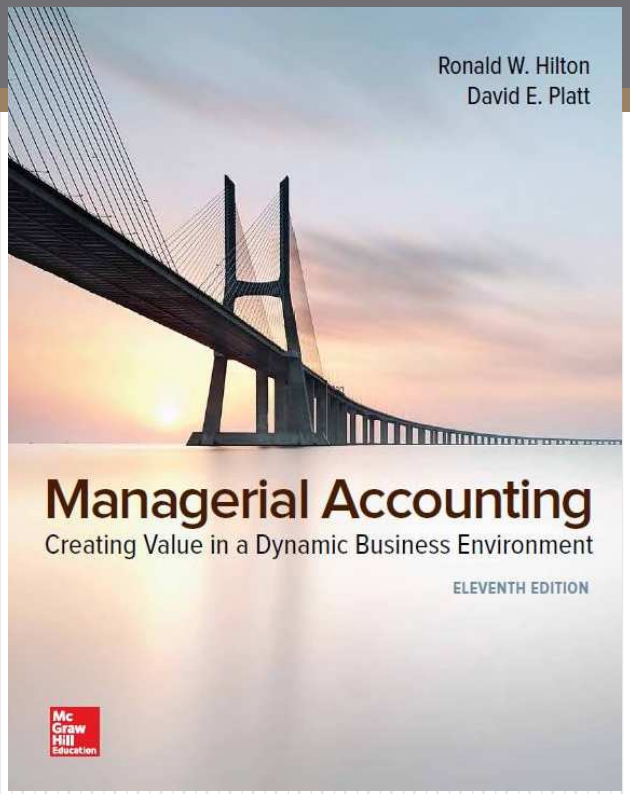
R1 R14

Chapter 2



Basic Cost Management Concepts

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Slide 1

R1 Slide 1 NN

Deleted the words 'and Accounting for Mass Customization Operations' to match the LO as presented in the pages (Hilton 11e).
Reviewer, 6/6/2016

R14 CHAPTER 2 CORRECTIONS REQUIRED

Note that pagination of the slides is inconsistent. Some slides have a slide number (bottom right), while other slides have no slide number.
Reviewer, 6/6/2016

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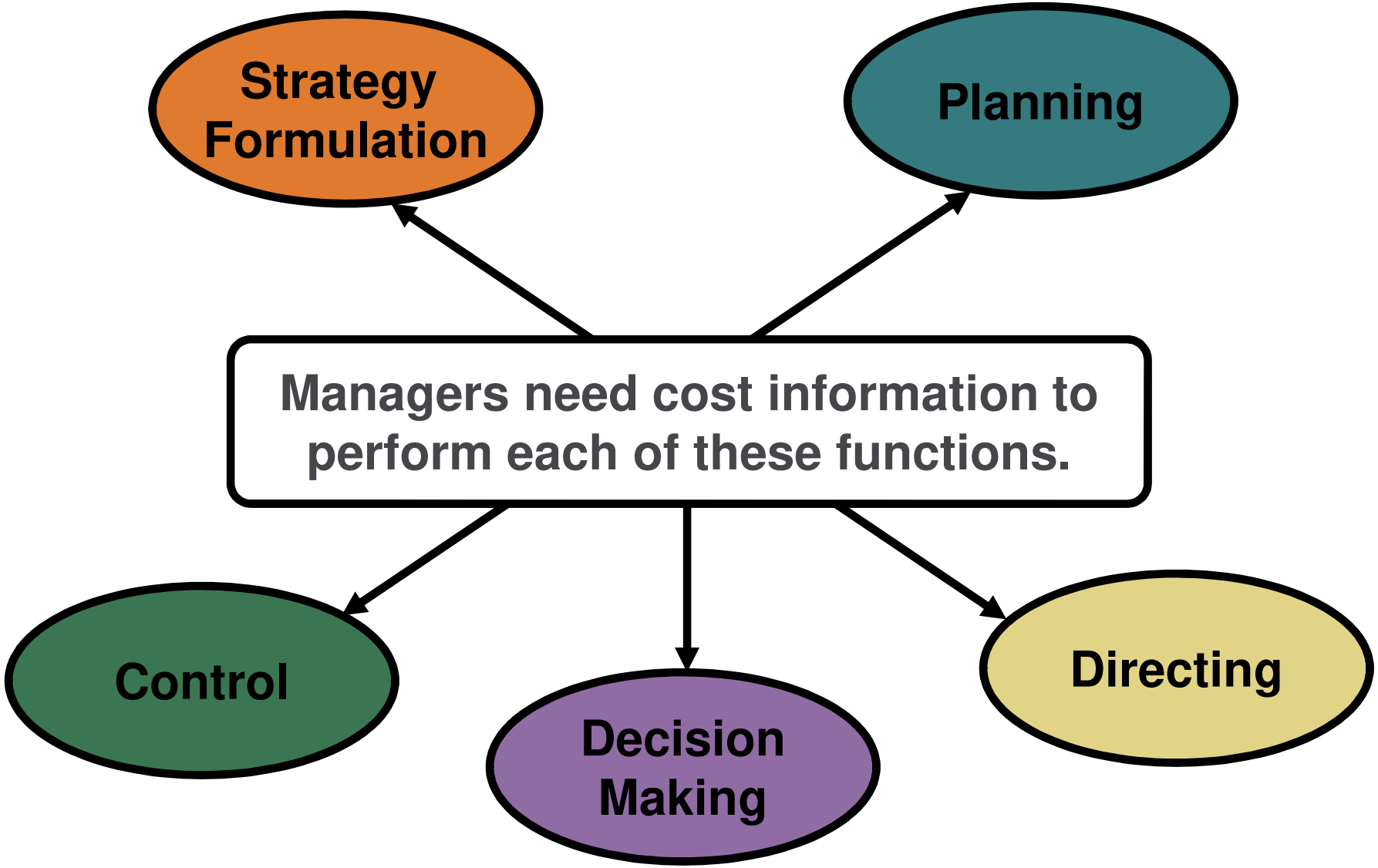
Learning Objective 2-1 – Explain what is meant by the word *cost*.

R2

Process of Management



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Slide 3

R2 Slide 3 NN

First sentence: Added a comma after the word 'making.'
Reviewer, 6/6/2016

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What Do We Mean By a Cost?

A cost is the measure of resources given up to achieve a particular purpose.

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Learning Objective 2-2 – Distinguish among product costs, period costs, and expenses.

R3

Product Costs, Period Costs, and Expenses

Product costs are costs assigned to inventory, to goods that are either purchased or manufactured for resale. Another term for product cost is inventoriable cost.

Period costs are costs that are expensed during the time period in which they are incurred.

Expenses are the consumption of assets for the purpose of generating revenue.

Slide 6

R3 Slide 6 NN

Added two spaces after each of the three bullets.

Last paragraph: Added a space after the last word.
Reviewer, 6/6/2016

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Learning Objective 2-3 – Describe the role of costs in published financial statements.

Cost Classifications on Financial Statements – Income Statement

Product Costs

↓

Cost of goods sold

Period Costs

↓

Operating expenses

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Cost Classifications on Financial Statements – Balance Sheet

Merchandiser

Current Assets

- Cash
- Receivables
- Prepaid Expenses
- Merchandise Inventory

Manufacturer

Current Assets

- Cash
- Receivables
- Prepaid Expenses
- Inventories
  - Raw Materials
  - Work in Process
  - Finished Goods

Cost Classifications on Financial Statements – Balance Sheet

Merchandiser

Current Assets

- Cash
- Receivables
- Prepaid Expenses
- Merchandise Inventory

Manufacturer

Current Assets

Those materials waiting to be processed.

- Inventories
  - Raw Materials
  - Work in Process
  - Finished Goods

R4

Cost Classifications on Financial Statements – Balance Sheet

Merchandiser

Current Assets

- Cash
- Receivables
- Prepaid Expenses
- Merchandise Inventory

Manufacturer

Partially completed products – material to which some labor and/or overhead has been added.

- Inventories
  - Raw Materials
  - Work in Process
  - Finished Goods

Slide 11

R4 Slide 11 NN

Changed the words 'Work-in-process' to non-bold font.
Reviewer, 6/6/2016

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Cost Classifications on Financial Statements – Balance Sheet

Merchandiser

Current Assets

- Cash
- Receivables
- Prepaid Expenses
- Merchandise Inventory

Manufacturer

Current Assets

- Cash

Completed products awaiting sale.

- Inventories
  - Raw Materials
  - Work in Process
  - Finished Goods

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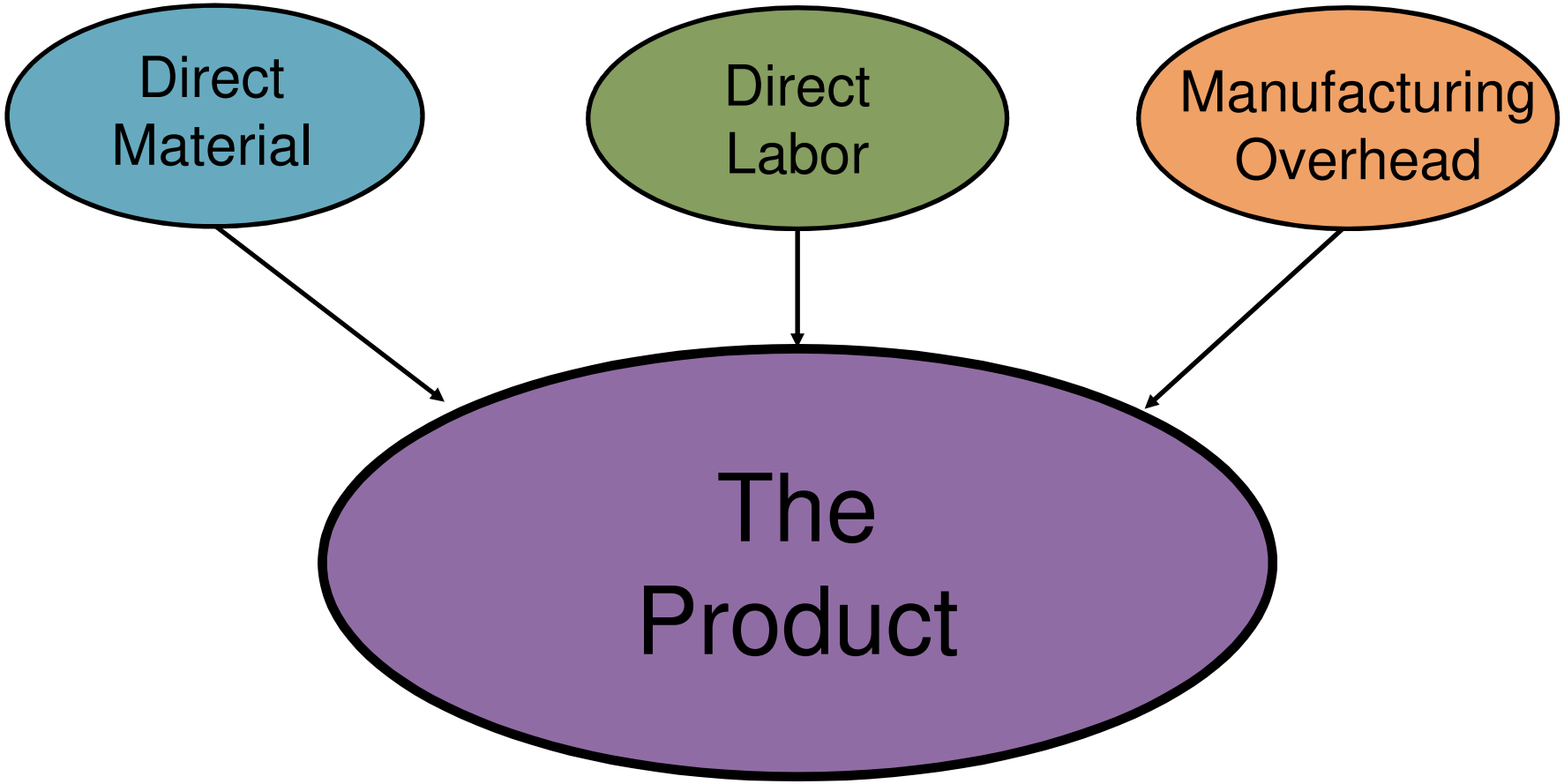
Learning Objective 2-4 – List and describe four types of manufacturing processes.

Types of Production Processes

Type of Production Process	Description of Process	Example of Manufacturer
Job Shop	Low production volume; little standardization; one-of-a-kind products. Habitat for Humanity (custom home builder).	© Kriss Russell/Getty Images RF
Batch	Multiple products; low volume; high product diversity; some customization. Caterpillar (batch production of heavy equipment).	© Matthew Lloyd/Bloomberg/Getty Images
Assembly	A few major products; higher volume; lower diversity; minimal customization. Ford (automobile assembly line).	© Bill Pugliano/Getty Images
Continuous Flow	High production volume; highly standardized commodity products. ExxonMobil (production of gasoline, a continuous-flow product).	© Royalty-Free/Corbis

Learning Objective 2-5 – Give examples of three types of manufacturing costs.

Manufacturing Costs

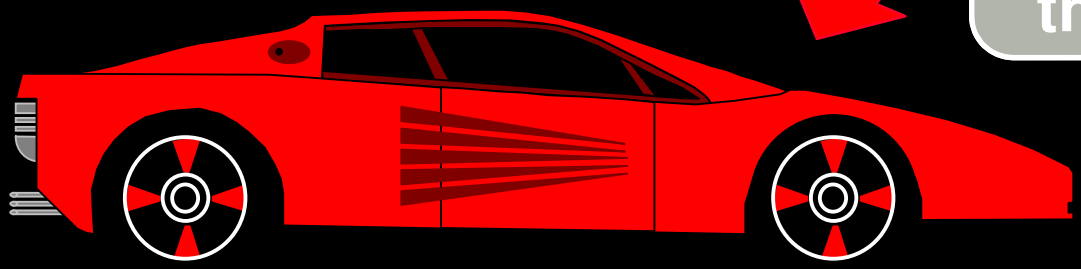


R5

Direct Material

Cost of raw material that is used to make, and can be conveniently traced, to the finished product.

Example:
Steel used to manufacture the automobile.



Slide 17

R5 Slide 17 NN

Changed the words 'direct material' to non-bold font.
Reviewer, 6/6/2016

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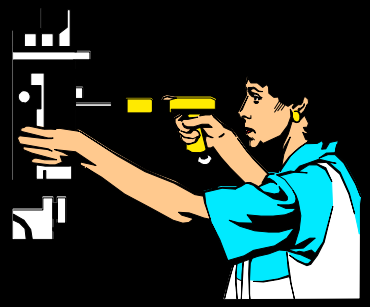
R6

Direct Labor

Cost of salaries, wages, and fringe benefits for personnel who work directly on manufactured products.



Example:

Wages paid to an automobile assembly worker.

Slide 18

R6 Slide 18 NN

Changed the words 'direct-labor' to non-italic font.
Reviewer, 6/6/2016

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Manufacturing Overhead

All other manufacturing costs

Indirect Material

Indirect Labor

Other Costs

Materials used to support the production process.
Examples: lubricants and cleaning supplies used in an automobile assembly plant.

R7

Manufacturing Overhead

All other manufacturing costs

Indirect Material

Indirect Labor

Other Costs

Cost of personnel who do not work directly on the product. Examples: maintenance workers, janitors, and security guards.

Slide 20

R7 Slide 20 NN

Changed the words 'indirect labor' to bold italic font.
Reviewer, 6/6/2016

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Manufacturing Overhead

All other manufacturing costs

Indirect Material

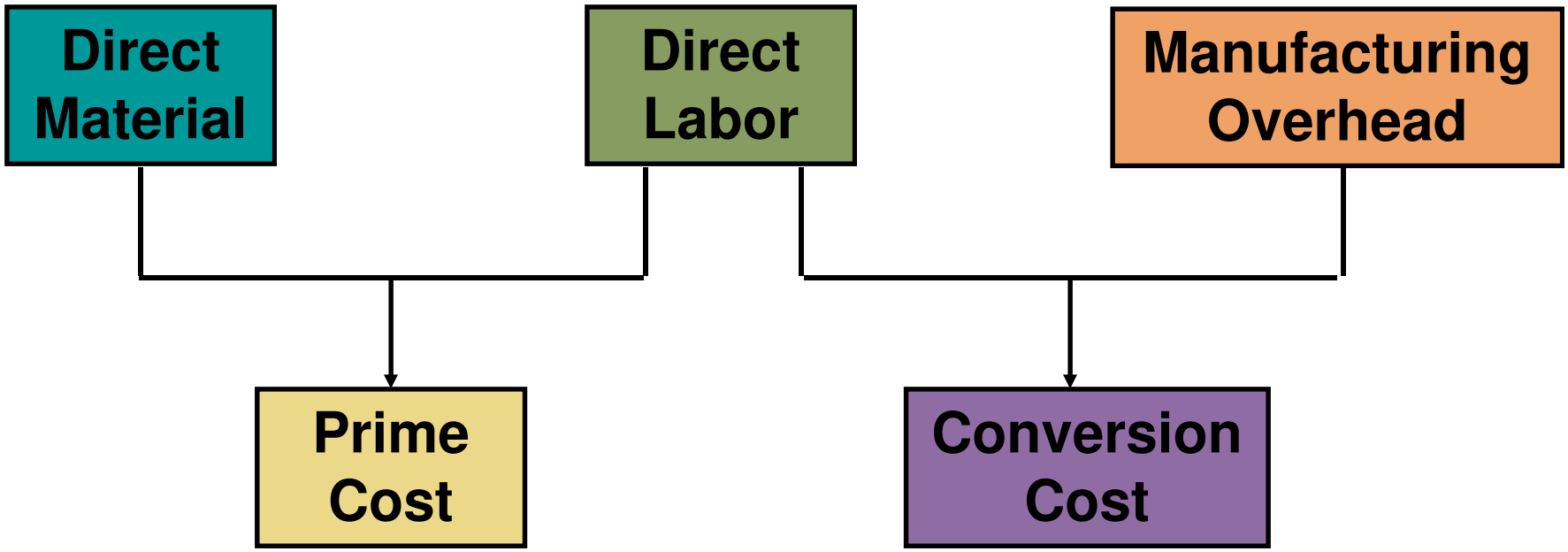
Indirect Labor

Other Costs

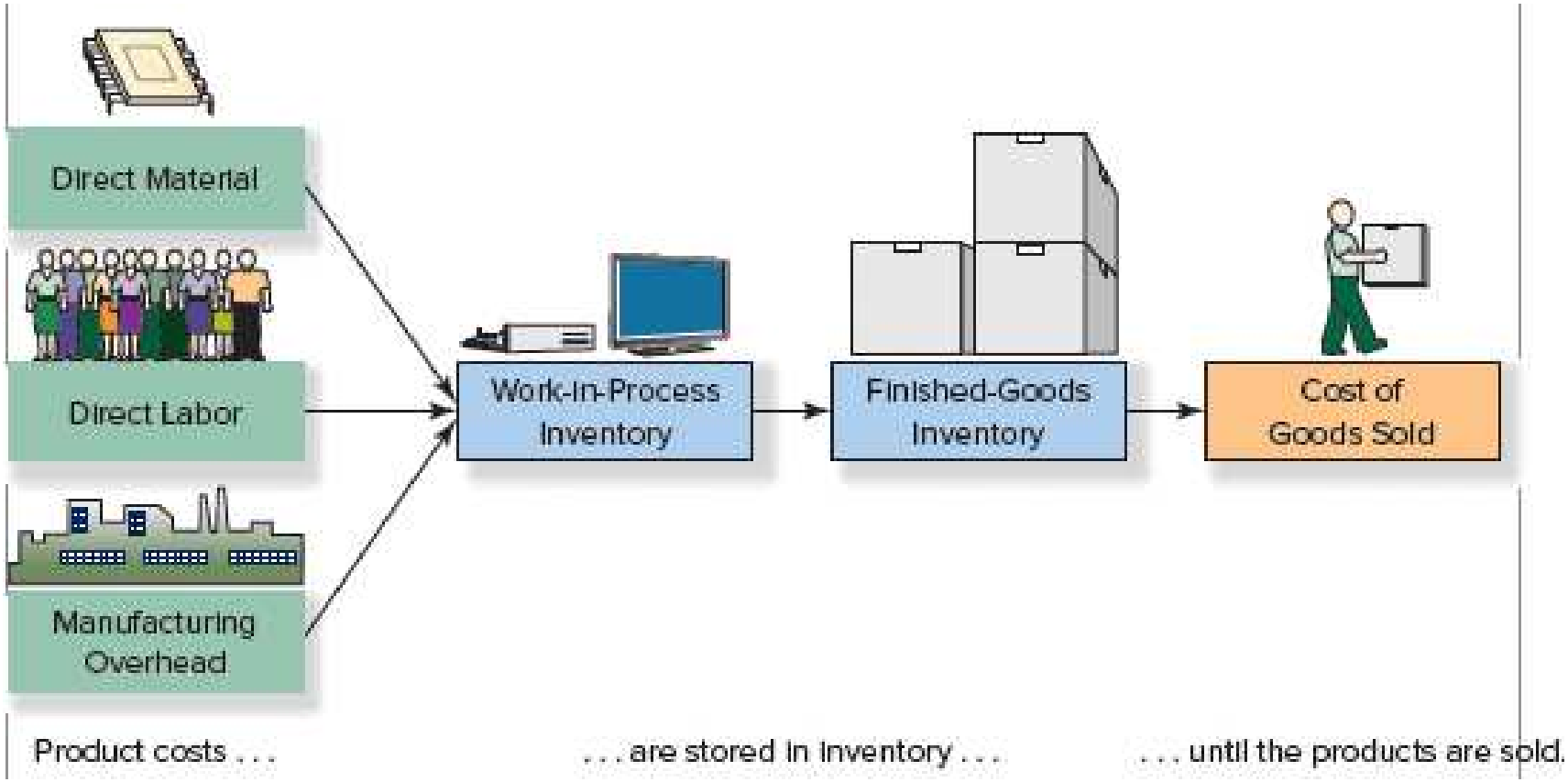
Examples: depreciation on plant and equipment, property taxes, insurance, utilities, overtime premium, and unavoidable idle time.

Classifications of Costs in Manufacturing Companies

Manufacturing costs are often combined as follows:



Manufacturing Cost Flows



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Learning Objective 2-6 – Prepare a schedule of cost of goods manufactured, a schedule of cost of goods sold, and an income statement for a manufacturer.

Schedule of Cost of Goods Manufactured

Comet Computer Corporation Schedule of Cost of Goods Manufactured	
Raw material used	$ 134,980
Direct labor	50,000
Total manufacturing overhead	230,000
Total manufacturing costs	$ 414,980
Add: Work-in-process inventory, January 1	120
Subtotal	$ 415,100
Deduct: Work-in-process inventory, December 31	100
Cost of goods manufactured	$ 415,000

Computation of Cost of Raw Material Used	
Raw-material inventory, January 1	$ 6,000
Add: Purchases of raw materials	134,000
Raw material available for use	140,000
Deduct: Raw material inventory, December 31	5,020
Raw material used	$ 134,980

Schedule of Cost of Goods Manufactured	
Raw material used	$ 134,980
Direct labor	50,000
Total manufacturing overhead	230,000
Total manufacturing costs	$ 414,980
Add: Work-in-process inventory, January 1	120
Subtotal	$ 415,100
Deduct: Work-in-process inventory, December 31	100
Cost of goods manufactured	$ 415,000

Schedule of Cost of Goods Manufactured

Include all direct labor costs incurred during the current period.

Schedule of Cost of Goods Manufactured	
Raw material used	$ 134,980
Direct labor	50,000
Total manufacturing overhead	230,000
Total manufacturing costs	$ 414,980
Add: Work-in-process inventory, January 1	120
Subtotal	$ 415,100
Deduct: Work-in-process inventory, December 31	100
Cost of goods manufactured	$ 415,000

Computation of Total Manufacturing Overhead	
Indirect material	$ 10,000
Indirect labor	40,000
Depreciation on factory	90,000
Depreciation on equipment	70,000
Utilities	15,000
Insurance	5,000
Total manufacturing overhead	$ 230,000

Raw materi	0
Direct labor	50,000
Total manufacturing overhead	230,000
Total manufacturing costs	$ 414,980
Add: Work-in-process inventory, January 1	120
Subtotal	$ 415,100
Deduct: Work-in-process inventory, December 31	100
Cost of goods manufactured	$ 415,000

Schedule of Cost of Goods Manufactured

Beginning work-in-process inventory is carried over from the prior period.

Comet Computer Schedule of Cost of Go	
Raw material used	$ 134,980
Direct labor	50,000
Total manufacturing overhead	230,000
	$ 414,980
nuary 1	120
	$ 415,100
, December 31	100
	$ 415,000

Ending work-in-process inventory contains the cost of unfinished goods, and is reported in the current assets section of the balance sheet.

Income Statement for a Manufacturer

Comet Computer Corporation Income Statement For the Year Ended December 31, 20X2	
Sales revenue	$ 700,000
Less: Cost of goods sold	415,010
Gross margin	$ 284,990
Selling and administrative expenses	174,490
Income before taxes	$ 110,500
Income tax expense	30,000
Net income	$ 80,500

Comet Computer Corporation
Schedule of Cost of Goods Sold
For the Year Ended December 31, 20X2

Finished-goods inventory, Jan. 1	$ 200
Add: Cost of goods manufactured	415,000
Cost of goods available for sale	415,200
Deduct Finished-goods inventory, Dec. 31	190
Cost of goods sold	$ 415,010

Sales revenue	$ 700,000
Less: Cost of goods sold	415,010
Gross margin	$ 284,990
Selling and administrative expenses	174,490
Income before taxes	$ 110,500
Income tax expense	30,000
Net income	$ 80,500

R8

Learning Objective 2-7 – Understand the importance of identifying an organization's cost drivers.

R8 Slide 32

Changed the LO to match the learning objective as presented in the pages (Hilton 11e).
Reviewer, 6/6/2016

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Activities that cause costs to be incurred are called COST DRIVERS:

Cost Driver Examples

Activity	Cost Driver
Machining operations	Machine hours
Setup	Setup hours
Production scheduling	Manufacturing orders
Inspection	Pieces inspected
Purchasing	Purchase orders
Shop order handling	Shop orders
Valve assembly support	Customer requisitions

Learning Objective 2-8 – Describe the behavior of variable and fixed costs, in total and on a per-unit basis.

Cost Classifications

Cost behavior means how a cost will react to changes in the level of business activity.

- Total variable costs change when activity changes.
- Total fixed costs remain unchanged when activity changes.

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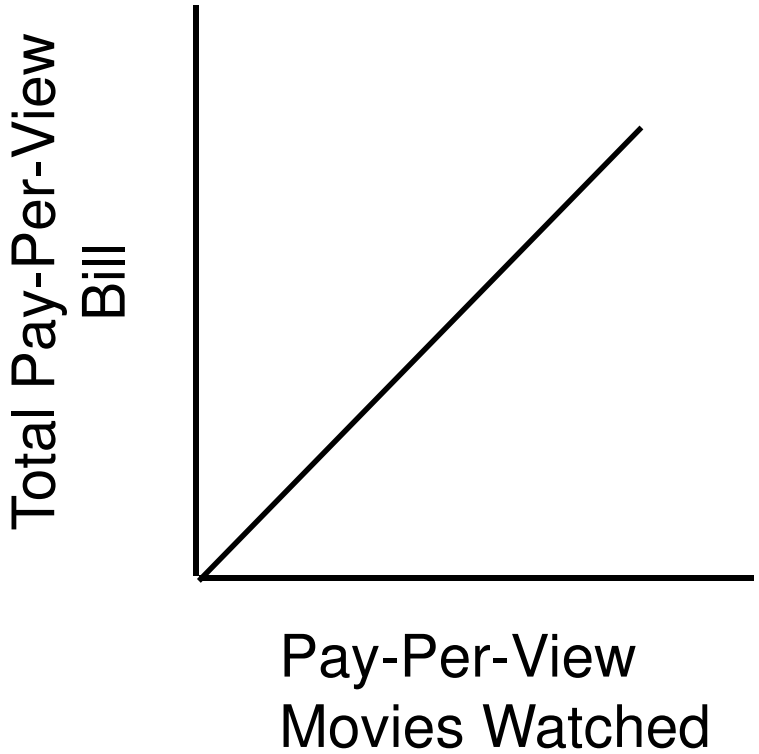
Total Variable Cost Example

Your total cable pay-per-view bill is based on how many movies you watch.



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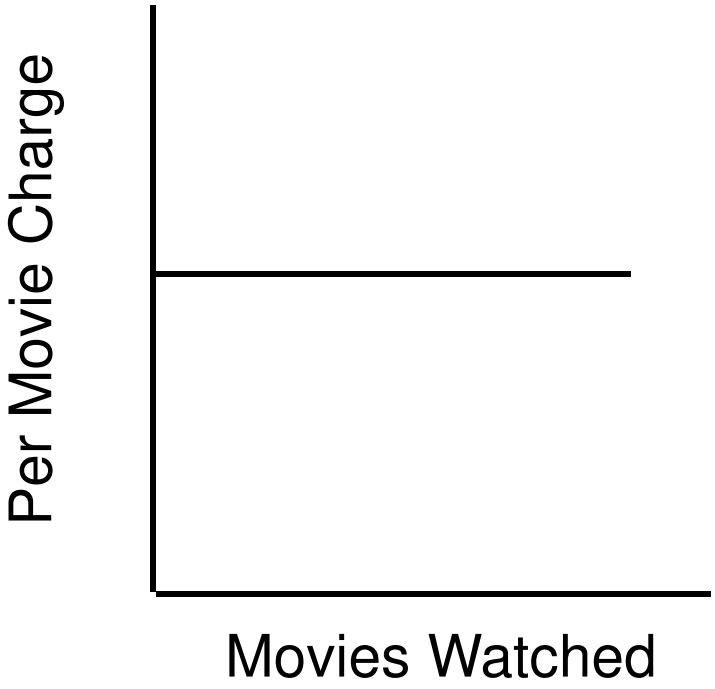
Variable Cost Per Unit Example

The cost per movie watched is constant. For example, $4.00 per movie.



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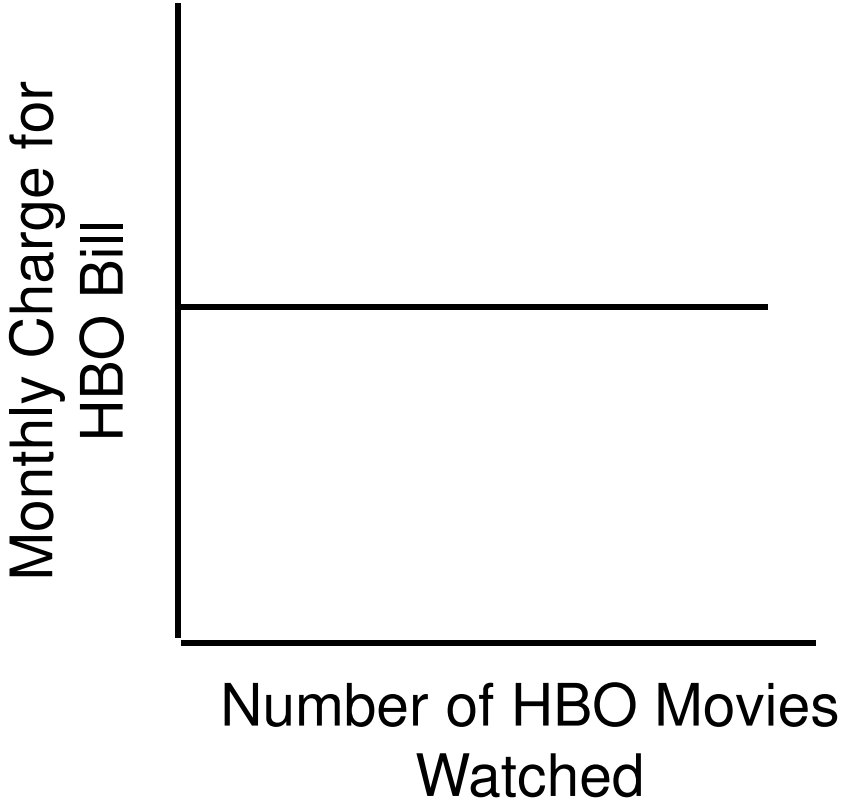
R9 R10

Total Fixed Cost Example

Your monthly cable bill probably does not change when you watch movies on channels that you have elected to be paid on a monthly basis.



R9 Slide 38

Moved the words 'on a' to the third line of text.
Reviewer, 6/6/2016

R10 Slide 38 NN

First sentence: Changed the word 'drive' to read 'driver.'
Reviewer, 6/6/2016

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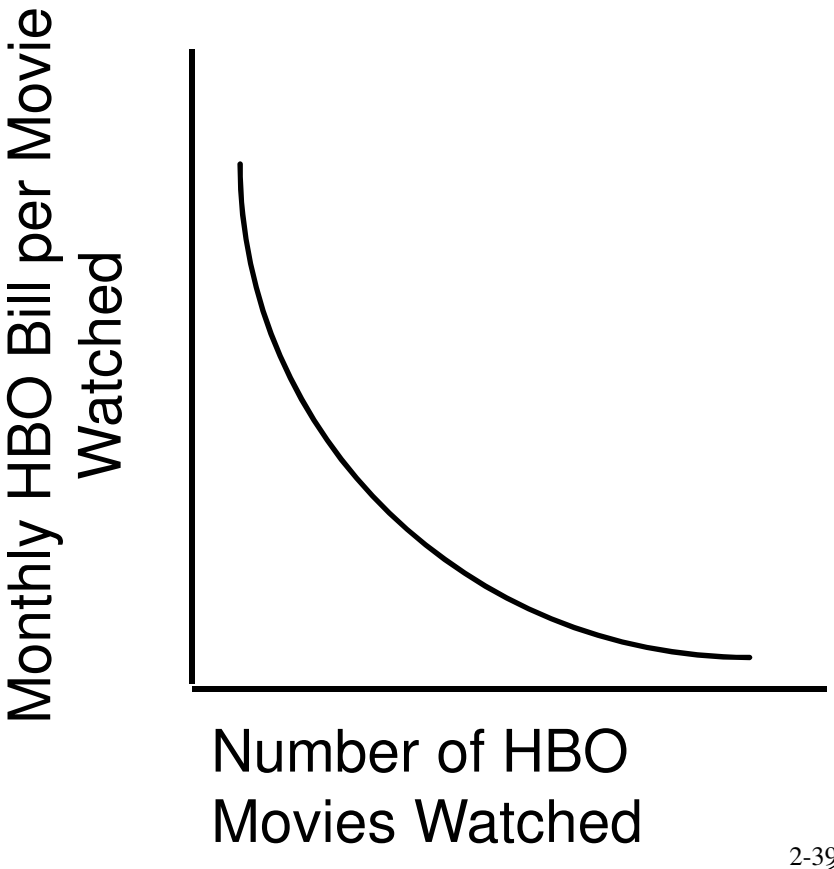
Graph of Unit Fixed Cost

The average cost per HBO movie decreases as more HBO movies are watched.



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Cost Classifications - Summary

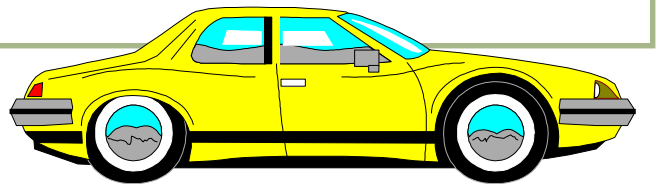
Summary of Variable and Fixed Cost Behavior		
Cost	**In Total**	**Per Unit**
Variable	**Total variable cost changes as activity level changes.**	**Variable cost per unit remains the same over wide ranges of activity.**
Fixed	**Total fixed cost remains the same even when the activity level changes.**	**Fixed cost per unit goes down as activity level goes up.**

Learning Objective 2-9 – Distinguish among direct, indirect, controllable, and uncontrollable costs.

Direct and Indirect Costs

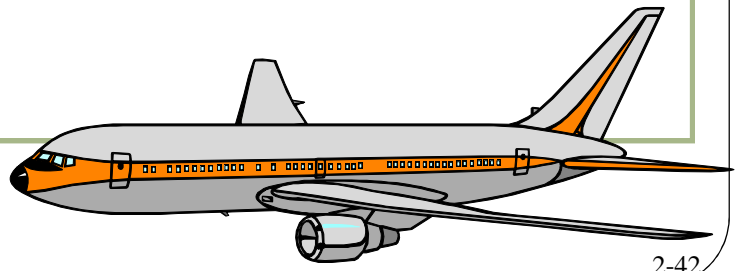
Direct costs

- Costs that can be easily and conveniently traced to a product or department.
- **Example**: cost of paint in the paint department of an automobile assembly plant.



Indirect costs

- Costs that must be allocated in order to be assigned to a product or department.
- **Example**: cost of national advertising for an airline is indirect to a particular flight.



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Controllable and Uncontrollable Costs

A cost that can be significantly influenced by a manager is a controllable cost.

Cost Item	Manager	Classification
Cost of raw material used to produce computer chips in an Intel factory	Supervisor of the production department for computer chips	Controllable (The production supervisor can exercise some control over the quantity of material used by ensuring that waste and defective units are minimized.)
Cost of food used in a Subway restaurant	Restaurant manager	Controllable (The restaurant manager exercises some control over the quantity of food used by scheduling production to ensure that excess food is not produced and wasted.)
Cost of national advertising for the Alamo car rental company	Manager of the Alamo rental agency at the Orlando airport	Uncontrollable
Cost of national accounting and data processing operations for Target	Manager of a Target store in Gainesville, Florida	Uncontrollable

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R11

Learning Objective 2-10 – Define and give examples of an opportunity cost, an out-of-pocket cost, a sunk cost, a differential cost, a marginal cost, and an average cost.

R11 Slide 44

Changed the word 'and' to read 'an.'
Reviewer, 6/6/2016

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Opportunity Costs

The potential benefit that is sacrificed when one alternative is selected over another.

- Example: If you were not attending college, you could be earning $30,000 per year.
- Your opportunity cost of attending college for one year is $30,000.

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R12 R13

Out-of-Pocket Costs

- Those costs that require the payment of cash or other assets as a result of its incurrence.
- These costs should be considered when making decisions.

R12 Slide 46

First bullet: Changed the word 'a' to read 'as.' Changed the word 'there' to read 'its.'

Reviewer, 6/6/2016

R13 Slide 46 NN

Second sentence: Changed the word 'their' to read 'its.
Reviewer, 6/6/2016

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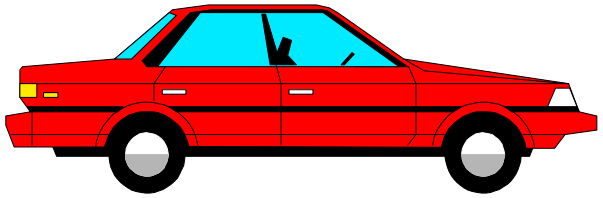
Sunk Costs

All costs incurred in the past that cannot be changed by any decision made now or in the future are sunk costs.

Sunk costs should **NOT** be considered in decisions.

- Example: You bought an automobile that cost $22,000 two years ago. The $22,000 cost is sunk because whether you drive it, park it, trade it, or sell it, you cannot change the $22,000 cost.



Differential Costs

Costs that differ between alternatives.

Example: You can earn $1,500 per month in your hometown or $2,000 per month in a nearby city. Your commuting costs are $50 per month in your hometown and $300 per month to the city.

What is your differential cost?
$300 - $50 = $250

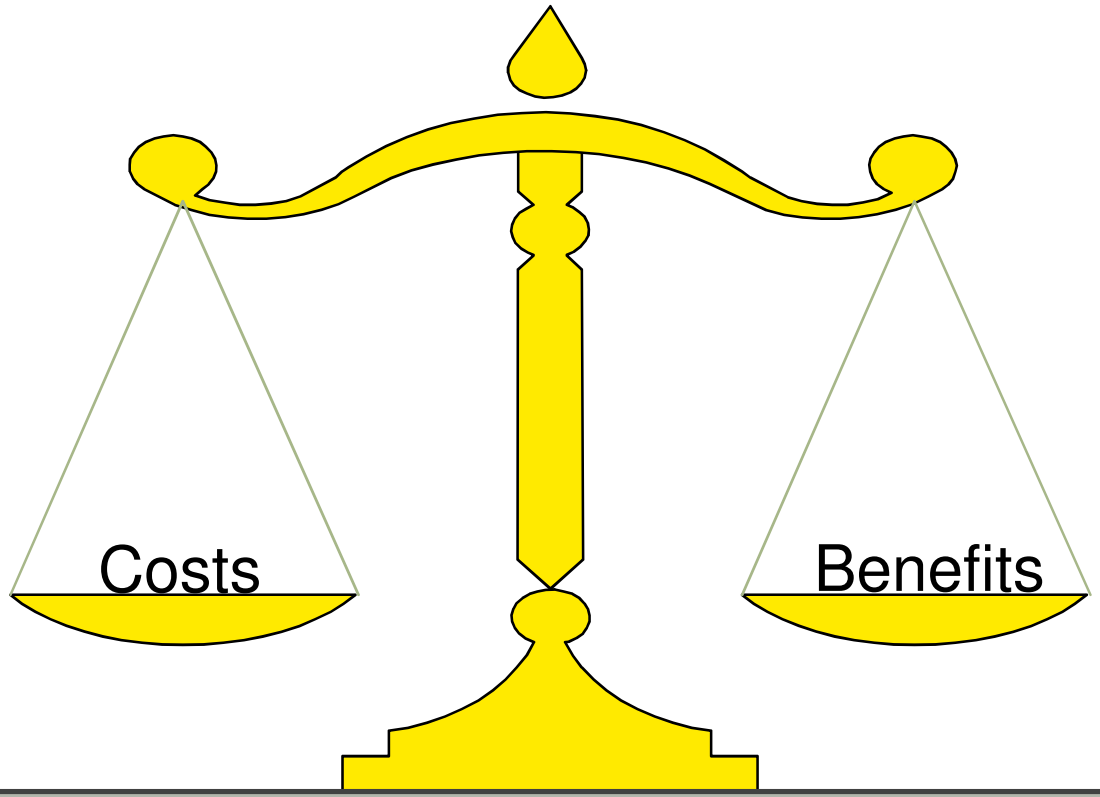
Marginal Costs and Average Costs

The extra cost incurred to produce one additional unit.

The total cost to produce a quantity divided by the quantity produced.

Marginal and average costs are largely a function of cost behavior -- variable and fixed costs.

Costs and Benefits of Information



More information does not mean more benefits if information overload results.

End of Chapter 2