

CHAPTER 4

ACTIVITY-BASED MANAGEMENT AND ACTIVITY-BASED COSTING

33. a. Allocation rate = Cost ÷ Allocation base
 Contracts rate = $\$270,000 \div 500,000 = \0.54 per contract page
 Regulation rate = $\$379,500 \div 750 = \506 per review request
 Court rate = $\$862,500 \div 3,750 = \230 per professional hour

b. Contracts: $21,000 \times \$0.54$	\$11,340
Regulation: $27 \times \$506$	13,662
Court: $315 \times \$230$	<u>72,450</u>
Total	<u>\$97,452</u>

- c. The rates will be used to bill other departments for the costs incurred in the legal department. If the legal department operates efficiently, its billings should equal or exceed the costs it incurs.

The firm can hire an outside law firm to perform the legal work rather than do the work internally. It is difficult to determine, without more information, how this action would affect total costs. However, it would tend to make the legal costs much more variable and less fixed.

34. a. $60 \text{ beds} \times 360 \text{ days} = 21,600$

- b. $\$3,620,400 \div 21,600 = \168 (rounded)

c. Rooms [$\$504,000 \div (35 \times 360)$]	$\$504,000 \div 12,600$	\$ 40
Laundry [$\$151,200 \div (60 \times 180)$]	$\$151,200 \div 10,800$	14
Nursing care ($\$1,314,000 \div 43,800$)		30
Physical therapy ($\$960,000 \div 8,000$)		120
General services ($\$691,200 \div 21,600$)		32

- d. Traditional: $6 \times \$168 = \underline{\$1,008}$

ABC:	
Room ($\$40 \times 6$)	\$ 240
Laundry ($\$14 \times 3$)	42
Nursing care ($\$30 \times 6$)	180
Physical therapy ($\$120 \times 30$)	3,600
General services ($\$32 \times 6$)	<u>192</u>
Total	<u>\$4,254</u>

- e. Traditional: $6 \times \$168 = \underline{\$1,008}$

ABC:	
Room [$(\$40 \div 2) \times 6$]	\$120
Laundry ($\$14 \times 3$)	42
Nursing care ($\$30 \times 6$)	180
General services ($\$32 \times 6$)	<u>192</u>

Total \$534

35. a. $\$375,000 \div 75,000 \text{ calls} = \5 per call
 $\$187,500 \div 46,875 \text{ purchase orders} = \$4 \text{ per purchase order}$
 $\$168,750 \div 28,125 \text{ receiving reports} = \$6 \text{ per receiving report}$

Cost assignment:

25 calls × \$5	\$125
50 purchase orders × \$4	200
35 receiving reports × \$6	<u>210</u>
Total cost assigned	<u>\$535</u>

- b. $\$535 \div 100 \text{ units} = \5.35 per unit

- c. $\$731,250 \div 75,000 = \9.75 per call
 $\$9.75 \times 25 \text{ calls} = \underline{\$243.75}$

36. a. $\$2,000,000 \div (170,000 + 30,000) = \$2,000,000 \div 200,000 = \10 per MH
Total OH assigned to regular dictionaries = $\$10 \times 170,000 = \$1,700,000$
Total OH assigned to hand-sewn dictionaries = $\$10 \times 30,000 = \$300,000$

- b. Utilities-related: $\$800,000 \div 200,000 = \4 per MH
Inspection-related: $\$1,200,000 \div 60,000 = \$20 \text{ per inspection hour}$
Total OH to regular dictionaries = $(\$4 \times 170,000) + (\$20 \times 10,000)$
 $= \$680,000 + \$200,000$
 $= \$880,000$
Total OH to hand-sewn dictionaries = $(\$4 \times 30,000) + (\$20 \times 50,000)$
 $= \$120,000 + \$1,000,000$
 $= \$1,120,000$

	<u>Regular</u>	<u>Hand-Sewn</u>
c. Revenues	\$ 6,400,000	\$ 5,600,000
Direct costs	(5,000,000)	(4,400,000)
Overhead assigned	<u>(880,000)</u>	<u>(1,120,000)</u>
Profit before tax	<u>\$ 520,000</u>	<u>\$ 80,000</u>

Management should not stop producing the regular dictionaries as these are generating a rate of return on revenues of 8 percent, while the hand-sewn dictionaries are only generating 1.4 percent.

37. a. Overhead rate = $\$3,960,000 \div 330,000 \text{ units} = \12 per unit

	<u>Mowers</u>	<u>Tractors</u>	<u>Total</u>
Revenue	\$19,500,000	\$17,850,000	\$37,350,000
Less:			
Direct material	(4,000,000)	(2,700,000)	(6,700,000)
Direct labor	(2,800,000)	(6,000,000)	(8,800,000)
Overhead*	<u>(3,600,000)</u>	<u>(360,000)</u>	<u>(3,960,000)</u>
Profit (loss)	\$ 9,100,000	\$ 8,790,000	\$17,890,000
Less: Admin. expense			<u>(7,400,000)</u>
Income before tax			<u>\$10,490,000</u>
Number of units	$\div 300,000$	$\div 30,000$	
Profit per unit	<u>\$ 30.33</u>	<u>\$ 293.00</u>	

*Mowers: $\$12 \times 300,000 = \$3,600,000$; Tractors: $\$12 \times 30,000 = \$360,000$

- b. Mowers: $\$2,800,000 \div \$20 \text{ per hour} = 140,000 \text{ direct labor hours}$
 Tractors: $\$6,000,000 \div \$20 \text{ per hour} = 300,000 \text{ direct labor hours}$
 Overhead rate = $\$3,960,000 \div 440,000 = \9 per DLH

	<u>Mowers</u>	<u>Tractors</u>	<u>Total</u>
Revenue	\$19,500,000	\$17,850,000	\$37,350,000
Less:			
Direct material	(4,000,000)	(2,700,000)	(6,700,000)
Direct labor	(2,800,000)	(6,000,000)	(8,800,000)
Overhead*	<u>(1,260,000)</u>	<u>(2,700,000)</u>	<u>3,960,000</u>
Profit (loss)	\$11,440,000	\$ 6,450,000	\$17,890,000
Less: Admin. expense			<u>(7,400,000)</u>
Income before tax			<u>\$10,490,000</u>
Number of units	$\div 300,000$	$\div 30,000$	
Profit per unit (rounded)	<u>\$ 38.13</u>	<u>\$ 215.00</u>	

*Mowers: $\$9 \times 140,000 = \$1,260,000$; Tractors: $\$9 \times 300,000 = \$2,700,000$

- c. Rate per DLH: $\$1,320,000 \div 440,000 = \3.00
 Rate per MH: $\$2,640,000 \div 150,000 = \17.60

	<u>Mowers</u>	<u>Tractors</u>	<u>Total</u>
Revenue	\$19,500,000	\$17,850,000	\$ 37,350,000
Less:			
Direct material	(4,000,000)	(2,700,000)	(6,700,000)
Direct labor	(2,800,000)	(6,000,000)	(8,800,000)
Overhead*	<u>(860,000)</u>	<u>(3,100,000)</u>	<u>(3,960,000)</u>
Profit (loss)	\$11,840,000	\$ 6,050,000	\$ 17,890,000
Less: Admin. expense			<u>(7,400,000)</u>
Income before tax			<u>\$ 10,490,000</u>
Number of units	$\div 300,000$	$\div 30,000$	
Profit per unit (rounded)	<u>\$ 39.47</u>	<u>\$ 201.67</u>	

*Mowers: $(\$3 \times 140,000) + (\$17.60 \times 25,000) = \$420,000 + \$440,000 = \$860,000$

Tractors: $(\$3 \times 300,000) + (\$17.60 \times 125,000) = \$900,000 + \$2,200,000 = \$3,100,000$

- d. The profit per unit in (c) provides the best picture. The solution to (a) does not recognize the difference in direct labor time and the solution to (b) does not recognize the difference in machine time. Costs should be attached to products using the most rationale and measurable bases of activity. However, given that the profits per unit are not significantly different, the allocation base in (b) would be acceptable if the additional tracking of machine hours is not easily nor inexpensively handled.
42. a. Surgery: professional hours (this is an activity base that would drive many costs related to surgery and would be easy to track)
 Housing patients: days in hospital (this activity base would be easy to follow and would account for use of time and space)

Outpatient care: professional hours (this would capture service provision to outpatients); or expected patient volume (this would capture those costs that are more related to capacity to provide service)

- b. Total costs = \$13,125,000 + \$6,187,500 + \$850,000 = \$20,162,500
 $\$20,162,500 \div 75,000 = \269 per professional hour (rounded)
- c. Professional salaries: $\$13,125,000 \div 75,000 = \175 per hr.
 Building costs: $\$6,187,500 \div 56,250 = \110 per sq. ft.
 Risk management: $\$850,000 \div 2,500 = \340 per patient
- d. Surgery = $(3,750 \times \$175) + (12,500 \times \$110) + (500 \times \$340) = \$656,250 + \$1,375,000 + \$170,000 = \$2,201,250$
 Housing = $(70,000 \times \$175) + (27,500 \times \$110) + (1,250 \times \$340) = \$12,250,000 + \$3,025,000 + \$425,000 = \$15,700,000$
 Outpatient care = $(1,250 \times \$175) + (16,250 \times \$110) + (750 \times \$340) = \$218,750 + \$1,787,500 + \$255,000 = \$2,261,250$
- e. Surgery: $\$2,201,250 \div 3,750 = \587 per professional hour
 Housing: $\$15,700,000 \div 70,000 = \224 per professional hour (rounded)
 Outpatient care: $\$2,261,250 \div 1,250 = \$1,809$ per professional hour

The cost per hour for housing patients is significantly lower than for the other two services because the majority of costs is fixed and are spread over a larger number of hours. The other two services create substantial variable costs for professional contact for short periods of time.

44. a. $\$2,362,500 \div (30,000 + 37,500) = \$2,362,500 \div 67,500 = \35

Direct material cost = $\$544,500 \div 330,000 = \1.65 per pound

	Product A	Product B
Direct material cost	\$ 230,175	\$ 314,325
Direct labor cost	360,000	450,000
Overhead	<u>1,050,000</u>	<u>1,312,500</u>
Total cost	\$1,640,175	\$2,076,825
Divided by # of units	$\div 15,000$	$\div 7,500$
Cost per unit	<u>\$ 109.345</u>	<u>\$ 276.91</u>

- b. $\$2,362,500 \div (52,500 + 22,500) = \$2,362,500 \div 75,000 = \31.50

	Product A	Product B
Direct material cost	\$ 230,175	\$ 314,325
Direct labor cost	360,000	450,000
Overhead	<u>1,653,750</u>	<u>708,750</u>
Total cost	\$2,243,925	\$1,473,075
Divided by # of units	$\div 15,000$	$\div 7,500$
Cost per unit	<u>\$ 149.595</u>	<u>\$ 196.41</u>

- c. Utilities: $\$750,000 \div 75,000 = \10 per MH
 Setup: $\$193,500 \div 1,290 = \150 per setup
 Material handling: $\$1,419,000 \div 330,000 = \4.30 per pound

	<u>Product A</u>	<u>Product B</u>
Direct material cost	\$ 230,175	\$ 314,325
Direct labor cost	360,000	450,000
Utilities	525,000	225,000
Setup	64,500	129,000
Material handling	<u>599,850</u>	<u>819,150</u>
Total cost	\$1,779,525	\$1,937,475
Divided by # of units	÷ 15,000	÷ 7,500
Cost per unit	<u>\$ 118.635</u>	<u>\$ 258.33</u>