

Hard
LD 9-01

Chapter 9: Activity-based Costing Practice Quiz

111) Falcon Company manufactures and sells two models of a computer tablets. The Basic Model has limited networking capability while the Explorer Model has significantly more features. The tablets are produced to order and the company has no inventories at the end of the year.

The cost accounting system at Falcon allocates overhead to products based on direct-labor cost. Overhead in year 1, which just ended, was \$3,412,500. Other data for year 1 for the two products follow:

	Total DL				
Sales revenue	3,412,500	= 150%	Basic Model (20,000 units)	Explorer Model (3,000 units)	Total
Direct materials	<u>2,275,000</u>		\$ 6,600,000	+ \$ 3,645,000	= 10,245,000
Direct labor	2,275,000		3,200,000	+ 450,000	= 3,650,000
Overhead @ 150%			1,600,000	+ 675,000	= 2,275,000
			<u>2,400,000</u>	<u>1,012,000</u>	= 3,412,000

Required:

- Compute product line profits for the Basic Model and the Explorer Model for year 1.
- A study of overhead shows that without the Basic Model, overhead would fall to \$2,750,000. Assume all other revenues and costs would remain the same for the Explorer Model in year 2. Compute product line profits for the Explorer Model in year 2 assuming the Basic Model was not produced or sold.

Revenue	6,600,000	3,645,000	10,245,000
Cost	<u>7,200,000</u>	<u>2,137,500</u>	<u>9,337,500</u>
Profit (loss)	<u>(600,000)</u>	<u>1,507,500</u>	<u>907,500</u>

(a)

Basic	Explorer
X	Sales 3,645,000 DM [450,000] DL [675,000] OH [2,750,000]
	Product cost 3,875,000
	Profit (loss) <u>(230,000)</u> (b)

Answer:

a.

	Basic	Explorer	Total
Sales revenue	\$ 6,600,000	\$ 3,645,000	\$ 10,245,000
Direct materials	3,200,000	450,000	3,650,000
Direct labor	1,600,000	675,000	2,275,000
Overhead @150%(1)	2,400,000(2)	1,012,500(3)	3,412,000
Product cost	\$ 7,200,000	\$ 2,137,500	\$ 9,337,500
Profit	\$ (600,000)	\$ 1,507,500	\$ 907,500

(1) 150% = (\$3,412,500 overhead ÷ \$2,275,000 direct labor).

(2) \$2,400,000 = \$1,600,000 direct labor × 150%.

(3) \$1,012,500 = \$675,000 direct labors × 150%.

b. After dropping the Basic Model, the profit on the Explorer Model (and for the company) becomes negative.

	Explorer	Total
Sales revenue	\$ 3,645,000	\$ 3,645,000
Direct Labor <i>Materials</i>	450,000	450,000
Direct materials <i>Labor.</i>	675,000	675,000
Overhead	2,750,000(1)	2,750,000
Product cost	\$ 3,875,000	\$ 3,875,000
Profit	\$ (230,000)	\$ (230,000)

(1) Given.

Difficulty: 3 Hard

Topic: Reported Product Costs and Decision Making

Learning Objective: 09-01 Understand the potential effects of using reported product costs for decision making.

Bloom's: Analyze

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Hard LO 9-03

115) Blalock Company manufactures and distributes several different products. The company currently uses a plantwide allocation method for allocating overhead at a rate of \$10 per direct labor hour. Department A produces Products #101X and #102Y. Department A has \$262,000 in traceable overhead. Department B manufactures Product #103Z. Department B has \$128,000 in traceable overhead. The product costs (per unit) and other information are as follows:

	Dept. A		Dept. B	Total
	Traceable OH			
	\$262,000		\$128,000	\$390,000 / 40,000 MHS = \$9.75 per MHS
	Products			
	101X	102Y	103Z	
Direct materials	\$ 60.00	\$ 58.00	\$ 46.00	
Direct labor	42.00	31.50	12.00	
Overhead	40.00	30.00	20.00	
	<u>\$ 142.00</u>	<u>\$ 119.50</u>	<u>\$ 78.00</u>	
Machine hours (per unit)	x 4	x 2	x 3	
Number of cases (per year)	<u>3,000</u>	<u>5,000</u>	<u>6,000</u>	
	12,000	10,000	18,000	= 40,000 MHS.

Required:

a. If Blalock changes its allocation basis to machine hours, what is the total overhead cost per unit for Product 101X, 102Y, and 103Z?

b. If Blalock changes its overhead allocation to departmental rates, what is the overhead cost per unit for Product 101X, 102Y, and 103Z, assuming Departments A and B use direct labor hours and machine hours as their respective allocation bases?

	DLH	MHS	
MH per unit	4	2	3
	x	x	x
OH rate	9.75	9.75	9.75
Total OH cost per unit	<u>\$39.00</u>	<u>\$19.50</u>	<u>\$29.25</u>

(a)

	101X	102Y	103Z
Overhead	40	30	20
OH Alloc Rate	10	10	10
Labor Time = DLHs.	4	3	2
	x		
Number of Cases	<u>3000</u>	<u>5000</u>	<u>6000</u>
	12,000	15,000	12,000

Dept A

Dept B

Dept A: $\frac{\$262,000}{27,000} = \9.7037 per DLH

Dept B: $\frac{\$128,000}{18,000} = \7.1111 per MHS

Dept A: $\$38.8148 = 4 \times \9.7037

Dept B: $\$21.333 = 3 \times \7.1111

Answer:

a.

Overhead rate: $(\$262,000 + 128,000)/[(4 \times 3,000) + (2 \times 5,000) + (3 \times 6,000)] = \$9.75/\text{MH}$; 101X: $(\$9.75 \times 4 \text{ MH}) = \39.00 ; 102Y: $(\$9.75 \times 2 \text{ MH}) = \19.50 ; 103Z: $(\$9.75 \times 3 \text{ MH}) = \29.25 .

b.

Labor time: 101X: $\text{OH } \$40/\$10 \text{ rate} = 4 \text{ hrs}$; 102Y: $\$30/\$10 = 3 \text{ hrs}$; 103Z: $\$20/\$10 = 2 \text{ hrs}$.

Dept A: $\$262,000/[(4 \times 3,000) + (3 \times 5,000)] = \$9.7037/\text{DLH}$; 101X: $(\$9.7037 \times 4 \text{ DLH}) = \38.8148 ; 102Y: $(\$9.7037 \times 3 \text{ DLH}) = \29.1111 .

Dept B: $\$128,000/(3 \times 6,000) = \$7.1111/\text{MH}$; 103Z: $\$7.1111 \times 3 \text{ MH} = \21.3333 .

Difficulty: 3 Hard

Topic: Plantwide versus Department-Specific Rates

Learning Objective: 09-03 Compare and contrast plantwide and department allocation methods.

Bloom's: Analyze

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Hard LO 9-04

114) Conform Foam Products produces different kinds of industrial packing materials, all in one manufacturing facility. They have identified four activities for their costing system:

- Materials management—allocated by number of purchase orders
 - Chemical processing—allocated on metric tons
 - Molding—allocated on direct labor hours
 - Packaging—allocated by number of units produced
- The activity rates are as follows:

Materials management	\$ 10.00	Per purchase order	x 5 =	\$ 50.00	
Chemical processing	6.50	Per metric ton	x 6 =	39.00	
Molding	23.50	Per direct labor hour	x 12 =	282.00	
Packaging	0.25	Per unit	x 5000 =	1,250.00	
					Total OH Cost (1)
					\$ 1,621.00

Engineering design shows that the order will require direct materials of \$775, direct labor cost of \$125, 5 purchase orders, 6 metric tons of chemical base, and 12 direct labor hours. The size of the order to produce is 5,000 units of product.

- Required:
- Calculate the overhead cost of the order.
 - Calculate total cost of the order.

DM	\$ 775
DL	125
OH	1621
Total Production Cost	<u>\$ 2,521.00</u> (2)

Answer: (1) Computation of overhead cost of the order:

Activity	Cost driver	Level of utilization of activity	Cost driver rate	Cost allocated
Materials management	Purchase order	5	\$ 10.00	\$ 50.00
Chemical processing	Metric ton	6	\$ 6.50	\$ 39.00
Molding	Direct labor hour	12	\$ 23.50	\$ 282.00
Packaging	Number of units	5,000	\$ 0.25	\$ 1,250.00
Total overhead cost				<u>\$ 1,621.00</u>

(2) Calculation of total cost of the order:

Direct material	\$ 775.00
Direct labor	125.00
Overhead cost	<u>1,621.00</u>
Total production cost	<u>\$ 2,521.00</u>

Difficulty: 3 Hard

Topic: Activity-Based Costing

Learning Objective: 09-04 Explain how activity-based costing and a two-stage product system are related.

Bloom's: Analyze

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Hard LO 9-05

tests for content or quality of a metal or an ore.

116) Conway Mountain Analysis offers agriculture and environmental assays. Its Soil Division performs testing on soil (S), as well as examines for the presence of pesticide residue (PR). Aggregated operating costs for the division are \$1,050,000 based on a single overhead pool at a rate of \$70 per testing hour. S testing uses 5,000 hours and PR uses 10,000 hours. The company is trying to determine whether a better costing structure can be established. The controller has identified the following costs:

- (1) Salaries and wages of laboratory techs are \$600,000 (based on 45% for S and 55% for PR testing).
- (2) Equipment related overhead like depreciation, maintenance, utilities, and insurance amounts to \$150,000, with a cost driver of number of test hours.
- (3) Setup costs are \$120,000 assigned based on 10,000 total setup hours. S testing requires 4,200 setup hours and PR testing requires 5,800 setup hours.
- (4) Costs of test designs amount to \$180,000, based on the time required to design the tests. S testing requires 3,250 hours and P testing requires 1,750 hours.

Required:

- (a) Calculate the cost per test hour for S and PR using an improved costing system.
- (b) Explain briefly the reasons why these costs are different from the \$70 per test-hour under the current costing system.

\$ 600,000	Sal + Wages
150,000	Equip.
120,000	Setup.
180,000	Test designs.
<hr/>	
\$ 1,050,000	Aggregated Operating Costs

Answer: Solution:

(a)	Soil (S)		Pesticide (PR)		Total 15,000
	TOTAL	Per Hour	TOTAL	Per Hour	
Test hours	5,000		10,000		
Salaries and Wages:					
(1) S (\$600,000 × 45%)	270,000	54.00			
PR (\$600,000 × 55%)			330,000	33.00	
Equipment-related costs:					
(2) S (\$150,000/15,000) × 5,000	50,000	10.00			
PR (\$150,000/15,000) × 10,000			100,000	10.00	
Setup costs:					
(3) S (\$120,000/10,000) × 4,200	50,400	\$ 10.08			
PR (\$120,000/10,000) × 5,800			69,600	6.96	
Test design costs:					
(4) S (\$180,000/5,000) × 3,250	117,000	23.40			
PR (\$180,000/5,000) × 1,750			63,000	6.30	
TOTAL	\$ 487,400	\$ 97.48	\$ 562,600	\$ 56.26	(a)

1,050,000 = Aggregated operating costs.

(b) The current costing system undercosts the soil analyses (S) [\$70.00 - \$97.48] and overcosts the pesticide residues analyses (PR) [\$70.00 - \$56.26]. Soil analyses use more setup costs and test design costs per hour than pesticide residue analyses, even though S has less test hours than PR. On average, S tests take longer to setup (0.84 versus 0.58 setup hour per test hour) and it is more difficult to design the test (0.65 versus 0.175 design hours per test hour).

	Test-Hours	Setup Hours		Test Design Hours	
		Total	Per Test-Hour	Total	Per Test-Hour
S	5,000	4,200	0.84	3,250	0.65
PR	10,000	5,800	0.58	1,750	0.175

Difficulty: 3 Hard

Topic: Activity-Based Costing Illustrated

Learning Objective: 09-05 Compute product costs using activity-based costing.

Bloom's: Analyze

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

117) Pretty Dog Corporation manufactures two models of grooming stations, a standard and a deluxe model. The following activity and cost information has been compiled:

Product	Number of Setups	Number of Components	Number of Direct Labor Hours
Standard	3	30	650
Deluxe	7	50	150
			800

$650 \times \$100 = \$65,000$ (a)
 $150 \times \$100 = \$15,000$ (b)

Overhead costs $\left(\frac{\$30,000}{10} \right) + \left(\frac{\$50,000}{80} \right) = 80,000 \div 800 = \$100/\text{DLH}$

Assume a traditional costing system applies the overhead costs based on direct labor hours.

Standard

$$\begin{array}{r} \$3,500 \\ \times 3 \\ \hline \$9,000 \end{array} + \begin{array}{r} \$625 \\ \times 30 \\ \hline \$18,750 \end{array} = \$27,750 \text{ (c)}$$

Required:

- What is the total amount of overhead costs assigned to the standard model?
 - What is the total amount of overhead costs assigned to the deluxe model?
- Assume an activity-based costing system is used and that the number of setups and the number of components are identified as the activity-cost drivers for overhead.
- What is the total amount of overhead costs assigned to the standard model?
 - What is the total amount of overhead costs assigned to the deluxe model?

Deluxe

$$\begin{array}{r} 3,500 \\ \times 7 \\ \hline 21,000 \end{array} + \begin{array}{r} 625 \\ \times 50 \\ \hline 31,250 \end{array} = \$52,250 \text{ (d)}$$

Answer:

a. Overhead rate: $(\$30,000 + 50,000)/(650 + 150) = \$100/\text{DLH}$;
Std: $\$100 \times 650 = \$65,000$.

b. Deluxe: $\$100 \times 150 = \$15,000$.

c.
Setups: $\$30,000/(3 + 7) = \$3,000/\text{Setup}$;
Components: $\$50,000/(30 + 50) = \$625/\text{component}$;
Std: $(\$3,000 \times 3) + (\$625 \times 30) = \$27,750$.

d. Deluxe: $(\$3,000 \times 7) + (\$625 \times 50) = \$52,250$.

Difficulty: 3 Hard

Topic: Unit Costs Compared

Learning Objective:

09-06 Compare activity-based product costing to traditional department product costing methods.

Bloom's: Analyze

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation

Hard LO 9-08

119) Cameron Company has two major segments with the following information:

	East	West	Total
Annual revenue	\$ 400,000	\$ 1,200,000	\$ 1,600,000
Annual salesperson salaries	300,000	450,000	750,000
Number of customers	60	90	150
Miles driven	180,000	120,000	300,000

The business also has overhead costs as follows:

Cost Pool	Cost in Pool	Cost driver
Travel	\$ 72,000	Number of miles driven $\div 300,000 = \$0.24/\text{mile}$
Entertainment	288,000	Number of customers $\div 150 = \$1,920/\text{customer}$
Administrative	289,000	Salaries $\div 750,000 = \$38,533.33$
Total	<u>\$ 649,000</u>	

NOTE: overhead does not include salesperson salaries.

Required:

- a. Determine the income of each segment if overhead costs are allocated based on sales revenue.
- b. Determine the income of each segment if overhead costs are allocated using activity-based cost drivers.

Answer:

a. East: (\$62,250); West: \$263,250.

b. East: (\$174,000); West: \$375,000.

$$400,000 \times 40.5625\% = \underline{\$162,250}$$

$$1,200,000 \times 40.5625\% = \underline{\$486,750}$$

a. $\$649,000/\$1,600,000 = 40.5625\%$; East: $40.5625\% \times \$400,000 = \$162,250$; West: $40.5625\% \times \$1,200,000 = \$486,750$.

	East	West	Total
Annual revenue	\$ 400,000	\$ 1,200,000	\$ 1,600,000
Annual salesperson salaries	300,000	450,000	750,000
Overhead	162,250	486,750	649,000 $\div 1,600,000 = 40.5625\%$
Income	\$ (62,250)	\$ 263,250	\$ 201,000

b. Travel: $\$72,000/300,000 = \$0.24/\text{mile}$; East: $\$0.24 \times 180,000 = \$43,200$; West: $\$0.24 \times 120,000 = \$28,800$.

Entertainment: $\$288,000/150 = \$1,920/\text{customer}$; East: $\$1,920 \times 60 = \$115,200$; West: $\$1,920 \times 90 = \$172,800$; Admin:

$\$289,000/\$750,000 = 38.5333\%$; East $38.5333\% \times \$300,000 = \$115,600$; West: $38.5333\% \times 450,000 = \$173,400$

	East	West	Total
Annual revenue	\$ 400,000	\$ 1,200,000	\$ 1,600,000
Annual salesperson salaries	300,000	450,000	750,000
Travel	43,200	28,800	72,000
Entertainment	115,200	172,800	288,000
Administrative	115,600	173,400	289,000
Income	\$ (174,000)	\$ 375,000	\$ 201,000

Difficulty: 3 Hard

Topic: Activity-Based Costing in Administration

Learning Objective: 09-08 Apply activity-based costing to marketing and administrative services.

Bloom's: Analyze

AACSB: Analytical Thinking

Accessibility: Keyboard Navigation