

SOLUTIONS TO PROBLEMS

PROBLEM 4-1A

(a) Computation of unit costs—traditional costing.

<u>Manufacturing Costs</u>	<u>Products</u>	
	<u>Home Model</u>	<u>Commercial Model</u>
Direct materials	\$18.50	\$26.50
Direct labor	19.00	19.00
Overhead	<u>24.68*</u>	<u>24.68*</u>
Total unit cost	<u>\$62.18</u>	<u>\$70.18</u>

*\$16.45 X 1.5 = \$24.68

(b)

<u>Activity Cost Pool</u>	<u>Estimated Overhead</u> ÷	<u>Expected Use of Cost Drivers</u>	=	<u>Activity-Based Overhead Rate</u>
Receiving	\$ 80,400	335,000 Pounds		\$.24 per pound
Forming	150,500	35,000 Machine hours		\$ 4.30 per machine hour
Assembling	412,300	217,000 Parts		\$ 1.90 per part
Testing	51,000	25,500 Tests		\$ 2.00 per test
Painting	52,580	5,258 Gallons		\$10.00 per gallon
Packing and shipping	<u>837,500</u>	335,000 Pounds		\$ 2.50 per pound
	<u>\$1,584,280</u>			

(c)

<u>Activity Cost Pool</u>	<u>Home Model</u>			<u>Commercial Model</u>		
	<u>Expected Use of Drivers</u>	<u>Activity-Based Overhead Rates</u>	<u>Cost Assigned</u>	<u>Expected Use of Drivers</u>	<u>Activity-Based Overhead Rates</u>	<u>Cost Assigned</u>
Receiving	215,000	\$.24	\$ 51,600	120,000	\$.24	\$ 28,800
Forming	27,000	\$ 4.30	116,100	8,000	\$ 4.30	34,400
Assembling	165,000	\$ 1.90	313,500	52,000	\$ 1.90	98,800
Testing	15,500	\$ 2.00	31,000	10,000	\$ 2.00	20,000
Painting	3,680	\$10.00	36,800	1,578	\$10.00	15,780
Packing and shipping	215,000	\$ 2.50	<u>537,500</u>	120,000	\$ 2.50	<u>300,000</u>
Total costs assigned (a)			<u>\$1,086,500</u>			<u>\$497,780</u>
Units produced (b)			<u>54,000</u>			<u>10,200</u>
Overhead cost per unit [(a) ÷ (b)]			<u>\$ 20.12</u>			<u>\$ 48.80</u>

PROBLEM 4-1A (Continued)

(d)

<u>ABC Manufacturing Costs</u>	<u>Home Model</u>	<u>Commercial Model</u>
Direct materials	\$18.50	\$26.50
Direct labor	19.00	19.00
Overhead	<u>20.12</u>	<u>48.80</u>
Total cost per unit	<u>\$57.62</u>	<u>\$94.30</u>

(e) <u>Activity</u>	<u>Value- vs. Non-Value-Added</u>
Receiving	Non-value-added
Forming	Value-added
Assembling	Value-added
Testing	Non-value-added
Painting	Value-added
Packing and shipping	Value-added

- (f) (1) Activity-based costing shows the commercial model absorbs nearly $2\frac{1}{2}$ ($\$48.80 \div \20.12) times as much overhead per unit as the home model.
- (2) The comparison of ABC and traditional costing shows that the proper amount of overhead assigned to the two products is not equal at \$24.68 but rather \$20.12 for the home model and \$48.80 for the commercial model. Under traditional costing, the margin of error on the commercial model was almost 100%, an understatement of \$24.12 on an assignment of \$24.68. These distorted overhead assignments have likely led to overpricing the home model and underpricing the commercial model.

PROBLEM 4-2A

- (a) The allocation of total manufacturing overhead using activity-based costing is as follows:

Overhead Rate	Royale		Majestic		Total Overhead
	Drivers Used	Cost Assigned	Drivers Used	Cost Assigned	
Purchase orders @ \$30	17,000	\$ 510,000	23,000	\$ 690,000	\$1,200,000
Machine setups @ \$50	5,000	250,000	13,000	650,000	900,000
Machine hours @ \$40	75,000	3,000,000	45,000	1,800,000	4,800,000
Inspections @ \$25	11,000	275,000	17,000	425,000	700,000
Total assigned costs (a)		<u>\$4,035,000</u>		<u>\$3,565,000</u>	<u>\$7,600,000</u>
Units produced (b)		<u>25,000</u>		<u>10,000</u>	
Cost per unit (a) ÷ (b)		<u>\$ 161.40</u>		<u>\$ 356.50</u>	

- (b) The cost per unit and gross profit of each model under ABC costing were:

	Royale	Majestic
Direct materials	\$ 700.00	\$ 420.00
Direct labor	120.00	100.00
Manufacturing overhead	<u>161.40</u>	<u>356.50</u>
Total cost per unit	<u>\$ 981.40</u>	<u>\$ 876.50</u>
Sales price per unit	\$1,600.00	\$1,300.00
Cost per unit	<u>981.40</u>	<u>876.50</u>
Gross profit	<u>\$ 618.60</u>	<u>\$ 423.50</u>

- (c) Management's future plans for the two television models are not sound. Under ABC costing, the Royale model is \$195.10 (\$618.60 – \$423.50) per unit more profitable than the Majestic model. If any product should be phased out, it is the Majestic. But, by applying ABC and activity-based management analysis, Schultz may determine how to reduce the costs of producing the Majestic model.

PROBLEM 4-3A

(a) Predetermined overhead rate using machine hours:

$$\$868,000 \div 100,000 \text{ hrs.} = \$8.68 \text{ per machine hour}$$

(b) Manufacturing cost per stairway under traditional costing:

Direct materials	\$ 103,600
Direct labor	112,000
Overhead (14,500 X \$8.68)	<u>125,860</u>
Total cost of 250 stairs	<u>\$ 341,460</u>
Cost per stairway (\$341,460 ÷ 250)	<u>\$1,365.84</u>

(c) Manufacturing cost per stairway under activity-based costing:

Computation of Activity-Based Overhead Rates

<u>Activity Cost Pools</u>	<u>Estimated Overhead</u>	<u>÷</u>	<u>Expected Use of Cost Drivers per Activity</u>	<u>=</u>	<u>Activity-Based Overhead Rate</u>
Purchasing	\$ 75,000		600 Orders		\$125 per order
Handling materials	82,000		8,000 Moves		\$10.25 per move
Production	210,000		100,000 D/L Hours		\$2.10 per D/L hour
Setting up machines	105,000		1,250 Setups		\$84 per setup
Inspecting	90,000		6,000 Inspections		\$15 per inspection
Inventory control	126,000		168,000 Components		\$.75 per component
Utilities	<u>180,000</u>		90,000 Sq. ft.		\$2.00 per sq. ft.
	<u>\$868,000</u>				

Assignment of Overhead to Order of 250 Stairs

<u>Activity Cost Pools</u>	<u>Expected Use of Cost Drivers</u>	<u>X</u>	<u>Activity-Based Overhead Rates</u>	<u>=</u>	<u>Cost Assigned</u>
Purchasing	60 Orders		\$125		\$ 7,500
Handling materials	800 Moves		\$10.25		8,200
Production	5,000 D/L Hours		\$2.10		10,500
Setting up machines	100 Setups		\$84		8,400
Inspecting	450 Inspections		\$15		6,750
Inventory control	16,000 Components		\$.75		12,000
Utilities	8,000 Sq. ft.		\$2.00		<u>16,000</u>
Total overhead assigned					<u>\$69,350</u>

PROBLEM 4-3A (Continued)

Total manufacturing cost per stairway under ABC:

Direct materials.....	\$ 103,600
Direct labor.....	112,000
Overhead.....	<u>69,350</u>
Total cost of 250 stairs	<u>\$ 284,950</u>
Total cost per stairway (\$284,950 ÷ 250).....	<u>\$1,139.80</u>

- (d) The difference between the traditional cost and the activity-based cost per unit, \$1,365.84 versus \$1,139.80, is not great in amount but \$226.04 (\$1,365.84 – \$1,139.80) is 19.8% of the more correct ABC cost per unit. Activity-based costing is the preferable costing system for setting prices because the real costs are more accurately reflected. The greater accuracy is a result of multiple, more relevant activity cost drivers under ABC than the single cost driver used with the traditional volume-based system.