

Exercise 8-3 (10 minutes)

The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	\$134,000
÷ Estimated total direct labor hours (DLHs).....	<u>20,000</u> DLHs
= Predetermined overhead rate	<u>\$6.70</u> per DLH

Exercise 8-4 (10 minutes)

1. Total direct labor-hours required for Job A-500:

Direct labor cost (a).....	\$108
Direct labor wage rate per hour (b)	\$12
Total direct labor hours (a) ÷ (b).....	9

Total manufacturing cost assigned to Job A-500:

Direct materials	\$230
Direct labor	108
Manufacturing overhead applied (\$14 per DLH × 9 DLHs).....	<u>126</u>
Total manufacturing cost	<u>\$464</u>

2. Unit product cost for Job A-500:

Total manufacturing cost (a)	\$464
Number of units in the job (b)	40
Unit product cost (a) ÷ (b).....	\$11.60

Exercise 8-6 (10 minutes)

Actual direct labor-hours	10,800
× Predetermined overhead rate	<u>\$23.40</u>
= Manufacturing overhead applied.....	<u><u>\$252,720</u></u>

Exercise 8-7 (20 minutes)

1. Cost of Goods Manufactured

Direct materials:

Raw materials inventory, beginning.....	\$12,000	
Add: Purchases of raw materials	<u>30,000</u>	
Total raw materials available	42,000	
Deduct: Raw materials inventory, ending	<u>18,000</u>	
Raw materials used in production	24,000	
Less indirect materials included in manufacturing overhead.....	<u>5,000</u>	\$ 19,000
Direct labor.....		58,000
Manufacturing overhead applied to work in process inventory		<u>87,000</u>
Total manufacturing costs.....		164,000
Add: Beginning work in process inventory.....		<u>56,000</u>
		220,000
Deduct: Ending work in process inventory		<u>65,000</u>
Cost of goods manufactured		<u><u>\$155,000</u></u>

2. Cost of Goods Sold

Finished goods inventory, beginning.....	\$ 35,000
Add: Cost of goods manufactured	<u>155,000</u>
Goods available for sale.....	190,000
Deduct: Finished goods inventory, ending.....	<u>42,000</u>
Unadjusted cost of goods sold	148,000
Add: Underapplied overhead.....	<u>4,000</u>
Adjusted cost of goods sold	<u><u>\$152,000</u></u>

Exercise 8-8 (20 minutes)

Parts 1 and 2.

Cash	
	(a) 94,000
	(c) 132,000
	(d) 143,000

Work in Process	
(b) 78,000	
(c) 112,000	
(e) 152,000	(f) 342,000
Bal. 0	

Manufacturing Overhead	
(b) 11,000	(e) 152,000
(c) 20,000	
(d) 143,000	(g) 22,000
Bal. 0	

Raw Materials	
(a) 94,000	(b) 89,000
Bal. 5,000	

Finished Goods	
(f) 342,000	(f) 342,000
Bal. 0	

Cost of Goods Sold	
(f) 342,000	
(g) 22,000	
Bal. 364,000	

Exercise 8-9 (10 minutes)

1. Actual direct labor-hours.....	11,500
× Predetermined overhead rate	<u>\$18.20</u>
= Manufacturing overhead applied	\$209,300
Less: Manufacturing overhead incurred	<u>215,000</u>
	<u>\$ (5,700)</u>
Manufacturing overhead underapplied	\$5,700

2. Because manufacturing overhead is underapplied, the cost of goods sold would increase by \$5,700 and the gross margin would decrease by \$5,700.

Exercise 8-16 (30 minutes)

1. Because \$120,000 of studio overhead was applied to Work in Process on the basis of \$75,000 of direct staff costs, the predetermined overhead rate was 160%:

$$\frac{\text{Studio overhead applied}}{\text{Direct staff costs incurred}} = \frac{\$120,000}{\$75,000} = 160\% \text{ rate}$$

2. The Lexington Gardens Project is the only job remaining in Work in Process at the end of the month; therefore, the entire \$35,000 balance in the Work in Process account at that point must apply to it. Recognizing that the predetermined overhead rate is 160% of direct staff costs, the following computation can be made:

Total cost in the Lexington Gardens Project		\$35,000
Less: Direct staff costs.....	\$ 6,500	
Studio overhead cost (\$6,500 × 160%)..	<u>10,400</u>	<u>16,900</u>
Costs of subcontracted work		<u>\$18,100</u>

With this information, we can now complete the job cost sheet for the Lexington Gardens Project:

Costs of subcontracted work	\$18,100
Direct staff costs	6,500
Studio overhead	<u>10,400</u>
Total cost to January 31	<u>\$35,000</u>

Exercise 9-1 (20 minutes)

a. To record issuing raw materials for use in production:		
Work in Process—Molding Department	23,000	
Work in Process—Firing Department.....	8,000	
Raw Materials		31,000
b. To record direct labor costs incurred:		
Work in Process—Molding Department	12,000	
Work in Process—Firing Department.....	7,000	
Wages Payable		19,000
c. To record applying manufacturing overhead:		
Work in Process—Molding Department	25,000	
Work in Process—Firing Department.....	37,000	
Manufacturing Overhead		62,000
d. To record transfer of unfired, molded bricks from the Molding Department to the Firing Department:		
Work in Process—Firing Department.....	57,000	
Work in Process—Molding Department...		57,000
e. To record transfer of finished bricks from the Firing Department to the finished bricks warehouse:		
Finished Goods.....	103,000	
Work in Process—Firing Department		103,000
f. To record cost of goods sold:		
Cost of Goods Sold	101,000	
Finished Goods		101,000

Exercise 9-2 (10 minutes)

Weighted-Average Method

	<i>Equivalent Units (EU)</i>	
	<i>Materials</i>	<i>Conversion</i>
Units transferred out.....	190,000	190,000
Work in process, ending:		
15,000 units × 80%	12,000	
15,000 units × 40%		6,000
Equivalent units of production	<u>202,000</u>	<u>196,000</u>

WEIGHTED-AVERAGE METHOD	PHYSICAL UNITS	%		
BEGINNING WORK IN PROCESS (BWIP)	30,000			
STARTED	175,000			
TOTAL AVAILABLE or INPUTS	205,000			
			MATERIALS	CONVERSION
			EQUIVALENT UNIT	
COMPLETED (i.e. TRANSFERRED OUT)	190,000	100%	190,000	190,000
ENDING WORK IN PROCESS (EWIP)	15,000	80%	12,000	-
		40%	-	6,000
TOTAL PRODUCED or OUTPUTS	205,000		202,000	196,000

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A	B	C	D	E
1 WEIGHTED-AVERAGE METHOD	PHYSICAL UNITS	%		
2 BEGINNING WORK IN PROCESS (BWIP)	30000			
3 STARTED	175000			
4 TOTAL AVAILABLE or INPUTS	=SUM(B2:B3)			
5			MATERIALS	CONVERSION
6			EQUIVALENT UNIT	
7 COMPLETED (i.e. TRANSFERRED OUT)	190000	1	=B7*SC\$7	=B7*SC\$7
8 ENDING WORK IN PROCESS (EWIP)	15000	0.8	=B8*C8	0
9		0.4	0	=B8*C9
10 TOTAL PRODUCED or OUTPUTS	=SUM(B7:B8)		=SUM(D7:D9)	=SUM(E7:E9)
11				

Ready Fundamental 15 Ex9-2 Average: 95058.95294 Count: 29 Sum: 1616002.2 210%

Exercise 9-3 (10 minutes)

Weighted-Average Method

1.

	<i>Materials</i>	<i>Labor</i>	<i>Overhead</i>
Cost of beginning work in process inventory.....	\$ 18,000	\$ 5,500	\$ 27,500
Cost added during the period	<u>238,900</u>	<u>80,300</u>	<u>401,500</u>
Total cost (a)	<u>\$256,900</u>	<u>\$85,800</u>	<u>\$429,000</u>
Equivalent units of production (b) .	35,000	33,000	33,000
Cost per equivalent unit (a) ÷ (b) .	\$7.34	\$2.60	\$13.00

2.

Cost per equivalent unit for materials	\$ 7.34
Cost per equivalent unit for labor	2.60
Cost per equivalent unit for overhead	<u>13.00</u>
Total cost per equivalent unit.....	<u>\$22.94</u>

GNBCY - SM - Chap09 - Process Costing - Microsoft Excel							
	A	B	C	D	E	F	G
1	WEIGHTED-AVERAGE METHOD	PHYSICAL UNITS	%				
2	BEGINNING WORK IN PROCESS (BWIP)						
3	STARTED						
4	TOTAL AVAILABLE or INPUTS						
5				MATERIALS	LABOR	OVERHEAD	
6				EQUIVALENT UNIT			
7	COMPLETED (i.e. TRANSFERRED OUT)			-	-	-	
8	ENDING WORK IN PROCESS (EWIP)			-	-	-	
9				-	-	-	
10				-	-	-	
11	TOTAL PRODUCED or OUTPUTS	-		35,000	33,000	33,000	
12				COSTS			TOTAL
13	BWIP			\$ 18,000	\$ 5,500	\$ 27,500	\$ 51,000
14	INCURRED DURING THE PERIOD			\$ 238,900	\$ 80,300	\$ 401,500	\$ 720,700
15			TOTAL	\$ 256,900	\$ 85,800	\$ 429,000	\$ 771,700
16	COST PER EQUIVALENT UNIT			\$ 7.34	\$ 2.60	\$ 13.00	\$ 22.94

GNBCY - SM - Chap09 - Process Costing - Microsoft Excel							
	A	B	C	D	E	F	G
1	WEIGHTED-AVERAGE METHOD	PHYSICAL UNITS	%				
2	BEGINNING WORK IN PROCESS (BWIP)						
3	STARTED						
4	TOTAL AVAILABLE or INPUTS						
5				MATERIALS	LABOR	OVERHEAD	
6				EQUIVALENT UNIT			
7	COMPLETED (i.e. TRANSFERRED OUT)			=B7*\$C\$7	=B7*\$C\$7	=B7*\$C\$7	
8	ENDING WORK IN PROCESS (EWIP)			=B8*C8	0	0	
9				0	=B9*C9	0	
10				0	0	=B8*C10	
11	TOTAL PRODUCED or OUTPUTS	=B4		35000	33000	33000	
12				COSTS			TOTAL
13	BWIP			18000	5500	27500	=SUM(D13:F13)
14	INCURRED DURING THE PERIOD			238900	80300	401500	=SUM(D14:F14)
15			TOTAL	=SUM(D13:D14)	=SUM(E13:E14)	=SUM(F13:F14)	=SUM(G13:G14)
16	COST PER EQUIVALENT UNIT			=D15/D11	=E15/E11	=F15/F11	=SUM(D16:F16)

Exercise 9-4 (10 minutes)

	<i>Materials</i>	<i>Conversion</i>	<i>Total</i>
<i>Ending work in process inventory:</i>			
Equivalent units of production	2,000	800	
Cost per equivalent unit	\$13.86	\$4.43	
Cost of ending work in process inventory	\$27,720	\$3,544	\$31,264
<i>Units completed and transferred out:</i>			
Units transferred to the next department	20,100	20,100	
Cost per equivalent unit	\$13.86	\$4.43	
Cost of units transferred out.....	\$278,586	\$89,043	\$367,629

Problem 9-14 (45 minutes)

Weighted-Average Method

1. Equivalent units of production

	<i>Materials</i>	<i>Conversion</i>
Transferred to next department*	95,000	95,000
Ending work in process:		
Materials: 15,000 units x 60% complete	<u>9,000</u>	
Conversion: 15,000 units x 20% complete		<u>3,000</u>
Equivalent units of production	<u>104,000</u>	<u>98,000</u>

*Units transferred to the next department = Units in beginning work in process + Units started into production – Units in ending work in process = 10,000 + 100,000 – 15,000 = 95,000

2. Cost per equivalent unit

	<i>Materials</i>	<i>Conversion</i>
Cost of beginning work in process	\$ 1,500	\$ 7,200
Cost added during the period	<u>154,500</u>	<u>90,800</u>
Total cost (a)	\$156,000	\$98,000
Equivalent units of production (b)	104,000	98,000
Cost per equivalent unit, (a) ÷ (b)	\$1.50	\$1.00

3. Cost of ending work in process inventory and units transferred out

	<i>Materials</i>	<i>Conversion</i>	<i>Total</i>
Ending work in process inventory:			
Equivalent units of production...	9,000	3,000	
Cost per equivalent unit	\$1.50	\$1.00	
Cost of ending work in process inventory	\$13,500	\$3,000	\$16,500
Units completed and transferred out:			
Units transferred to the next department	95,000	95,000	
Cost per equivalent unit	\$1.50	\$1.00	
Cost of units completed and transferred out	\$142,500	\$95,000	\$237,500

Problem 9-14 (continued)

4. Cost Reconciliation

Costs to be accounted for:

Cost of beginning work in process inventory (\$1,500 + \$7,200)	\$ 8,700
Costs added to production during the period (\$154,500 + \$90,800)	<u>245,300</u>
Total cost to be accounted for	<u><u>\$254,000</u></u>

Costs accounted for as follows:

Cost of ending work in process inventory	\$ 16,500
Cost of units completed and transferred out ..	<u>237,500</u>
Total cost accounted for	<u><u>\$254,000</u></u>

Exercise 9A-1 (10 minutes)

FIFO Method

	<i>Materials</i>	<i>Conversion</i>
To complete beginning work in process:		
Materials: 30,000 units $\times$ (100% – 65%)	10,500	
Conversion: 30,000 units $\times$ (100% – 30%)		21,000
Units started and completed during October*	160,000	160,000
Ending work in process:		
Materials: 15,000 units $\times$ 80% complete	12,000	
Conversion: 15,000 units $\times$ 40% complete		<u>6,000</u>
Equivalent units of production	<u>182,500</u>	<u>187,000</u>

* 175,000 units started – 15,000 units in ending work in process
= 160,000 units started and completed

Exercise 9A-8 (45 minutes)

FIFO Method

1. Computation of the total cost per equivalent unit of production:

Cost per equivalent unit of production for material	\$25.40
Cost per equivalent unit of production for conversion	<u>18.20</u>
Total cost per equivalent unit of production	<u>\$43.60</u>

2. Computation of equivalent units in ending inventory:

	<i>Materials</i>	<i>Conversion</i>
Units in ending inventory (a).....	300	300
Percentage completed (b).....	70%	60%
Equivalent units of production (a) × (b)...	210	180

3. Computation of equivalent units required to complete the beginning inventory:

	<i>Materials</i>	<i>Conversion</i>
Units in ending inventory (a).....	400	400
Percentage completed (b).....	20%	60%
Equivalent units of production (a) × (b)...	80	240

4. Units transferred to the next department..... 3,100
Units from the beginning inventory..... 400
Units started and completed during the period 2,700

Exercise 9A-8 (continued)

5.	<i>Materials</i>	<i>Conversion</i>	<i>Total</i>
Ending work in process inventory:			
Equivalent units of production	210	180	
Cost per equivalent unit	\$25.40	\$18.20	
Cost of ending work in process inventory	\$5,334	\$3,276	<u>\$8,610</u>
Units transferred out:			
Cost from the beginning work in process inventory	\$8,120	\$2,920	\$11,040
Cost to complete the units in beginning work in process inventory:			
Equivalent units of production required to complete the units in beginning inventory	80	240	
Cost per equivalent unit	\$25.40	\$18.20	
Cost to complete the units in beginning inventory	\$2,032	\$4,368	\$6,400
Cost of units started and completed this period:			
Units started and completed this period	2,700	2,700	
Cost per equivalent unit	\$25.40	\$18.20	
Cost of units started and completed this period	\$68,580	\$49,140	<u>\$117,720</u>
Total cost of units transferred out			<u>\$135,160</u>

Exercise 7-1 (10 minutes)

a.	Receive raw materials from suppliers.	Batch-level
b.	Manage parts inventories.	Product-level
c.	Do rough milling work on products.	Unit-level
d.	Interview and process new employees in the personnel department.	Organization-sustaining
e.	Design new products.	Product-level
f.	Perform periodic preventive maintenance on general-use equipment.	Organization-sustaining
g.	Use the general factory building.	Organization-sustaining
h.	Issue purchase orders for a job.	Batch-level

Some of these classifications are debatable and depend on the specific circumstances found in particular companies.

Exercise 7-2 (15 minutes)

	<i>Travel</i>	<i>Pickup and Delivery</i>	<i>Customer Service</i>	<i>Other</i>	<i>Totals</i>
Driver and guard wages.....	\$360,000	\$252,000	\$ 72,000	\$ 36,000	\$ 720,000
Vehicle operating expense.....	196,000	14,000	0	70,000	280,000
Vehicle depreciation.....	72,000	18,000	0	30,000	120,000
Customer representative salaries and expenses.....	0	0	144,000	16,000	160,000
Office expenses.....	0	6,000	9,000	15,000	30,000
Administrative expenses.....	<u>0</u>	<u>16,000</u>	<u>192,000</u>	<u>112,000</u>	<u>320,000</u>
Total cost.....	<u>\$628,000</u>	<u>\$306,000</u>	<u>\$417,000</u>	<u>\$279,000</u>	<u>\$1,630,000</u>

Each entry in the table is derived by multiplying the total cost for the cost category by the percentage taken from the table below that shows the distribution of resource consumption:

	<i>Travel</i>	<i>Pickup and Delivery</i>	<i>Customer Service</i>	<i>Other</i>	<i>Totals</i>
Driver and guard wages.....	50%	35%	10%	5%	100%
Vehicle operating expense.....	70%	5%	0%	25%	100%
Vehicle depreciation.....	60%	15%	0%	25%	100%
Customer representative salaries and expenses.....	0%	0%	90%	10%	100%
Office expenses.....	0%	20%	30%	50%	100%
Administrative expenses.....	0%	5%	60%	35%	100%

Exercise 7-3 (10 minutes)

<i>Activity Cost Pool</i>	<i>Estimated Overhead Cost</i>	<i>Expected Activity</i>	<i>Activity Rate</i>
		square feet of	\$0.48 per square foot of
Caring for lawn.....	\$72,000	150,000 lawn	lawn
Caring for garden beds– low maintenance.....	\$26,400	20,000 square feet of low maintenance beds	\$1.32 per square foot of low maintenance beds
Caring for garden beds–high maintenance.....	\$41,400	15,000 square feet of high maintenance beds	\$2.76 per square foot of high maintenance beds
Travel to jobs.....	\$3,250	12,500 miles	\$0.26 per mile
Customer billing and service..	\$8,750	25 customers	\$350 per customer

The activity rate for each activity cost pool is computed by dividing its estimated overhead cost by its expected activity.

Exercise 7-4 (10 minutes)*K425*

<i>Activity Cost Pool</i>		<i>Activity Rate</i>		<i>Activity</i>	<i>ABC Cost</i>
Supporting direct labor	\$6	per direct labor-hour	80	direct labor-hours	\$ 480
Machine processing	\$4	per machine-hour	100	machine-hours	400
Machine setups	\$50	per setup	1	setups	50
Production orders	\$90	per order	1	order	90
Shipments.....	\$14	per shipment	1	shipment	14
Product sustaining	\$840	per product	1	product	840
Total.....					<u>\$1,874</u>

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<i>Activity Cost Pool</i>		<i>Activity Rate</i>		<i>Activity</i>	<i>ABC Cost</i>
Supporting direct labor	\$6	per direct labor-hour	500	direct labor-hours	\$ 3,000
Machine processing	\$4	per machine-hour	1,500	machine-hours	6,000
Machine setups	\$50	per setup	4	setups	200
Production orders	\$90	per order	4	orders	360
Shipments.....	\$14	per shipment	10	shipments	140
Product sustaining	\$840	per product	1	product	840
Total.....					<u>\$10,540</u>

Exercise 7-5 (15 minutes)

Sales (\$1,850 per standard model glider × 20 standard model gliders + \$2,400 per custom designed glider × 3 custom designed gliders) \$44,200

Costs:

Direct materials (\$564 per standard model glider × 20 standard model gliders + \$634 per custom designed glider × 3 custom designed gliders)	\$13,182	
Direct labor (\$19.50 per direct labor-hour × 26.35 direct labor-hours per standard model glider × 20 standard model gliders + \$19.50 per direct labor-hour × 28 direct labor-hours per custom designed glider × 3 custom designed gliders)	11,915	
Supporting direct labor (\$26 per direct labor-hour × 26.35 direct labor-hours per standard model glider × 20 standard model gliders + \$26 per direct labor-hour × 28 direct labor-hours per custom designed glider × 3 custom designed gliders)	15,886	
Order processing (\$284 per order × 4 orders)	1,136	
Custom designing (\$186 per custom design × 3 custom designs)	558	
Customer service (\$379 per customer × 1 customer)	<u>379</u>	<u>43,056</u>
Customer margin		<u>\$ 1,144</u>

Problem 7-17 (45 minutes)

1. Under the traditional direct labor-dollar based costing system, manufacturing overhead is applied to products using the predetermined overhead rate computed as follows:

$$\begin{aligned}\text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total direct labor dollars}} \\ &= \frac{\$608,000}{\$304,000} = \$2.00 \text{ per DL\$}\end{aligned}$$

The product margins using the traditional approach would be computed as follows:

	<i>B300</i>	<i>T500</i>	<i>Total</i>
Sales	<u>\$1,400,000</u>	<u>\$700,000</u>	<u>\$2,100,000</u>
Direct materials.....	436,300	251,700	688,000
Direct labor.....	200,000	104,000	304,000
Manufacturing overhead applied @ \$2.00 per direct labor-dollar.....	<u>400,000</u>	<u>208,000</u>	<u>608,000</u>
Total manufacturing cost	<u>1,036,300</u>	<u>563,700</u>	<u>1,600,000</u>
Product margin	<u>\$ 363,700</u>	<u>\$136,300</u>	<u>\$ 500,000</u>

Note that all of the manufacturing overhead cost is applied to the products under the company's traditional costing system.

Problem 7-17 (continued)

2. The first step is to determine the activity rates:

<i>Activity Cost Pools</i>	<i>(a) Total Cost</i>	<i>(b) Total Activity</i>	<i>(a) ÷ (b) Activity Rate</i>
Machining	\$213,500	152,500 MHR	\$1.40 per MHR
Setups	\$157,500	375 setup hrs.	\$420 per setup hr.
Product sustaining ..	\$120,000	2 products	\$60,000 per product

*The Other activity cost pool is not shown above because it includes organization-sustaining and idle capacity costs that should not be assigned to products.

Under the activity-based costing system, the product margins would be computed as follows:

	<i>B300</i>	<i>T500</i>	<i>Total</i>
Sales	<u>\$1,400,000</u>	<u>\$700,000</u>	<u>\$2,100,000</u>
Direct materials	436,300	251,700	688,000
Direct labor	200,000	104,000	304,000
Advertising expense	50,000	100,000	150,000
Machining	126,000	87,500	213,500
Setups	31,500	126,000	157,500
Product sustaining	<u>60,000</u>	<u>60,000</u>	<u>120,000</u>
Total cost	<u>903,800</u>	<u>729,200</u>	<u>1,633,000</u>
Product margin	<u>\$ 496,200</u>	<u>\$(29,200)</u>	<u>\$ 467,000</u>

Problem 7-17 (continued)

3. The quantitative comparison is as follows:

	B300		T500		Total
<i>Traditional Cost System</i>	(a)	(a) ÷ (c)	(b)	(b) ÷ (c)	(c)
	Amount	%	Amount	%	Amount
Direct materials	\$436,300	63.4%	\$251,700	36.6%	\$ 688,000
Direct labor	200,000	65.8%	104,000	34.2%	304,000
Manufacturing overhead	<u>400,000</u>	65.8%	<u>208,000</u>	34.2%	<u>608,000</u>
Total cost assigned to products	<u>\$1,036,300</u>		<u>\$563,700</u>		\$1,600,000
	0				
Selling and administrative					<u>550,000</u>
Total cost					<u>\$2,150,000</u>
 <i>Activity-Based Costing System</i>					
Direct costs:					
Direct materials	\$436,300	63.4%	\$251,700	36.6%	\$ 688,000
Direct labor	200,000	65.8%	104,000	34.2%	304,000
Advertising expense	50,000	33.3%	100,000	66.7%	150,000
Indirect costs:					
Machining	126,000	59.0%	87,500	41.0%	213,500
Setups	31,500	20.0%	126,000	80.0%	157,500
Product sustaining	<u>60,000</u>	50.0%	<u>60,000</u>	50.0%	<u>120,000</u>
Total cost assigned to products	<u>\$903,800</u>		<u>\$729,200</u>		1,633,000
Costs not assigned to products:					
Selling and administrative					400,000
Other					<u>117,000</u>
Total cost					<u>\$2,150,000</u>

Problem 7-17 (continued)

The traditional and activity-based cost assignments differ for three reasons. First, the traditional system assigns all \$608,000 of manufacturing overhead to products. The ABC system assigns only \$491,000 of manufacturing overhead to products. The ABC system does not assign the \$117,000 of Other activity costs to products because they represent organization-sustaining costs. Second, the traditional system uses one unit-level activity measure, direct labor dollars, to assign 65.8% of all overhead to the B300 product line and 34.2% of all overhead to the T500 product line. The ABC system assigns 59.0% of Machining costs to the B300 product line and 41.0% to the T500 product line. The ABC system assigns 20.0% of Setup costs (a batch-level activity) to the B300 product line and 80.0% to the T500 product line. The ABC system assigns 50% of Product sustaining costs (a product-level activity) to each product line. Third, the traditional system does not trace any advertising expenses to the two products. The ABC system traces \$50,000 of advertising to the B300 and \$100,000 of advertising to the T500 product line.

Problem 7-19 (45 minutes)

1. The first-stage allocation of costs to activity cost pools appears below:

	<i>Distribution of Resource Consumption Across Activity Cost Pools</i>				
	<i>Cleaning Carpets</i>	<i>Travel to Jobs</i>	<i>Job Support</i>	<i>Other</i>	<i>Total</i>
Wages	70%	20%	0%	10%	100%
Cleaning supplies	100%	0%	0%	0%	100%
Cleaning equipment depreciation..	80%	0%	0%	20%	100%
Vehicle expenses.....	0%	60%	0%	40%	100%
Office expenses.....	0%	0%	45%	55%	100%
President's compensation.....	0%	0%	40%	60%	100%

	<i>Cleaning Carpets</i>	<i>Travel to Jobs</i>	<i>Job Support</i>	<i>Other</i>	<i>Total</i>
Wages	\$105,000	\$30,000	\$ 0	\$ 15,000	\$150,000
Cleaning supplies	40,000	0	0	0	40,000
Cleaning equipment depreciation..	16,000	0	0	4,000	20,000
Vehicle expenses.....	0	48,000	0	32,000	80,000
Office expenses.....	0	0	27,000	33,000	60,000
President's compensation.....	0	0	32,000	48,000	80,000
Total cost	<u>\$161,000</u>	<u>\$78,000</u>	<u>\$59,000</u>	<u>\$132,000</u>	<u>\$430,000</u>

Example: 70% of \$150,000 = \$105,000

Other entries in the table are determined in a similar manner.

Problem 7-19 (continued)

2. The activity rates are computed as follows:

<i>Activity Cost Pool</i>	<i>(a) Total Cost</i>	<i>(b) Total Activity</i>	<i>(a) ÷ (b) Activity Rate</i>
Cleaning carpets...	\$161,000	20,000 hundred square feet	\$8.05 per hundred square feet
Travel to jobs.....	\$78,000	60,000 miles	\$1.30 per mile
Job support.....	\$59,000	2,000 jobs	\$29.50 per job

3. The cost for the Flying N Ranch job is computed as follows:

<i>Activity Cost Pool</i>	<i>(a) Activity Rate</i>	<i>(b) Activity</i>	<i>(a) × (b) ABC Cost</i>
Cleaning carpets...	\$8.05 per hundred square feet	5 hundred square feet	\$ 40.25
Travel to jobs.....	\$1.30 per mile	75 miles	97.50
Job support.....	\$29.50 per job	1 job	<u>29.50</u>
Total.....			<u>\$167.25</u>

4. The margin earned on the job can be easily computed by using the costs calculated in part (3) above.

Sales	\$140.00
Costs:	
Cleaning carpets	\$40.25
Travel to jobs	97.50
Job support	<u>29.50</u>
Margin	<u>167.25</u>
	<u><u>\$(27.25)</u></u>

Problem 7-19 (continued)

5. Gallatin Carpet Cleaning appears to be losing money on the Flying N Ranch job. However, caution is advised. Some of the costs may not be avoidable and hence would have been incurred even if the Flying N Ranch job had not been accepted. An action analysis (discussed in Appendix 7A) is a more appropriate starting point for analysis than the simple report in part (4) above.

Nevertheless, there is a point at which travel costs eat up all of the profit from a job. With the company's current policy of charging a flat fee for carpet cleaning irrespective of how far away the client is from the office, there clearly is some point at which jobs should be turned down. (What if a potential customer is located in Florida?)

6. The company should consider charging a fee for travel to outlying customers based on the distance traveled and a flat fee per job. At present, close-in customers are in essence subsidizing service to outlying customers and large-volume customers are subsidizing service to low-volume customers. With fees for travel and for job support, the fee per hundred square feet can be dropped substantially. This may result in losing some low-volume jobs in outlying areas, but the lower fee per hundred square feet may result in substantially more business close to Bozeman. (If the fee is low enough, the added business may not even have to come at the expense of competitors. Some customers may choose to clean their carpets more frequently if the price were more attractive.)

Problem 7-21 (45 minutes)

1. The results of the first-stage allocation appear below:

	<i>Job Size</i>	<i>Estimating and Job Setup</i>	<i>Working on Nonroutine Jobs</i>	<i>Other</i>	<i>Totals</i>
Wages and salaries	\$150,000	\$ 30,000	\$ 90,000	\$ 30,000	\$ 300,000
Disposal fees.....	420,000	0	280,000	0	700,000
Equipment depreciation ...	36,000	4,500	18,000	31,500	90,000
On-site supplies	30,000	15,000	5,000	0	50,000
Office expenses.....	20,000	70,000	50,000	60,000	200,000
Licensing and insurance...	<u>120,000</u>	<u>0</u>	<u>200,000</u>	<u>80,000</u>	<u>400,000</u>
Total cost	<u>\$776,000</u>	<u>\$119,500</u>	<u>\$643,000</u>	<u>\$201,500</u>	<u>\$1,740,000</u>

According to the data in the problem, 50% of the wages and salaries cost of \$300,000 is attributable to activities related to job size.

$$\$300,000 \times 50\% = \$150,000.$$

Other entries in the table are determined in a similar manner.

	<i>(a)</i> <i>Activity Cost Pool</i>	<i>(b)</i> <i>Total Activity</i>	<i>(a) ÷ (b)</i> <i>Activity Rate</i>
Job size	\$776,000	800 thousand square feet	\$970 per thousand square feet
Estimating and job setup	\$119,500	500 jobs	\$239 per job
Working on nonroutine jobs...	\$643,000	100 nonroutine jobs	\$6,430 per nonroutine job

Problem 7-21 (continued)

3. The costs of each of the jobs can be computed as follows using the activity rates computed above:

a. *Routine one thousand square foot job:*

Job size (1 thousand square feet @ \$970 per thousand square feet)....	\$ 970.00
Estimating and job setup (1 job @ \$239 per job).....	239.00
Nonroutine job (not applicable).....	<u>0</u>
Total cost of the job.....	<u>\$1,209.00</u>
Cost per thousand square feet ($\$1,209 \div 1$ thousand square feet).....	<u>\$1,209.00</u>

b. *Routine two thousand square foot job:*

Job size (2 thousand square feet @ \$970 per thousand square feet)....	\$1,940.00
Estimating and job setup (1 job @ \$239 per job).....	239.00
Nonroutine job (not applicable).....	<u>0</u>
Total cost of the job.....	<u>\$2,179.00</u>
Cost per thousand square feet ($\$2,179 \div 2$ thousand square feet).....	<u>\$1,089.50</u>

c. *Nonroutine two thousand square foot job:*

Job size (2 thousand square feet @ \$970 per thousand square feet)....	\$1,940.00
Estimating and job setup (1 job @ \$239 per job).....	239.00
Nonroutine job.....	<u>6,430.00</u>
Total cost of the job.....	<u>\$8,609.00</u>
Cost per thousand square feet ($\$8,609 \div 2$ thousand square feet).....	<u>\$4,304.50</u>

Problem 7-21 (continued)

4. The objectivity of the interview data can be questioned because the on-site work supervisors were undoubtedly trying to prove their case about the cost of nonroutine jobs. Nevertheless, the activity-based costing data certainly suggest that dramatic differences exist in the costs of jobs. While some of the costs may be difficult to adjust in response to changes in activity, it does appear that the standard bid of \$2,500 per thousand square feet may be substantially under the company's cost for nonroutine jobs. Even though it may be difficult to detect nonroutine situations before work begins, the average additional cost of \$6,430 for nonroutine work suggests that the estimator should try. And if a nonroutine situation is spotted, this should be reflected in the bid price.

Savvy competitors are likely to bid less than \$2,500 per thousand square feet on routine work and substantially more than \$2,500 per thousand square feet on nonroutine work. Consequently, Mercer Asbestos Removal may find that its product mix shifts toward nonroutine work and away from routine work as customers accept bids on nonroutine work from the company and go to competitors for routine work. This may have a negative effect on the company's profits.