

# ACTIVITY BASE COSTING

## Key Terms and Concepts to Know

### Single Plantwide Rate vs. Multiple Department Rates

- Job order costing relied on a single plantwide overhead rate to apply overhead to work-in-process.
- Multiple department overhead rates may provide a more precise application of overhead to work-in-process when:
  - Overhead incurred varies greatly among departments
  - Product(s) use different amounts of activity in each department.

### Activity-Based Costing (ABC):

- Activity Based Costing is a two-stage costing method in which overhead costs are assigned to overhead cost pools and the costs in each pool are applied to products based on the amount of activities they require.
- An activity in ABC is an event that causes the consumption of overhead resources.
- ABC affects only overhead costs; direct materials and direct labor are the same under job-order costing and ABC costing.
- An activity cost pool is a “cost bucket” in which costs for a particular activity are accumulated.
- An activity measure is used as an allocation base for applying overhead costs.
- An activity rate is the predetermined overhead rate in ABC.

### Benefits of Activity-Based Costing

- Costs are accumulated for each major activity.
- All costs in a cost pool pertain to a single activity.
- ABC uses a variety of measures to assign overhead costs.
- ABC highlights activities that could benefit most from improvements.

### Benchmarking

The company's performance is compared to similar companies with outstanding performance. Activities with the greatest room for improvement are identified.

## Key Topics to Know

### Departmental Overhead Rates

- Job costing relies on a single type of activity to calculate a predetermined overhead rate using the total overhead for the entire plant.
- Departmental overhead rates recognize that departments may incur significantly different amounts of overhead and may have different types of activity.
- In addition, products may use different amounts of activity in each department.

#### **Example #1**

B Company allocates overhead using direct labor hours. Next year, the company's two products will utilize the assembly and finishing departments as shown below.

	<u>Product A</u>		<u>Product B</u>	
Stamping and Assembly	2,000 mh	500 dlh	6,000 mh	1,500 dlh
Finishing	100 mh	2,000 dlh	400 mh	8,000 dlh

Overhead by department is expected to be:

Stamping and Assembly	\$400,000
Finishing	<u>200,000</u>
Total	\$600,000

B Company is considering using departmental overhead rates to allocate overhead. Stamping and Assembly would be allocated based on machine hours and Finishing would be allocated using direct labor hours.

- Required:
- a) Calculate the single plant-wide overhead rate.
  - b) Calculate the overhead applied to each product.
  - c) Calculate department overhead rates.
  - d) Calculate the overhead applied to each product.

**Solution #1**

a)

	<u>Machine Hours</u>		<u>Direct Labor Hours</u>	
	A	B	A	B
Stamping and Assembly	2,000	6,000	500	1,500
Finishing	<u>100</u>	<u>400</u>	<u>2,000</u>	<u>8,000</u>
Total	2,100	6,400	2,500	9,500

b)

Pre-determined overhead rate	\$50.00 =	<u>\$600,000</u>	12,000 direct labor hours in both departments
Applied to Product A	\$50.00 X	2,500 dlh =	\$125,000
Applied to Product B	\$50.00 X	9,500 dlh =	\$475,000
Total			\$600,000

c)

Pre-determined overhead rate – Stamping and Assembly	\$50.00 =	<u>\$400,000</u>	8,000 direct labor hours in Stamping and Assembly
Pre-determined overhead rate – Finishing	\$20.00 =	<u>\$200,000</u>	10,000 direct labor hours in Finishing

d)

<u>Applied overhead Product A</u>			
Stamping and Assembly	\$50.00 X	2,000 mh =	\$100,000
Finishing	\$20.00 X	2,000 dlh =	<u>40,000</u>
Total			\$140,000
<u>Applied overhead Product B</u>			
Stamping and Assembly	\$50.00 X	6,000 dlh =	\$300,000
Finishing	\$20.00 X	8,000 dlh =	<u>160,000</u>
Total			\$460,000

**Activity/Predetermined Overhead Rates under  
Job-Order Costing and ABC**

	<u><b>Traditional Job Costing</b></u>	<u><b>Activity-Based Costing</b></u>
Cost Pools	One	One for each activity (first stage allocation)
Costs	Total overhead cost	Total overhead is divided among the cost pools
Activities	One plant-wide measure of production volume	One per cost pool which measures the level of the pool's activity
Predetermined/ Activity Rates	One plant-wide predetermined overhead rate	One rate for each activity cost pool

- After the rates have been calculated, they can be used in several different ways:

<u>Apply Overhead to Work-in-Process</u>	<u>Product Overhead</u>	<u>Overhead Cost/Unit</u>	<u>Total Cost per Unit</u>
Apply overhead to production in work-in-process	Assign total overhead to each product line	Calculate the overhead cost per unit for each product line (second stage allocation)	Calculate the total cost per unit for each product line
How: for each job, multiply the actual activity by predetermined/ activity rate for each pool and add the results	How: for each product line, multiply the actual activity by predetermined/ activity rate for each pool and add the results	How: divide the total overhead cost assigned to each product line by the units of product to be produced	How: add the overhead cost per unit to the direct materials cost per unit and the direct labor cost per unit

## Steps in the Activity Based Costing Process

- Both manufacturing and services companies can use ABC. The application is unique to each company regardless in the industry involved.
- Although the activities, costs and activities are unique to each company, ABC is always a process or recipe of specific steps performed in a specific order.

### Example #2

T Company makes two types of chairs, a hand-built lounge chair and a folding beach chair. The company had used a job-order costing system and applies overhead on the basis of direct labor hours. Best Chair expects to produce 40,000 lounge chairs and 100,000 beach chairs next year. Total direct material costs are \$3,200,000 for lounge chairs and \$1,000,000 for beach chairs.

T Company has begun changing to an activity based costing system. The company has reported the following results from the first-stage cost allocations for year's production:

<u>Activity</u>	<u>Overhead</u>	<u>Activities by Product</u>	
	<u>Cost Assigned</u>	<u>Lounge Chairs</u>	<u>Beach Chairs</u>
Labor related	\$300,000	100,000 DLH	200,000 DLH
Machine related	\$450,000	30,000 MH	60,000 MH
Machine setups	\$730,000	4,000 Setups	1,000 Setups
Order processing	\$600,000	4,500 Orders	1,500 Orders
General factory	\$500,000	\$2,000,000 DL\$	\$3,000,000 DL\$

- Required:
- a) Determine the pre-determined overhead rate using traditional job-order costing.
  - b) Determine the total cost per unit for each product using traditional job-order costing.
  - c) Determine the amount of overhead assigned to each product using traditional job-order costing.
  - d) Determine the total cost per unit for each product using activity based costing.
  - e) Determine the amount of overhead applied using traditional job-order costing if the initial production run was 10% of annual volume.
  - f) Determine the amount of overhead applied using activity based costing if the initial production run was 10% of annual volume.

**Solution #2**

## a) Pre-determined Overhead Rate

		<u>Overhead Cost</u>	
	Labor related	\$300,000	
	Machine related	\$450,000	
	Machine setups	\$730,000	
	Order processing	\$600,000	
	General factory	\$500,000	
Predetermined overhead rate	Total Overhead Total DLH	<u>\$2,580,000</u> 100,000+200,000	= \$8.60 per DLH

## b) Traditional Job-Order Costing

	<u>Lounge Chairs</u>		<u>Beach Chairs</u>	
Direct materials	<u>\$3,200,000</u> 40,000 units	= \$80.00	<u>\$1,000,000</u> 100,000 units	= \$10.00
Direct labor	<u>\$2,000,000</u> 40,000 units	= \$50.00	<u>\$3,000,000</u> 100,000 units	= \$30.00
Overhead	<u>\$8.60 x 100,000 DLH</u> 40,000 units	= \$21.50	<u>\$8.60 x 200,000 DLH</u> 100,000 units	= \$17.20
Total Unit Cost	<u>\$151.50</u>		<u>\$57.20</u>	

## c) Traditional Job-Order Costing

	<u>Lounge Chairs</u>	<u>Beach Chairs</u>
Overhead cost per unit	\$21.50	\$17.20
Units produced	40,000	100,000
Overhead cost assigned	<u>\$860,000</u>	<u>\$1,720,000</u>

d) Activity Based Costing

<u>Activities</u>	<u>Overhead Cost</u>	<u>÷ Total Expected Activity</u>	<u>= Activity Rate</u>
Labor related	\$300,000	100,000 + 200,000 DLH	= \$1.00 per DLH
Machine related	\$450,000	30,000 + 60,000 MH	= \$5.00 per MH
Machine setups	\$730,000	4,000 + 1,000 setups	= \$146.00 per setup
Order processing	\$600,000	4,500 + 1,500 orders	= \$100.00 per order
General factory	\$500,000	\$2,000,000 + \$3,000,000	= \$.10 per DL\$

<u>Activities</u>	<u>Activity Rate</u>	<u>Lounge Chair</u>		<u>Beach Chair</u>	
		<u>Activity</u>	<u>Amount</u>	<u>Activity</u>	<u>Amount</u>
Labor related	\$1.00	100,000	\$100,000	200,000	\$200,000
Machine related	\$5.00	30,000	\$150,000	60,000	\$300,000
Machine setups	\$146.00	4,000	\$584,000	1,000	\$146,000
Order processing	\$100.00	4,500	\$450,000	1,500	\$150,000
General factory	\$.10	\$2,000,000	\$200,000	\$3,000,000	\$300,000
Total Overhead Assigned to each Product			\$1,484,000		\$1,096,000
Total Units Produced			40,000		100,000
Overhead Cost per Unit			<u>\$37.10</u>		<u>\$10.96</u>

	<u>Lounge Chairs</u>		<u>Beach Chairs</u>	
Direct materials	<u>\$3,200,000</u>	= \$80.00	<u>\$1,000,000</u>	= \$10.00
	40,000 units		100,000 units	
Direct labor	<u>\$2,000,000</u>	= \$50.00	<u>\$3,000,000</u>	= \$30.00
	40,000 units		100,000 units	
Overhead		= \$37.10		= \$10.96
Total Unit Cost		<u>\$167.10</u>		<u>\$50.96</u>

## e) Traditional Job-Order Costing

	<u>Lounge Chairs</u>	<u>Beach Chairs</u>	<u>Total</u>
Annual Production:	40,000	100,000	
Percent produced:	10%	10%	
Production	4,000	10,000	
Overhead cost per unit	\$21.50	\$17.20	
Overhead Applied	\$86,000	\$172,000	\$258,000

f) Activity Based Costing

<u>Activities</u>	<u>Activity Rate</u>	<u>Lounge Chair</u>		<u>Beach Chair</u>	
		<u>10%</u> <u>Activity</u>	<u>Amount</u>	<u>10%</u> <u>Activity</u>	<u>Amount</u>
Labor related	\$1.00	10,000	\$10,000	20,000	\$20,000
Machine related	\$5.00	3,000	\$15,000	6,000	\$30,000
Machine setups	\$146.00	400	\$58,400	100	\$14,600
Order processing	\$100.00	450	\$45,000	150	\$15,000
General factory	\$.10	\$200,000	\$20,000	\$300,000	\$30,000
Total Overhead Assigned to each Product			<u>\$148,400</u>		<u>\$109,600</u>
Total Overhead Applied				<u>\$258,000</u>	

**Shifting of Overhead Cost**

- Activity-based costing often shifts overhead cost from high-volume products to low volume products. The reason: batch-level and product-level costs.
- In a traditional costing system, such costs are spread more or less uniformly to all products. When using ABC, these costs, when spread to lower-volume products, result in a higher average cost.
- The effect of shifting overhead costs is symmetrical with respect to total overhead costs but asymmetrical with respect to overhead cost per unit.
  - Total overhead costs assigned to the high volume product will decrease by the same amount as the overhead costs assigned to the low volume product will increase.
  - Overhead costs per unit for the high volume product will decrease by less than the amount that the overhead costs per unit for the low volume product will increase. This is because the additional overhead costs shifted to the low volume product will be spread over a lower number of units than they were prior to the shift.

- In the example above, one-third of the direct labor hours were worked on lounge chairs and two-thirds on beach chairs. As a result, lounge chairs were assigned one-third of all overhead costs. After implementing ABC, only the labor related costs will be shared in this manner. Order processing costs, for example, will be shared 75% to lounge chairs and 25% to beach chairs. Therefore, overhead costs for order processing activities have been shifted from beach chairs to lounge chairs.

### **Cost Flows in an Activity-Based System**

- The journal entries and the flow of costs in an activity-based system are the same as in a conventional costing system.
- The only difference is the use of more than one predetermined overhead rate.

## Practice Problems

### Practice Problem #1

G Company has decided to produce two different briefcases: nylon and leather. They are deciding whether to use job-order costing or activity based costing. Based on next year's budget, two cost pools have been developed with the following information:

	<u>Nylon</u>	<u>Leather</u>	<u>Overhead Assigned</u>
Direct labor costs	\$50,000	\$100,000	\$0
Sewing machine hours	1,000	1,000	\$200,000
Machine setup hours	100	400	\$100,000

- Required:
- a) Compute the plant-wide overhead rate if overhead is applied on the basis of direct labor costs.
  - b) Compute the overhead rates using activity based costing.
  - c) Determine the difference in the amount of overhead allocated to each product between the two methods.

### Practice Problem #2

W Company manufactures spoked and solid bicycle wheels. The company relies on an activity based costing system. The following information is for the cost pools:

<u>Cost Pool</u>	<u>Activity</u>	<u>Activity Rate</u>	<u>Spoked</u>	<u>Solid</u>
Machine set-up	Set-ups	\$180.00	200	800
Assembly / Polish	Labor hours	\$4.00	40,000	30,000
Inspection	Inspections	\$20.00	100	1,100
Total production			10,000	10,000

- Required:
- a) Determine the total overhead cost assigned to each product.
  - b) Determine the overhead cost per unit for each product.
  - c) If Genesis produces 30% of the spoked wheels and 20% of the solid wheels during the second quarter, how much overhead will be applied to work-in-process?

**Practice Problem #3**

A Company has two products: X and Y. It has prepared the following analysis showing budgeted cost and activity for each of its three activity cost pools:

<u>Cost Pool</u>	<u>Per Budget</u>		
	<u>Cost</u>	<u>Product X Activity</u>	<u>Product Y Activity</u>
Activity 1	\$3,600	25,200	46,800
Activity 2	\$4,800	36,000	44,000
Activity 3	\$6,300	43,200	46,800

Annual production and sales level of Product X is 161,100 units, and the annual production and sales level of Product Y is 275,200 units.

- Required:
- Compute the approximate overhead cost per unit of Product X.
  - Compute the approximate overhead cost per unit of Product Y.

**Practice Problem #4**

X Company has budgeted the following overhead costs and cost drivers for the year:

<u>Overhead Item</u>	<u>Cost Driver</u>	<u>Cost</u>	<u>Activity Level</u>
Machine setup	Number of setups	\$20,000	200
Inspection	Number of inspections	130,000	6,500
Material handling	Number of material moves	80,000	8,000
Engineering	Engineering hours	50,000	1,000

Budgeted direct labor cost was \$100,000 and budgeted direct material cost was \$280,000. The following three jobs that were completed during the year:

	<u>Job 101</u>	<u>Job 102</u>	<u>Job 103</u>
Direct materials	\$5,000	\$12,000	\$8,000
Direct labor	\$2,000	\$2,000	\$4,000
Units completed	100	50	200
Number of setups	1	2	4
Number of inspections	20	10	30
Number of material moves	30	10	50
Engineering hours	10	50	10

- Required: How much overhead cost should be assigned to Job 101?

**Practice Problem #5**

F Company identified the following activities, costs and activity drivers.

	<u>Expected Costs</u>	<u>Expected Activity</u>
Handling parts	\$425,000	25,000 parts
Inspecting stock	390,000	940 batches
Processing purchase orders	220,000	440 orders
Designing packaging	230,000	5 models

- Required:
- a) Compute a plant-wide overhead rate assuming the company assigns overhead based on 70,000 budgeted direct labor hours.
  - b) Assuming that handling parts and inspection occurs in warehouse department and purchasing and designing occurs in the manufacturing management department, compute the multiple department overhead rates based on parts and models.
  - c) Compute separate rates for each of the four activities using the activity based costing.
  - d) F Company has completed a job which 17,000 direct labor hours, 25% of each activity in the warehouse department and 20% of each activity in the manufacturing management department. Compute the overhead cost assigned.

## True / False Questions

1. Activity-based costing uses one predetermined overhead rate.  
True      False
2. Activity-based costing is more expensive to implement than traditional costing.  
; True      False
3. Activity-based costing usually shifts overhead costs from low-volume products to high-volume products.  
True      False
4. Unit-level activities relate to overall costs of maintaining and managing productive capacity and cannot be traced to specific products.  
True      False
5. An activity in ABC is an event that causes overhead costs.  
True      False
6. The ABC model does not use the manufacturing overhead account to apply overhead to units of product.  
True      False
7. ABC improves control over prime costs.  
; True      False
8. The flow of costs in an ABC is the same as in traditional costing system.  
True      False
9. When applying overhead in an ABC, a separate journal entry must be made for each activity cost pool.  
True      False
10. Under ABC, manufacturing overhead costs are applied to products via a two-stage process.  
True      False
11. In an ABC each cost pool has its own predetermined overhead rate.  
True      False

12. Compared to the departmental overhead rate method, the plantwide overhead rate method usually results in more accurate overhead allocations.  
True      False
13. In activity-based costing, an activity can involve several related tasks.  
True      False
14. Multiple cost pools are used when allocating overhead using the plantwide overhead rate method.  
True      False
15. K Company estimates that overhead costs for the next year will be \$1,600,000 for indirect labor and \$400,000 for factory utilities. The company uses direct labor hours as its overhead allocation base. If 50,000 direct labor hours are planned for this next year, then the plantwide overhead rate is \$.025 per direct labor hour.  
True      False

## Multiple Choice Questions

1. Activity-based costing:
  - a) Uses a plant-wide overhead rate to assign overhead
  - b) Is not expensive to implement
  - c) Typically applies overhead costs using direct labor-hours
  - d) Uses multiple activity rates
  
2. Assigning overhead using ABC often:
  - a) Shifts overhead costs from high-volume products to low-volume products
  - b) Shifts overhead costs from low-volume products to high-volume products
  - c) Provides the same results as traditional costing
  - d) Requires one predetermined overhead rate
  
3. Which of the following is not an activity cost pool?
  - a) Testing new products
  - b) Designing products
  - c) Direct labor-hours
  - d) Processing purchase orders
  
4. X Company uses activity-based costing for Product B and Product D. The total estimated overhead cost for the parts administration pool was \$550,000 and the expected activity was 2000 part types. If Product D requires 1200 part types, the amount of overhead allocated to it would be:
  - a) \$275,000
  - b) \$300,000
  - c) \$330,000
  - d) \$345,000
  
5. Which is an appropriate activity measure for processing of production orders cost pool?
  - a) Machine setups
  - b) Orders processed
  - c) Machine-hours
  - d) Direct labor-hours

6. B Company uses activity-based costing and has the following activity cost pools and estimated overhead cost for each pool:

Machine related	\$350,000
Handling material	\$240,000
Processing purchase orders	\$720,000
General factory	\$500,000

The amount of total estimated overhead is:

- a) \$1,310,000
  - b) \$1,090,000
  - c) \$ 850,000
  - d) \$1,810,000
7. Which of the following costs would be included in an activity cost pool?
- a) Machine setups
  - b) Administrative salaries
  - c) Selling commissions
  - d) Advertising expense
8. One of T Company's cost pools is parts administration. The expected overhead cost for that cost pool was \$380,000 and the expected activity was 5,000 part types. The actual overhead cost for the cost pool was \$420,000 at an actual activity of 6,000 part types. The activity rate for that cost pool was:
- a) \$63 per part type
  - b) \$76 per part type
  - c) \$70 per part type
  - d) \$84 per part type
9. P Company produces three types of products- product A, product B and product C. Product A requires 200 machine setups and machine hours used on it were 1,000. Product B requires 400 machine setups and machine hours used on it were 500. Product C requires 620 machine setups and machine hours used on it were 1,500. The company has defined an activity cost pool machine setups for which the cost driver is number of machine setups. The total overhead cost assigned to that cost pool was \$183,000. The machine setups overhead assigned to each of the products was:
- a) \$61,000 for A; \$61,000 for B; \$61,000 for C
  - b) \$61,000 for A; \$30,500 for B; \$91,500 for C
  - c) \$30,000 for A; \$60,000 for B; \$93,000 for C
  - d) \$30,000 for A; \$63,000 for B; \$90,000 for C

10. L Company produces two products- calculators and games. A calculator requires 4 part types and a game requires 3 part types. The company planned to produce 4,000 calculators and 6,000 games. The total amount of estimated overhead for the parts administration cost pool was \$748,000. The amount of parts administration overhead allocated to calculators was:
- \$374,000
  - \$396,000
  - \$352,000
  - \$348,000

The next 2 questions refer to the following information.

Y Company estimated that it will incur a total overhead cost of \$600,000. It considers implementing activity-based costing. Three cost pools (and respective activity measures) have been identified: machine-related (machine-hours), production orders (number of orders), and product testing (number of tests).

The \$600,000 estimated total overhead was assigned to the pools as follows: \$200,000 to machine-related, \$100,000 to production orders, and \$300,000 to product testing. Y Company produces two products. The following information is available:

	<u>Product 1</u>	<u>Product 2</u>
Machine-hours	40,000	10,000
Orders	800	200
Tests	6,000	9,000
Direct labor hours	25,000	15,000

The company currently uses traditional costing and allocates overhead based on direct labor-hours.

11. How much overhead is assigned to Product 1 using traditional costing?
- \$375,000
  - \$300,000
  - \$325,000
  - \$225,000
12. How much overhead would be assigned to Product 1 if ABC is used?
- \$300,000
  - \$173,000
  - \$420,000
  - \$360,000

13. Which of the following is true for an activity rate in an ABC system:
- a) There is only one plant-wide rate
  - b) Each activity cost pool has its own activity rate
  - c) Activity rate and a cost pool are the same thing
  - d) Activity rates are not used in activity-based costing
14. Which of the following characteristics would be an indicator that a company would benefit from switching to activity-based costing?
- a) Only one homogenous product is produced on a continuous basis
  - b) The existing cost system is reliable and predictable
  - c) Overhead costs are high and increasing with no apparent reason
  - d) The costs of implementing ABC outweigh the benefits
15. Which of the following is a limitation of activity-based costing?
- a) Costs are accumulated by each major activity
  - b) A variety of activity measures are used
  - c) All costs in an activity cost pool pertain to a single activity
  - d) Activity-based costing relies on the assumption that the cost in each cost pool is strictly proportional to its cost measure

# Solutions to Practice Problems

## Practice Problem #1

a) Predetermined overhead rate:

$$\text{Predetermined overhead rate} = \frac{\text{Total Overhead}}{\text{Total DL Cost}} = \frac{\$100,000 + \$200,000}{\$50,000 + \$100,000} = \$2.00 \text{ per DL\$}$$

b)

<u>Activities</u>	<u>Overhead Cost</u>	<u>Total Expected Activity</u>	<u>Activity Rate</u>
Direct labor costs	\$0	\$50,000 + \$100,000	= \$0.00 per DL\$
Sewing machine hours	\$200,000	1,000 + 1,000 SMH	= \$100.00 per MH
Machine setups	\$100,000	400 + 100 setups	= \$200.00 per setup

	<u>Activity Rate</u>	<u>Nylon Activity</u>	<u>Amount</u>	<u>Leather Activity</u>	<u>Amount</u>
Job order costing					
Direct labor \$			\$50,000		\$100,000
Overhead rate			\$2.00		\$2.00
Overhead assigned			\$100,000		\$200,000

Activity based costing:

Direct labor costs	\$0.00	\$50,000	\$0	\$100,000	\$0
Sewing machine hours	\$100.00	1,000	\$100,000	1,000	\$100,000
Machine setup hours	\$200.00	100	\$20,000	400	\$80,000
			\$120,000		\$180,000

Shift in overhead allocated:

+\$20,000	-\$20,000
0	

**Practice Problem #2**

a)

<u>Cost Pools</u>	<u>Activity Rate</u>	<u>Spoked</u>		<u>Solid</u>	
		<u>Activity</u>	<u>Amount</u>	<u>Activity</u>	<u>Amount</u>
Machine set-up	\$180.00	200	\$36,000	800	\$144,000
Assembly / Polish	\$4.00	40,000	\$160,000	30,000	\$120,000
Inspection	\$20.00	100	\$2,000	1,100	\$22,000
Total Overhead Assigned to each Product			\$198,000		\$286,000
Total Units Produced			10,000		10,000
b) Overhead Cost per Unit			\$19.80		\$28.60

c)

<u>Cost Pools</u>	<u>Activity Rate</u>	<u>Spoked</u>		<u>Solid</u>	
		<u>Activity</u>	<u>Amount</u>	<u>Activity</u>	<u>Amount</u>
Machine set-up	\$180.00	60	\$10,800	160	\$28,800
Assembly / Polish	\$4.00	12,000	\$48,000	6,000	\$24,000
Inspection	\$20.00	30	\$600	220	\$4,400
Total Overhead Applied to WIP			\$59,400		\$57,200
Total Overhead Applied				\$116,600	

**Practice Problem #3**

	<u>Cost</u>	<u>Product X Activity</u>	<u>Total Activity</u>	<u>Overhead Assigned</u>
Activity 1	\$3,600	25,200	70,000	\$1,260
Activity 2	4,800	36,000	80,000	2,160
Activity 3	6,300	43,200	90,000	3,024
				\$6,444
		Divide by units of X		161,100
		Cost per unit		\$.04

	<u>Cost</u>	<u>Product Y Activity</u>	<u>Total Activity</u>	<u>Overhead Assigned</u>
Activity 1	\$3,600	46,800	70,000	\$2,340
Activity 2	4,800	44,000	80,000	2,640
Activity 3	6,300	46,800	90,000	3,276
				\$8,256
		Divide by units of X		275,200
		Cost per unit		\$.03

**Practice Problem #4**

<u>Overhead Item</u>	<u>Budgeted Cost</u>	<u>Budgeted Activity Level</u>	<u>Activity Rate</u>
Machine setup	\$20,000	200	\$100
Inspection	130,000	6,500	\$20
Material handling	80,000	8,000	\$10
Engineering	50,000	1,000	\$50

	<u>Job 101</u>	<u>Activity Rate</u>	<u>Overhead Cost</u>
Number of setups	1	\$100	\$100
Number of inspections	20	\$20	400
Number of material moves	30	\$10	300
Engineering hours	10	\$50	<u>500</u>
Total Overhead Cost			\$1,300

**Practice Problem #5**

a)

	<u>Overhead Cost</u>	<u>Activity</u>	<u>Overhead Rate</u>
	\$425,000+390,000+220,000+230,000 = \$1,265,000	70,000	\$18.07

b)

	<u>Expected Costs</u>	<u>Expected Activity</u>	<u>Department Rates</u>
Handling parts	\$425,000	25,000 parts	
Inspecting stock	<u>390,000</u>	940 batches	
Department total	\$815,000	25,000 parts	\$32.60/part
Processing purchase orders	\$220,000	440 orders	
Designing packaging	<u>230,000</u>	5 models	
Department total	\$450,000	5 models	\$90,000/model

c)

	<u>Expected Costs</u>	<u>Expected Activity</u>	<u>Activity Rates</u>
Handling parts	\$425,000	25,000 parts	\$17.00/part
Inspecting stock	390,000	940 batches	\$414.89/batch
Processing purchase orders	220,000	440 orders	\$500.00/order
Designing packaging	230,000	5 models	\$46,000.00/model

d)

	<u>Activity</u>	<u>Rate</u>	<u>Overhead \$</u>
Plantwide rate	17,000 dlh	\$18.07	\$307,190
Department rates:			
Warehouse	6,250 parts	\$32.60	\$203,750
Manufacturing Mgt.	1 model	\$90,000.00	<u>\$90,000</u>
			\$253,000
Activity rates:			
Handling parts	6,250 parts	\$17.00	\$106,250
Inspecting stock	235 batches	\$414.89	97,499
Processing purchase orders	88 orders	\$500.00	44,000
Designing packaging	1 model	\$46,000.00	<u>46,000</u>
			\$293,749

## Solutions to True / False Problems

1. False - ABC uses multiple activity rates, one for each cost pool
2. True
3. False - Overhead is shifted from high-volume to low-volume products
4. False - Unit activities relate to costs which can be traced to specific products
5. True
6. True
7. False - ABC improves control over overhead costs.
8. True
9. False – Overhead may be applied either in a single journal entry combining all pools or in a separate journal entry for each pool.
10. True
11. True
12. False – BAC is used because multiple cost pools and activity rates tend to assign overhead costs more accurately than a single plantwide rate.
13. True
14. False – A plantwide rate uses only one cost pool.
15. False – The plantwide rate is:  $(\$1,600,000 + \$400,000)/50,000$  direct labor hours = \$40 per direct labor hour

**Solutions to Multiple Choice Questions**

- 1. D
- 2. A
- 3. C
- 4. C
- 5. B
- 6. D
- 7. A
- 8. B
- 9. C
- 10. C
- 11. A
- 12. D
- 13. B
- 14. C
- 15. D