

SOLUTIONS TO EXERCISES SECTION 4

1. A number of costs that are commonly allocated are listed in the following table followed by two alternative cost allocation bases.

Cost Description	Allocation Base Alternatives	
Cafeteria costs	Direct labor costs	Number of employees
Computer system costs	Number of departments	Amount of computer time used
Indirect labor costs	Direct labor hours	Number of supervisors
Indirect materials	Direct labor hours	Direct material dollars
Factory rent	Number of departments	Square footage
Fringe benefits costs	Number of departments	Number of employees
Housekeeping costs	Square footage	Number of employees
Joint costs	Number of joint products	Sales value at split-off
Maintenance costs	Machine hours	Number of employees
Personnel department costs	Number of employees	Number of departments

Required:

For each cost listed, circle the cost **allocation base** that you believe would be *more appropriate* for allocating the cost.

Feedback:

Cost Description	Allocation Base Alternatives	
Cafeteria costs		Number of employees
Computer system costs		Amount of computer time used
Indirect labor costs	Direct labor hours	
Indirect materials		Direct material dollars
Factory rent		Square footage
Fringe benefits costs		Number of employees
Housekeeping costs	Square footage	
Joint costs		Sales value at split-off
Maintenance costs	Machine hours	
Personnel department costs	Number of employees	

2. Martin's is a store with **3 departments**: Appliances, Tools, and Home Improvements. The company expects to incur the following indirect costs related to its operations:

Store manager's salary

Store supplies

Electric bill

Clerical staff salaries

Payroll taxes

Office supplies

Water bill

Sewer bill

Medical insurance

Vacation pay

Required:

- 1) Organize the indirect costs into **3 cost pools**: *Store Administration*, *Utilities*, and *Fringe Benefit Costs*, assuming that each department is a cost object.
- 2) Identify an **appropriate cost driver** for each cost pool.

Feedback:

1) Cost Pools:

Store Administration: store manager's salary, store supplies, clerical staff salaries, office supplies

Utilities: Water bill, electric bill, sewer bill

Fringe Benefit Costs: Payroll taxes, medical insurance, vacation pay

2) Cost Drivers

Store Administration: dollar amount of sales or square feet occupied by each department

Utilities: square feet occupied by each department

Fringe Benefit Costs: number of employees

3. Jefferson Company expects to incur **\$ 620,000** in manufacturing **overhead costs** during 2024. Other budget information follows:

	Direct labor hours	Machine hours
Department A	18,000	7,500
Department B	6,000	9,000
Department C	22,000	11,500

Required:

- 1) Use **direct labor hours** as the cost driver to compute the allocation rate. Determine the amount of budgeted overhead cost for each department.
- 2) Use **machine hours** as the cost driver to compute the allocation. Determine the amount of budgeted overhead cost for each department.
- 3) Assume that Department A manufactured a product that required **180 direct labor hours** and **95 machine hours**. If overhead is allocated based on direct labor hours, how much overhead would be allocated to this product?
- 4) Assume that Department A manufactured a product that required 180 direct labor hours and 95 machine hours. If overhead is allocated based on machine hours, how much overhead would be allocated to this product?

Feedback:

- 1) Total Direct Labor Hours = 18,000 + 6,000 + 22,000 = **46,000**

Allocation rate = \$ 620,000/46,000 = **\$13.48** per direct labor hour

Amount of overhead allocated to **Department A** = 18,000 × \$13.48 = \$242,640

Amount of overhead allocated to **Department B** = 6,000 × \$13.48 = \$80,880

Amount of overhead allocated to **Department C** = 22,000 × \$13.48 = \$296,560

2) Total Machine Hours = 7,500 + 9,000 + 11,500 = **28,000**

Allocation rate = \$ 620,000/28,000 = **\$22.14** per machine hour

Amount of overhead allocated to **Department A** = 7,500 × \$22.14 = \$166,050

Amount of overhead allocated to **Department B** = 9,000 × \$22.14 = \$199,260

Amount of overhead allocated to **Department C** = 11,500 × \$22.14 = \$254,610

3) 180 direct labor hours × **\$13.48** = \$2,426.40

4) 95 machine hours × **\$22.14** = \$2,103.30

4. Madison Manufacturing anticipates incurring **\$720,000** in manufacturing overhead during the upcoming year. The company produces **2 products, X and Y**, and has compiled the following budget information:

	Product X	Product Y
<i>Number of units produced</i>	<i>12,000</i>	<i>6,000</i>
Direct labor hours	28,000	7,000
Machine hours	18,000	36,000

Required:

- 1) Use **direct labor hours** as the cost driver to compute the allocation rate. Determine the amount of budgeted overhead to be allocated to each unit of product X.
- 2) Use **machine hours** as the cost driver to compute the allocation rate. Determine the amount of budgeted overhead to be allocated to each unit of product X.
- 3) How should Madison determine whether to use machine hours or direct labor hours as the appropriate cost driver for allocating overhead?

Feedback:

- 1) Total Direct Labor Hours (DLH) = 28,000 + 7,000 = **35,000** hours

Allocation rate = \$720,000 ÷ 35,000 = **\$20.57** per DLH

Product X overhead allocation = 28,000 × \$20.57 = **\$575,960**

Per unit overhead for Product X = \$575,960 ÷ 12,000 = **\$47.99**

- 2) Total Machine Hours (MH) = 18,000 + 36,000 = **54,000** hours

Allocation rate = \$720,000 ÷ 54,000 = **\$13.33** per MH

Product X overhead allocation = $18,000 \times \$13.33 = \$239,940$

Per unit overhead for Product X = $\$239,940 \div 12,000 = \19.99

- 3) Madison should consider which of the two possible cost drivers, labor hours or machine hours, is more likely to have a cause-and-effect relationship with overhead costs.

5. The management accountant at Lawrence Manufacturing Co. has prepared the following **cost estimates** for producing **3,000 units** of a custom product:

Cost Component	Estimated Cost
Direct Materials	\$12,000
Direct Labor (1 hour per unit)	\$6,000
Unit-level Support Costs	\$9,000
Batch-level Support Costs	\$4,000
Product-level Support Costs	\$2,500
Facility-level Support Costs	\$6,500

The company has identified **direct labor hours** as the most suitable cost driver for allocating manufacturing overhead.

Required:

- 1) Calculate the **predetermined overhead rate**.
- 2) Compute the **estimated total cost per unit** of the product.
- 3) Explain why companies use a **predetermined overhead rate** instead of assigning actual overhead costs.

Feedback:

- 1) Predetermined overhead rate:

First, identify which costs are **overhead**:

Unit-level Support = \$9,000

Batch-level Support = \$4,000

Product-level Support = \$2,500

Facility-level Support = \$6,500

Total overhead = \$9,000 + \$4,000 + \$2,500 + \$6,500 = **\$22,000**;

Predetermined rate = \$22,000/3,000 = **\$7.33** per direct labor hour

2) Cost per unit:

Direct Materials: \$12,000 / 3,000 units = \$4.00

Direct Labor: \$6,000 / 3,000 units = \$2.00

Overhead: 1 DLH × \$7.33 = \$7.33

Total Cost per Unit = \$4.00 + \$2.00 + \$7.33 = **\$13.33**

3) Using a predetermined rate allows management to determine the cost of the product in a more timely manner. In addition, it smoothes out or annualizes overhead costs so that unit costs are more stable.

6. Blue Ridge Farms processes livestock to produce **3 joint meat products**: *ham*, *ribs*, and *tenderloin*. Each production batch incurs **\$120,000** in joint processing costs. From each batch, the following quantities are obtained:

- Ham: 12,000 pounds
- Ribs: 20,000 pounds
- Tenderloin: 8,000 pounds

Tenderloin is sold at \$4.00 per pound. Ham and ribs are sold at the split-off point for \$3.75 per pound and \$3.25 per pound, respectively.

Required:

- 1) Allocate Blue Ridge's joint costs using *pounds produced* as the **allocation base**.
- 2) Allocate Blue Ridge's joint costs using the relative *sales value* at **split-off method**.
- 3) Assume that Tenderloin is processed further after the split-off point at an additional cost of **\$5,000**, and joint costs are allocated based on pounds produced. What is the **total cost assigned** to Tenderloin?

Feedback:

- 1) Allocation of joint costs based on **pounds produced**:

Total output = 12,000 (ham) + 20,000 (ribs) + 8,000 (tenderloin) = **40,000 pounds**

Ham: $12,000/40,000 = 0.30$; $\rightarrow 30\%$ of \$120,000 = **\$36,000**

Ribs: $20,000/40,000 = 0.50$; $\rightarrow 50\%$ of \$120,000 = **\$60,000**

Tenderloin: $8,000/40,000 = 0.20$; $\rightarrow 20\%$ of \$120,000 = **\$24,000**

2) Allocation of joint costs using the relative **sales value method at split-off**:

Sales values at split-off:

Ham: $12,000 \times \$3.75 =$ **\$45,000**

Ribs: $20,000 \times \$3.25 =$ **\$65,000**

Tenderloin: $8,000 \times \$4.00 =$ **\$32,000**

Total sales value = \$45,000 + \$65,000 + \$32,000 = \$142,000

Ham: $\$45,000 / \$142,000 = 0.3169$; $\rightarrow 31.69\%$ of \$120,000 = **\$38,028**

Ribs: $\$65,000 / \$142,000 = 0.4577$; $\rightarrow 45.77\%$ of \$120,000 = **\$54,924**

Tenderloin: $\$32,000 / \$142,000 = 0.2254$; $\rightarrow 22.54\%$ of \$120,000 = **\$27,048**

3) Total Cost Assigned to Tenderloin with further processing:

Tenderloin Joint cost (from method 1): **\$24,000**

Additional processing cost: **\$5,000**

Total Cost of Tenderloin = \$24,000+\$5,000=\$29,000