

Exercises with solutions –
Chapters 1-4

Questions and Exercises (1/4)

- What are the main three major types of product costs in a manufacturing company?
- Define the following: direct materials; indirect materials; direct labor; indirect labor; manufacturing overhead.
- Explain the difference between a product cost and a period cost.
- What effect does an increase in the activity level have on: unit fixed cost? Unit variable cost? Total fixed cost? Total variable cost?

Questions and Exercises (2/4)

Java Express operates a number of espresso coffee stands in busy suburban malls. The fixed weekly expense of a coffee stand is \$1,500 and the variable cost per cup of coffee served is \$0.19.

Required:

Estimate the total costs and average cost per cup of coffee at the indicated levels of activity for a coffee stand. Round off the cost of a cup of coffee to the nearest cent.

	<u>Cups of Coffee Served in a</u> <u>Week</u>		
	<i>3,700</i>	<i>3,800</i>	<i>3,900</i>
Fixed cost	\$1,500	\$1,500	\$1,500
Variable cost	<u>703</u>	<u>722</u>	<u>741</u>
Total cost	<u>\$2,203</u>	<u>\$2,222</u>	<u>\$2,241</u>
Average cost per cup of coffee served	<u>\$ 0.60</u>	<u>\$ 0.58</u>	<u>\$ 0.57</u>

Questions and Exercises (3/4)

Hough Company manufactures and sells a single product. A partially completed schedule of the company's total and per unit costs over a relevant range of 80,000 to 120,000 units produced and sold each year is given below:

	Units produced and sold		
	<u>80,000</u>	<u>100,000</u>	<u>120,000</u>
Total costs:			
Variable costs	\$240,000		
Fixed costs	<u>320,000</u>		
Total costs	<u>\$560,000</u>		
Cost per unit:			
Variable cost			
Fixed cost			
Total cost per unit			

Required:

1. Complete the schedule of the company's total and unit costs.

Requirement 1:

Complete the schedule of total costs and unit costs.

	Units produced and sold		
	<u>80,000</u>	<u>100,000</u>	<u>120,000</u>
Total costs:			
Variable costs	\$240,000	\$300,000	\$360,000
Fixed costs	<u>320,000</u>	<u>320,000</u>	<u>320,000</u>
Total costs	<u>\$560,000</u>	<u>\$620,000</u>	<u>\$680,000</u>
Cost per unit:			
Variable cost	\$3.00	\$3.00	\$3.00
Fixed cost	<u>4.00</u>	<u>3.20</u>	<u>2.67</u>
Total cost per unit	<u>\$7.00</u>	<u>\$6.20</u>	<u>\$5.67</u>

Variable cost per unit = Total variable cost/Number of units

Variable cost per unit = \$240,000/80,000 units

Variable cost per unit = \$3.00/unit

Harris Company manufactures and sells a single product. A partially completed schedule of the Company's total costs and costs per unit over the relevant range of 30,000 to 50,000 units is given below:

	Units Produced and Sold		
	30,000	40,000	50,000
Total costs:			
Variable cost	\$180,000	?	?
Fixed cost	<u>300,000</u>	<u>?</u>	<u>?</u>
Total cost	<u><u>\$480,000</u></u>	<u><u>?</u></u>	<u><u>?</u></u>
Costs per unit:			
Variable cost	?	?	?
Fixed cost	<u>?</u>	<u>?</u>	<u>?</u>
Total cost per unit	<u><u>?</u></u>	<u><u>?</u></u>	<u><u>?</u></u>

Required:

- Complete the schedule of the company's total costs and costs per unit;
- Assume that the company produces and sells 45,000 units during the year at a selling price of \$16 per unit. Prepare a contribution format income statement for the year.

Solution 1

1. The company's variable cost per unit is:

$$\frac{\$180,000}{30,000 \text{ units}} = \$6 \text{ per unit.}$$

The completed schedule is as follows:

	Units produced and sold		
	30,000	40,000	50,000
Total costs:			
Variable cost	\$180,000	\$240,000	\$300,000
Fixed cost	<u>300,000</u>	<u>300,000</u>	<u>300,000</u>
Total cost	<u>\$480,000</u>	<u>\$540,000</u>	<u>\$600,000</u>
Costs per unit:			
Variable cost	\$ 6.00	\$ 6.00	\$ 6.00
Fixed cost	<u>10.00</u>	<u>7.50</u>	<u>6.00</u>
Total cost per unit	<u>\$16.00</u>	<u>\$13.50</u>	<u>\$12.00</u>

Solution 2

2. The company's contribution format income statement is:

Sales (45,000 units × \$16 per unit)	\$720,000
Variable expenses (45,000 units × \$6 per unit)	<u>270,000</u>
Contribution margin	450,000
Fixed expense	<u>300,000</u>
Net operating income	<u>\$150,000</u>

Otsego, Inc., is a merchandiser that provided the following information:

Number of units sold	12,000
Selling price per unit	\$25
Variable selling expense per unit	\$2.50
Variable administrative expense per unit	\$2
Total fixed selling expense	\$16,000
Total fixed administrative expense	\$17,000
Merchandise inventory, beginning balance	\$25,000
Merchandise inventory, ending balance	\$18,000
Merchandise purchases	\$101,000

Required:

1. Prepare a traditional income statement.
2. Prepare a contribution format income statement.

Requirement 1:

Prepare a traditional income statement.

Otsego, Inc.		
Traditional Income Statement		
Sales (\$25 per unit X 12,000 units)		\$ 300,000
Cost of goods sold (\$25,000 + 101,000 - 18,000)		<u>108,000</u>
Gross margin		192,000
Selling and administrative expenses:		
Selling expenses ((\$2.50 per unit X 12,000 units) + \$16,000)	<u>46,000</u>	
Administrative expenses ((\$2 per unit X 12,000 units) + \$17,000)	<u>41,000</u>	<u>87,000</u>
Net operating income		<u>\$ 105,000</u>

Requirement 2:

Prepare a contribution format income statement.

Otsego, Inc.		
Contribution Format Income Statement		
Sales (\$25 per unit X 12,000 units)		\$ 300,000
Variable expenses:		
Cost of goods sold (\$25,000 + 101,000 - 18,000)	\$ 108,000	
Selling expenses (\$2.50 per unit X 12,000 units)	30,000	
Administrative expenses (\$2 per unit X 12,000 units)	<u>24,000</u>	<u>162,000</u>
Contribution margin		138,000
Fixed expenses:		
Selling expenses	16,000	
Administrative expenses	<u>17,000</u>	<u>33,000</u>
Net operating income		<u>\$ 105,000</u>

The Alpine House Inc. is a large retailer of snow skis. The company assembled the information shown below for the quarter ended March 31:

	Amount
Sales	\$150,000
Selling price per pair of skis	\$750
Variable selling expense per pair of skis.....	\$50
Variable administrative expense per pair of skis	\$10
Total fixed selling expense	\$20,000
Total fixed administrative expense	\$20,000
Beginning merchandise inventory	\$30,000
Ending merchandise inventory	\$40,000
Merchandise purchases.....	\$100,000

Required:

- Prepare a traditional income statement for the quarter ended March 31;
- Prepare a contribution format income statement for the quarter ended March 31;
- What was the contribution margin per unit?

Solution 1

1. Traditional income statement

The Alpine House, Inc. Traditional Income Statement		
Sales		\$150,000
Cost of goods sold (\$30,000 + \$100,000 – \$40,000)		<u>90,000</u>
Gross margin		60,000
Selling and administrative expenses:		
Selling expenses ((\$50 per unit × 200 pairs of skis*) + \$20,000)	\$30,000	
Administrative expenses ((\$10 per unit × 200 pairs of skis) + \$20,000)	<u>22,000</u>	<u>52,000</u>
Net operating income		<u>\$ 8,000</u>

*\$150,000 sales ÷ \$750 per pair of skis = 200 pairs of skis.

Solution 2

2. Contribution format income statement

The Alpine House, Inc. Contribution Format Income Statement		
Sales		\$150,000
Variable expenses:		
Cost of goods sold (\$30,000 + \$100,000 – \$40,000)	\$90,000	
Selling expenses (\$50 per unit × 200 pairs of skis)	10,000	
Administrative expenses (\$10 per unit × 200 pairs of skis)	<u>2,000</u>	<u>102,000</u>
Contribution margin		48,000
Fixed expenses:		
Selling expenses	20,000	
Administrative expenses	<u>20,000</u>	<u>40,000</u>
Net operating income		<u>\$ 8,000</u>

Solution 3

3. Since 200 pairs of skis were sold and the contribution margin totaled \$48,000 for the quarter, the **contribution margin per unit was \$240** ($\$48,000 \div 200 \text{ pair of skis} = \$240 \text{ per pair of skis}$).