Exercise 6-10 (30 minutes)

1. Sales = Variable expenses + Fixed expenses + Profits
    $30Q = $12Q + $216,000 + $0
    $18Q = $216,000
       Q = $216,000 ÷ $18 per unit
       Q = 12,000 units, or at $30 per unit, $360,000

    Alternative solution:

    $$\text{Break-even point in unit sales} = \frac{\text{Fixed expenses}}{\text{Unit contribution margin}}$$

    $$= \frac{\$216,000}{\$18 \text{ per unit}} = 12,000 \text{ units}$$

    or at $30 per unit, $360,000

2. The contribution margin is $216,000 since the contribution margin is equal to the fixed expenses at the break-even point.

3. $$\text{Units sold to attain target profit} = \frac{\text{Fixed expenses + Target profit}}{\text{Unit contribution margin}}$$

    $$= \frac{\$216,000 + \$90,000}{\$18 \text{ per unit}} = 17,000 \text{ units}$$

	Total	Unit
Sales (17,000 units × $30 per unit).........	$510,000	$30
Variable expenses (17,000 units × $12 per unit)...............	204,000	12
Contribution margin.............................	306,000	$18
Fixed expenses.....................................	216,000	
Net operating income...........................	$ 90,000	

Exercise 6-10 (continued)

4. Margin of safety in dollar terms:

$$\text{Margin of safety in dollars} = \text{Total sales} - \text{Break-even sales}$$

$$= \$450,000 - \$360,000 = \$90,000$$

Margin of safety in percentage terms:

$$\text{Margin of safety percentage} = \frac{\text{Margin of safety in dollars}}{\text{Total sales}}$$

$$= \frac{\$90,000}{\$450,000} = 20\%$$

5. The CM ratio is 60%.

Expected total contribution margin: ($500,000 × 60%) $300,000
Present total contribution margin: ($450,000 × 60%) 270,000
Increased contribution margin....................................... $ 30,000

Alternative solution:
$50,000 incremental sales × 60% CM ratio = $30,000.

Since in this case the company's fixed expenses will not change, quarterly net operating income will also increase by $30,000.