Demonstration Problem for Chapter 3

Demonstration Problem 3-1 Cost-Volume-Profit Analysis

Jeff Jamail is evaluating a business opportunity to sell cookware at trade shows. Mr. Jamail can buy the cookware at a wholesale cost of $210 per set. He plans to sell the cookware for $350 per set. He estimates fixed costs such as plane fare, booth rental cost, and lodging to be $5,600 per trade show.

Required

a. Determine the number of cookware sets Mr. Jamail must sell at a trade show to break even (zero profit or loss). Use the following structure to answer this question:

(1) Contribution Margin Per Unit Approach:

a. Determine the amount of the contribution margin per unit.
b. Explain that when the total contribution margin is sufficient to pay for the fixed cost, Mr. Jamail will break even. Show the computation of break-even in units.
c. Show how to compute the break-even point in number of dollars using the break-even point in units and the selling price.
d. Confirm the results by preparing an income statement.

(2) Contribution Margin Ratio Approach.

a. Calculate the contribution margin ratio.
b. Use the ratio to calculate the break-even point in sales dollars, then use the results and the selling price to calculate the break-even point in units.

(3) Equation Approach.

a. Calculate the break-even point in units.
b. Calculate the break-even point in sales dollars.

b. Assume Mr. Jamail desires to earn a profit of $4,900 per show.

(1) Determine the sales volume in units (sets of cookware) necessary to earn the desired profit.
(2) Determine the sales volume in dollars necessary to earn the desired profit.
(3) Using the contribution margin format, prepare an income statement to confirm your answers to parts 1 and 2.

c. Draw a CVP graph for Mr. Jamail's operation at a trade show.

d. Determine the margin of safety between the sales volume at the break-even point and the sales volume required to earn the desired profit. Determine the margin of safety both in sales dollars and as a percentage.

e. After researching the market, Mr. Jamail concludes that the $350 per set selling price is too high. Customers will likely pay only $310 per set. Mr. Jamail believes he can obtain a cost reduction from his supplier of $20 per set (variable cost drops from $210 per set to $190 per set) and still provide the level of quality required to achieve a sales volume of 75 sets. Under these circumstances, what amount of fixed costs can Mr. Jamail incur and still obtain the target profit of $4,900? Support your answer with appropriate computations.

Demonstration Problem 3-1 Solution
a. Break-even point

(1) Contribution Margin Per Unit Approach

(a) Determine the contribution margin per unit.

Per Unit Contribution Margin	
Sales Price	$350
Variable Cost	210
Contribution Margin	$140

(b) When the total contribution margin is sufficient to pay for the fixed costs, Mr. Jamail will break even. The number of units required to break even can be computed as follows:

Formula for Computation of Break-Even Point in Units				
Fixed Cost	=	$5,600	=	40 sets
Contribution Margin Per Unit		$140		

(c) The break-even point in number of dollars can be computed as follows:

Break-Even Point in Sales Dollars	
Sales Price Per Unit	$ 350
Times Number of Units	40
Sales Volume in Dollars	$14,000

(d) Confirm the results by preparing an income statement.

Income Statement	
Sales (40 x $350)	$14,000
Variable Cost (40 x $210)	(8,400)
Contribution Margin	5,600
Fixed Cost	(5,600)
Net Income	$ 0

(2) Contribution Margin Ratio Approach

(a) The contribution margin ratio is computed as follows.

Contribution Margin Ratio

$$\text{Contribution Margin Ratio} = \frac{\text{Contribution Margin Per Unit}}{\text{Sales Price Per Unit}} = \frac{\$140}{\$350} = .4$$

(b) Using the contribution margin ratio, calculate the break-even point in sales dollars and units.

Break-Even Point in Sales Dollars

$$\text{Break-Even in Sales Dollars} = \frac{\text{Fixed Cost}}{\text{Contribution Margin Ratio}} = \frac{\$5,600}{.4} = \$14,000$$

Break-Even Point in Number of Units

$$\text{Break-Even in Units} = \frac{\text{Total Sales}}{\text{Sales Price Per Unit}} = \frac{\$14,000}{\$350} = 40 \text{ Units}$$

(3) Equation Approach

(a) Use the break-even equation and solve for number of units:

Break-Even Equation
Sales Price x Units = Variable Cost x Units + Fixed Cost
$350 x Units = $210 x Units + $5,600
$140 x Units = $5,600
Units = 40 sets

(b) Compute the break-even point in dollars as in part a3 above:

Break-Even Point in Sales Dollars	
Sales Price	$ 350
Times Number of Units	40
Sales Volume in Dollars	$14,000

b. Target profit

(1) Sales Volume Required to Earn a Desired Profit

Formula for Computation of Sales Volume Necessary to Earn a Target Profit of $4,900

$$\frac{\text{Fixed Cost + Target Profit}}{\text{Contribution Margin Per Unit}} = \frac{\$5{,}600 + \$4{,}900}{\$140} = 75 \text{ sets}$$

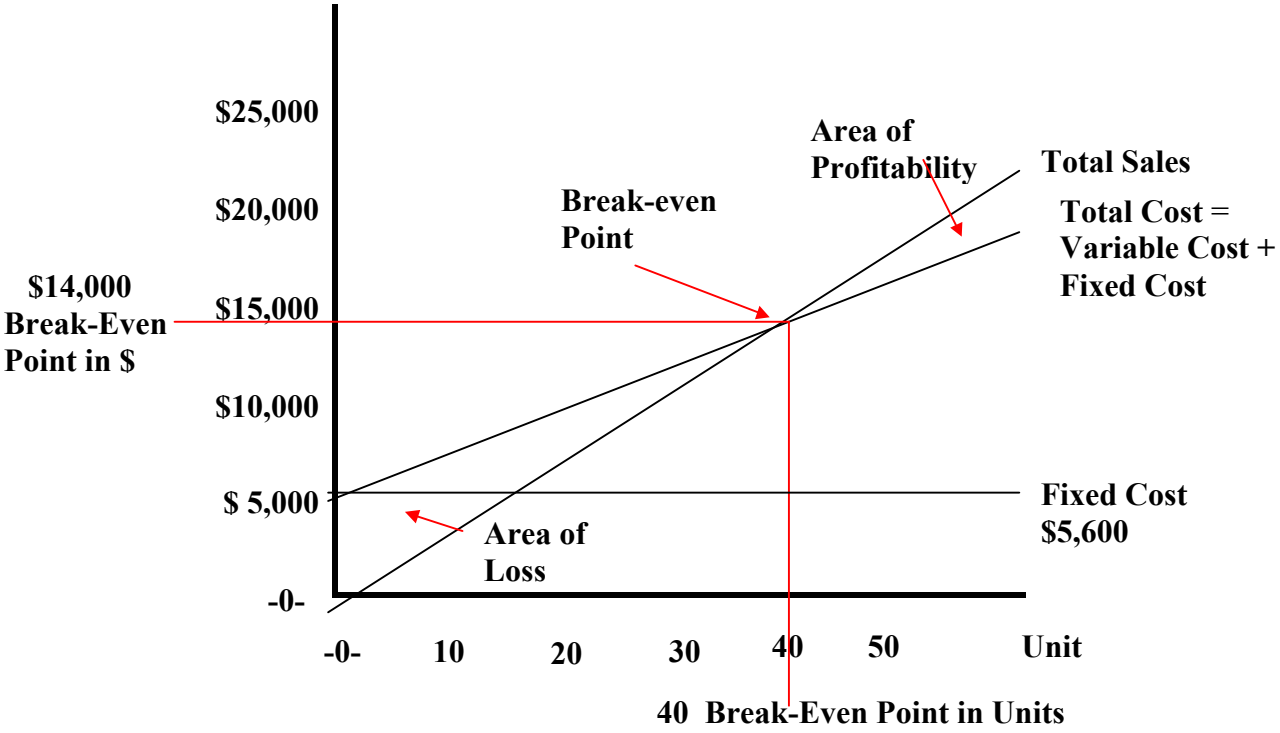
(2) Determine the sales volume in dollars required to earn the desired profit.

Required Sales in Number of Dollars	
Sales Price	$ 350
Times Number of Units	75
Sales Volume in No. of Dollars	$26,250

(3) Confirm the answers by preparing an income statement.

Income Statement	
Sales	$26,250
Variable Cost (75 x $210)	(15,750)
Contribution Margin	10,500
Fixed Cost	(5,600)
Net Income	$ 4,900

c. CVP Graph



d. Margin of Safety

(1) Margin of Safety Expressed in Sales Dollars:

Margin of Safety	
Budgeted Sales to Earn Target Profit (75 sets x $350)	$26,250
Break-even Sales (40 sets x $350)	14,000
Margin of Safety	$12,250

(2) Margin of Safety Expressed as a Percentage:

Margin of Safety Percentage

$$\frac{\text{Margin of Safety in \$}}{\text{Budgeted Sales}} = \frac{\$12,250}{\$26,250} = 46.7\%$$

e. Target Pricing

Use the Break-Even Equation and Solve for Fixed Cost:

Equation Approach to Compute Fixed Cost
Sales Price x Units = Fixed Cost + (Variable Cost Per Unit x Units) + Profit
Sales Price x Units – [(Variable Cost Per Unit x Units)] – Profit = Fixed Cost
($310 x 75 Units) – [($190 x 75 Units)] – $4,900 = Fixed Cost
$23,250 – $14,250 – $4,900 = Fixed Cost
$4,100 = Fixed Cost

Confirm the computations by preparing an income statement.

Income Statement	
Sales (75 x $310)	$23,250
Variable Cost (75 x $190)	(14,250)
Contribution Margin	9,000
Fixed Cost	(4,100)
Net Income	$ 4,900