

Summary: Cheat Sheet

IDENTIFYING COST BEHAVIOR

- Fixed costs:** Costs that do not change in total as volume changes.
- Variable costs:** Costs that change proportionately with volume.
- Mixed costs:** Costs that include both fixed and variable components.
- Step-wise costs:** Costs with step pattern, but fixed in each relevant range.
- Relevant range:** Normal operating range; neither near zero nor maximum capacity.

MEASURING COST BEHAVIOR

- Cost equation:** Fixed costs + (Variable cost per unit × Units produced)
- High-Low:** Estimates cost equation using highest and lowest volumes.

$$\text{Variable cost per unit} = \frac{\text{Cost at highest volume} - \text{Cost at lowest volume}}{\text{Highest volume} - \text{Lowest volume}}$$

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 Total costs = Fixed cost + (Variable cost per unit × # of units)
- Regression:** Statistical method using all data. Likely more accurate.

CONTRIBUTION MARGIN AND BREAK-EVEN

$$\text{Contribution margin per unit} = \text{Selling price per unit} - \text{Variable costs per unit}$$

$$\text{Contribution margin ratio} = \frac{\text{Contribution margin per unit}}{\text{Selling price per unit}}$$

Contribution Margin Income Statement Format	Contribution Margin Income Statement (at Break-Even) For Month Ended January 31	
Sales	Sales (800 units at \$100 each)	\$80,000
- Variable costs	Variable costs (800 units at \$70 each)	56,000
Contribution margin	Contribution margin (800 units at \$30 each) ...	24,000
- Fixed costs	Fixed costs	24,000
Income	Income	\$ 0

Break-even point in units and in dollars

$$\text{Break-even point in units} = \frac{\text{Fixed costs}}{\text{Contribution margin per unit}}$$

$$\text{Break-even point in dollars} = \frac{\text{Fixed costs}}{\text{Contribution margin ratio}}$$

APPLYING COST-VOLUME-PROFIT ANALYSIS

Margin of safety: Amount that sales can drop before company incurs a loss.

$$\text{Margin of safety (in percent)} = \frac{\text{Expected sales} - \text{Break-even sales}}{\text{Expected sales}}$$

Dollar sales for a target income

$$\text{Dollar sales at target income} = \frac{\text{Fixed costs} + \text{Target income}}{\text{Contribution margin ratio}}$$

Unit sales for a target income

$$\text{Unit sales at target income} = \frac{\text{Fixed costs} + \text{Target income}}{\text{Contribution margin per unit}}$$

Business strategy and break-even

$$\text{Revised break-even point in dollars} = \frac{\text{Revised fixed costs}}{\text{Revised contribution margin ratio}}$$

SALES MIX AND BREAK-EVEN

Sales mix: Proportion of sales volumes for various products or services.

Weighted-average contribution margin:

$$\begin{aligned} & \text{Contribution margin per unit product 1} \times \% \text{ sales product 1} \\ & + \text{Contribution margin per unit product 2} \times \% \text{ sales product 2} \\ & = \text{Weighted-average contribution margin per unit} \end{aligned}$$

$$\text{Break-even sales in units} = \frac{\text{Fixed costs}}{\text{Weighted-average contribution margin per unit}}$$

$$\text{Units of each product to sell at break-even} = \begin{cases} \text{Break-even units} \times \% \text{ sales product 1} \\ \text{Break-even units} \times \% \text{ sales product 2} \end{cases}$$

Degree of operating leverage (DOL)

$$\text{DOL} = \text{Contribution margin} / \text{Income}$$

Using DOL to predict Income from Sales

$$\text{Change in income (\%)} = \text{DOL} \times \text{Change in sales (\%)}$$