

What is Cost-Volume-Profit Analysis?

Worksheet

CVP uses the break-even formula ($BE = FC / CM$ per unit) to determine the volume needed to cover fixed costs. It helps managers set prices, control costs, and plan profitability.

$$Q_{\text{BE}} = \frac{FC}{P - VC}$$

Questions

- Fixed costs \$60,000, price \$40, variable cost \$15 per unit. Break-even quantity?
 - 1,500 units
 - 2,400 units
 - 4,000 units
 - 6,000 units
- What is contribution margin?
 - Fixed costs per unit
 - Selling price minus variable cost per unit
 - Total profit divided by volume
 - Fixed costs times quantity
- If a company sells above break-even, it:
 - Breaks even
 - Earns profit
 - Has zero margin
 - Loses money
- Which reduces the break-even point?
 - Higher fixed costs
 - Lower selling price
 - Higher variable costs
 - Higher contribution margin
- A bakery has fixed costs of \$10,000/month. Each loaf sells for \$5 with a variable cost of \$2. How many loaves must it sell to break even?
- A software company has annual fixed costs of \$500,000. Each subscription is priced at \$100/year with variable costs of \$20/year (support, hosting). Break-even subscribers?
- A manufacturer has $FC = \$150,000$, $price = \$80/unit$, $VC = \$50/unit$. What sales revenue is needed to earn \$30,000 profit?
- Define: What is break-even point?
- Define: What is contribution margin?
- Define: How do fixed and variable costs differ?

Answer Key

1. B) 2,400 units - $BE = \$60,000 / (\$40 - \$15) = \$60,000 / \$25 = 2,400$ units.
2. B) Selling price minus variable cost per unit - Contribution margin = P - VC; it's the amount each sale contributes to fixed costs and profit.
3. B) Earns profit - Above break-even, each additional unit generates profit equal to the contribution margin.
4. D) Higher contribution margin - Higher contribution margin (higher price or lower VC) lowers the units needed to break even.
5. $BE = FC / (P - VC)$ $BE = \$10,000 / (\$5 - \$2)$ $BE = \$10,000 / \3 $BE = 3,333$ loaves (rounded) The bakery breaks even at 3,333 loaves per month
6. $BE = \$500,000 / (\$100 - \$20)$ $BE = \$500,000 / \80 $BE = 6,250$ subscribers The company needs 6,250 subscribers to cover fixed costs
7. Target Profit = (FC + Desired Profit) / Contribution Margin
Contribution Margin per unit = $\$80 - \$50 = \$30$
Quantity needed = $(\$150,000 + \$30,000) / \$30 = 6,000$ units
Revenue = $6,000 \times \$80 = \$480,000$
8. The quantity sold where revenue equals total costs; profit is zero.
9. Selling price minus variable cost per unit; it covers fixed costs and profit.
10. Fixed costs stay constant (rent, salaries); variable costs change with volume (materials, labor).

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