Cost-Volume-Profit Relationships

Contribution margin approach
Less: variable costs = contribution margin
Less: fixed costs = net operating income

\[
\text{Contribution Margin Ratio} = \frac{CM}{\text{Sales}} = \frac{\text{TotalCM}}{\text{TotalSales}} = \frac{\text{UnitCM}}{\text{UnitSellingprice}}
\]

Break-even equation method
Sales = variable costs plus fixed costs plus profits
Profits = zero for break-even profits = desired profit to determine units sales for that number

Break even contribution margin method
\[
\text{BE in Units Sold} = \frac{\text{FixedCosts}}{\text{UnitCM}}
\]
\[
\text{BE in Total Sales $} = \frac{\text{FixedCosts}}{\text{CMRatio}}
\]

Margin of safety: the excess of budgeted sales dollars over break even volume of sales dollars
Margin of safety = total budgeted or actual sales break even sales

\[
\text{Margin of Safety Percentage} = \frac{\text{Margin of Safety in Dollars}}{\text{Total Budgeted Sales}}
\]
\[
\text{Degree of Operating Leverage} = \frac{CM}{\text{Net Operating Income}}
\]