1. Calculate a given percentage of a quantity

◆ Method:

To find a percentage of a quantity:

$$\text{Percentage of quantity} = \frac{\text{Percentage}}{100} \times \text{Quantity}$$

🧠 Example:

Find 25% of 160.

$$\frac{25}{100} \times 160 = 0.25 \times 160 = 40$$

2. Express one quantity as a percentage of another

◆ Method:

$$\text{Percentage} = \left(\frac{\text{Part}}{\text{Whole}}\right) \times 100$$

🧠 Example:

Express 30 as a percentage of 200.

$$\frac{30}{200} \times 100 = 0.15 \times 100 = 15\%$$

3. Calculate percentage increase or decrease

◆ Method:

$$\text{Percentage change} = \left(\frac{\text{Change}}{\text{Original value}}\right) \times 100$$

- If the value **increases**, it's a **percentage increase**.
- If the value **decreases**, it's a **percentage decrease**.

🧠 Example 1 (Increase):

A price rises from $50 to $65. Find the percentage increase.

$$\text{Change} = 65 - 50 = 15$$
$$\text{Percentage increase} = \left(\frac{15}{50}\right) \times 100 = 30\%$$

🧠 Example 2 (Decrease):

A value falls from 80 to 60. Find the percentage decrease.

$$\text{Change} = 80 - 60 = 20$$
$$\text{Percentage decrease} = \left(\frac{20}{80}\right) \times 100 = 25\%$$

4. Calculate with simple and compound interest

◆ Simple Interest Formula:

$$\text{Simple Interest (SI)} = \frac{P \times R \times T}{100}$$

Where:

- P = Principal (initial amount)
- R = Rate (%)
- T = Time (in years)

🧠 Example (Simple Interest):

Find the interest on $1000 at 5% per annum for 3 years.

$$SI = \frac{1000 \times 5 \times 3}{100} = \$150$$

◆ Compound Interest Formula:

$$A = P \left(1 + \frac{R}{100}\right)^T$$

Where:

- A = Amount after time
- P = Principal
- R = Rate (%)
- T = Time (in years)

To find **compound interest**:

$$CI = A - P$$

🧠 Example (Compound Interest):

Find the compound interest on $2000 at 5% per annum for 2 years.

$$A = 2000 \left(1 + \frac{5}{100}\right)^2 = 2000 \times (1.05)^2 = 2000 \times 1.1025 = \$2205$$
$$CI = 2205 - 2000 = \$205$$

5. Calculate using reverse percentages

◆ Method:

To find the **original amount** before a percentage increase/decrease:

- If a price is increased by x%, divide by $\left(1 + \frac{x}{100}\right)$

- If a price is decreased by x%, divide by $\left(1 - \frac{x}{100}\right)$

🔴 Example 1 (Increase):

An item costs $120 after a 20% increase. Find the original price.

$$\text{Original price} = \frac{120}{1.20} = \$100$$

🔴 Example 2 (Decrease):

An item costs $90 after a 10% discount. Find the original price.

$$\text{Original price} = \frac{90}{0.90} = \$100$$