

Percentage - Important Formulas

1. Concept of Percentage:

By a certain **percent**, we mean that many hundredths.

Thus, x percent means x hundredths, written as $x\%$.

To express $x\%$ as a fraction: We have, $x\% = \frac{x}{100}$.

$$\text{Thus, } 20\% = \frac{20}{100} = \frac{1}{5}.$$

To express $\frac{a}{b}$ as a percent: We have, $\frac{a}{b} = \left(\frac{a}{b} \times 100\right)\%$.

$$\text{Thus, } \frac{1}{4} = \left(\frac{1}{4} \times 100\right)\% = 25\%.$$

2. Percentage Increase/Decrease:

If the price of a commodity increases by $R\%$, then the reduction in consumption so as not to increase the expenditure is:

$$\left[\frac{R}{(100 + R)} \times 100\right]\%$$

If the price of a commodity decreases by $R\%$, then the increase in consumption so as not to decrease the expenditure is:

$$\left[\frac{R}{(100 - R)} \times 100\right]\%$$

3. Results on Population:

Let the population of a town be P now and suppose it increases at the rate of $R\%$ per annum, then:

$$1. \text{ Population after } n \text{ years} = P \left(1 + \frac{R}{100}\right)^n$$

$$2. \text{ Population } n \text{ years ago} = \frac{P}{\left(1 + \frac{R}{100}\right)^n}$$

4. Results on Depreciation:

Let the present value of a machine be P . Suppose it depreciates at the rate of $R\%$ per annum. Then:

$$1. \text{ Value of the machine after } n \text{ years} = P \left(1 - \frac{R}{100}\right)^n$$

$$2. \text{ Value of the machine } n \text{ years ago} = \frac{P}{\left(1 - \frac{R}{100}\right)^n}$$

$$\left(1 - \frac{R}{100}\right)^n$$

3. If A is R% more than B, then B is less than A by $\left[\frac{R}{(100 + R)} \times 100\right]\%$.

4. If A is R% less than B, then B is more than A by $\left[\frac{R}{(100 - R)} \times 100\right]\%$.