

Simple & Compound Interest- Formulae

Principal:

The amount which is lent / deposited is called Principal.

Interest:

The money that the principal generates is called Interest. This is the money generated as a result of borrowing/lending.

Simple interest:

In Simple Interest the principal and the Interest (occurred every period) remains constant.

- The sum of principal and the interest is called Amount.
Amount (A) = Principal (P) + Interest (I)
- The Simple Interest (I) occurred over a time period (T) for R% (rate of Interest per annum),

$$I = \frac{PTR}{100}$$

Compound interest:

In Compound Interest the Interest earned over the period is added over to the existing principal after every compounding period. So the principal and the Interest over a period changes after every compounding period. (Simply, there will be interest on interest).

- The amount to be paid, if money is borrowed at Compound Interest for N number of years,

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

- The Interest occurred, $I = A - P$

$$I = P \left(1 + \frac{R}{100} \right)^N - P$$

Note:

If compounding period is not annual, rate of interest is divided in accordance with the compounding period. For example,

- If the interest is compounded half yearly, then Amount,

$$A = P \left(1 + \frac{R/2}{100} \right)^{2N}$$

- If the interest is compounded quarterly, then Amount,

$$A = P \left(1 + \frac{R/4}{100} \right)^{4N}$$

- If the interest is compounded monthly, then Amount

$$A = P \left(1 + \frac{R/12}{100} \right)^{12N}$$

- If the interest is compounded daily, then Amount

$$A = P \left(1 + \frac{R/365}{100} \right)^{365N}$$

Some important points:

- If interest Rate is R1% for first year, R2% for second year and R3% for 3rd year, then the Amount,

$$A = P \left(1 + \frac{R_1}{100} \right) \left(1 + \frac{R_2}{100} \right) \left(1 + \frac{R_3}{100} \right)$$

- If a difference between C.I and S.I for certain sum at same rate of interest is given, then

$$\text{Principal} = \text{Difference} \left(\frac{100}{R} \right)^2$$

- If R is the rate per annum, then present worth of Rs. K due to N years hence is given by

$$\text{Present worth} = \frac{K}{\left(1 + \frac{R}{100}\right)^N}$$

- If principal amount is P and rate of interest is R, then difference between compound interest and simple interest for 2 years,

$$\text{Difference} = P \left(\frac{R}{100}\right)^2$$

- If a certain sum becomes "x" times in n years, then the rate of compound interest will be

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

- If a sum of money P amounts to A_1 after T years at CI and the same sum of money amounts to A_2 after (T + 1) years at CI, then

$$R = \frac{A_2 - A_1}{A_1} \times 100$$



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