

Concept and Short Trick on C.I and S.I

Simple Interest (SI) :

Principal: - The money borrowed or lent out for certain period is called the principal or the Sum.

Interest: - Extra money paid for using other money is called interest.

If the interest on a sum borrowed for certain period is reckoned uniformly, then it is called **simple interest**.



Let

Principal = P, Rate = r % per annum (p.a.), and Time = t years then

$$\text{Simple Interest (SI)} = \frac{P \times r \times t}{100}$$

Using this formula we can also find out

$$P = \frac{(100 \times S.I.)}{(r \times t)}$$

$$R = \frac{(100 \times S.I.)}{(P \times t)}$$

$$T = \frac{100 \times S.I.)}{(P \times r)}$$

Compound Interest:

When compound interest is applied, interest is paid on both the original principal and on earned interest.

So for one year Simple interest and Compound interest both are equal.

Simple interest and compound interest

Suppose if you make a deposit into a bank account that pays compounded interest, you will receive interest payments on the original amount that you deposited, as well as additional interest payments. This allows your investment to grow even more than if you were paid only simple interest. So Amount at the end of 1st year (or Period) will become the principal for the 2nd year (or Period) and Amount at the end of 2nd year (or Period) becomes the Principal of 3rd year.

Amount = Principal + Interest

A= Amount,

P= Principal,

r= Rate %,

n= no. of years.

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

$$\text{So Compound Interest} = \left[P \left(1 + \frac{r}{100}\right)^n - P \right]$$

$$= P \left[\left(1 + \frac{r}{100}\right)^n - 1 \right]$$

Condition:-

1. When interest is compounded annually,

$$\text{Amount} = P \left(1 + \frac{r}{100}\right)^n$$

2. When interest is compounded half yearly,

$$\text{Amount} = P \left(1 + \frac{r}{200}\right)^{2n}$$

3. When interest is compounded quarterly,

$$\text{Amount} = P \left(1 + \frac{r}{400}\right)^{4n}$$

4. When interest is compounded annually but time is in Fraction, say 3 whole $\frac{2}{5}$ year

$$\text{Amount} = P \left(1 + \frac{r}{100}\right)^3 \times \left(1 + \frac{2r}{500}\right)$$

5. When Rates are different for different years, say $r_1\%$, $r_2\%$, and $r_3\%$ for 1st, 2nd and 3rd year respectively.

Then,

Simple interest and compound interest

$$\text{Amount} = P \left(1 + \frac{r_1}{100}\right) \times \left(1 + \frac{r_2}{100}\right) \times \left(1 + \frac{r_3}{100}\right)$$

Present worth of Rs. x due n years hence is given by:

$$\text{Present Worth} = \frac{x}{\left(1 + \frac{r}{100}\right)}$$

Difference between Compound Interest & Simple interest Concept For Two years

$$CI - SI = P \left(\frac{r}{100}\right)^2$$

For Three Year :

$$CI - SI = P \left(\frac{r}{100}\right)^2 \times \frac{(300+r)}{100}$$

For Two year :

$$\frac{C.I}{S.I} = \frac{(200+r)}{200}$$

Simple Interest and compound interest

Interest: Interest is a fee paid by a borrower of assets to the owner as a form of compensation for the use of the assets. It is most commonly the price paid for the use of borrowed money, or money earned by deposited funds.

When money is borrowed, interest is typically paid to the lender as a percentage of the principal, the amount owed to the lender. The percentage of the principal that is paid as a fee over a certain period of time (typically one month or year) is called the interest rate. A bank deposit will earn interest because the bank is paying for the use of the deposited funds. Assets that are sometimes lent with interest include money, shares, consumer goods through hire purchase, major assets such as aircraft, and even entire factories in finance lease arrangements. The interest is calculated upon the value of the assets in the same manner as upon money.

Simple interest and compound interest

If the interest is paid as it falls due, at the end of the decided period (yearly, half yearly or quarterly), the principal is said to be lent or borrowed at simple interest.

Quicker Method to solve the Questions

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

Here P = principal, R = rate per annum, T = time in years

$$\text{Therefore Amount (A)} = P + \frac{PRT}{100} = P \left(1 + \frac{RT}{100} \right)$$

If T is given in months, since rate is per annum, the time has to be converted into years, so the period in months has to be divided by 12. If T = 2 months this $\frac{2}{12}$ years)

Example 1: Find the simple interest and amount when Rs. 1000 is lent at 5% per annum for 5 years.

$$\text{Solution: By the formula, SI} = \frac{P \times R \times T}{100} = \frac{1000 \times 5 \times 5}{100}$$

$$\therefore \text{Amount} = P + \text{SI} = 1000 + 125 = \text{Rs. } 1125$$

$$\text{Principal} = \frac{\text{SI} \times 100}{RT}$$

Example 2: Find the principal when simple interest is Rs. 60 at 4% per annum for 4 years.

$$\text{Solution: Principal} = \frac{\text{SI} \times 100}{RT} = \frac{60 \times 100}{4 \times 4} = \text{Rs. } 750$$

$$\text{Time} = \frac{\text{SI} \times 100}{R \times P}$$

Example 3: In how many years will the sum of Rs. 500 become Rs. 620 if the rate of simple interest is 4% per annum?

Simple interest and compound interest

Solution: Using the formula, $T = \frac{SI \times 100}{R \times P}$

Here, SI = 620 – 500 = Rs. 120

$$\therefore T = \frac{120 \times 100}{500 \times 4} = 6 \text{ years}$$

$$\text{Rate} = \frac{SI \times 100}{P \times T}$$

Example 4: At what rate percent per annum will a sum of money double in 8 years?

Solution: Let principal = Rs. P, Then SI = Rs. P and Time = 8 years

$$\therefore \text{Rate} = \frac{SI \times 100}{P \times T} = \frac{P \times 100}{P \times 8} = \frac{100}{8} = \frac{25}{2} = 12\frac{1}{2} \% \text{ per annum}$$