

CI and SI

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

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

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

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

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.

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

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

A= Amount,

P= Principal,

r= Rate %,

n= no. of years.

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

Condition:-

1. When interest is compounded annually,
Amount = $P(1+r/100)^n$

2. When interest is compounded half yearly,
Amount = $P(1+(r/2)/100)^{2n}$

3. When interest is compounded Quarterly,
Amount = $P(1+(r/4)/100)^{4n}$

4. When interest is compounded annually but time is in fraction, say 3 whole 2/5 year
Amount = $P(1+r/100)^3 \times (1+(2r/5)/100)$

5. When Rates are different for different years, say r1%, r2%, and r3% for 1st, 2nd and 3rd year respectively.

Then,
Amount = $P(1+r1/100) \times (1+r2/100) \times (1+r3/100)$.

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

$$\text{Present Worth} = x/(1+r/100)$$

Difference between Compound Interest & Simple interest Concept For Two years

$$CI - SI = P(r/100)^2$$

For Three Year

$$CI - SI = P(r^2/(100^2)) \times (300+r)/100$$

For Two year

$$CI/SI = (200+r)/200$$