

Simple Interest and Compound Interest

Interest is defined as the cost of borrowing money as in the case of interest charged on a loan balance. Conversely, interest can also be the rate paid for money on deposit as in the case of a certificate of deposit. Interest can be calculated in two ways, simple interest or compound interest.

- **Simple interest** is calculated on the principal, or original, amount of a loan.
- **Compound interest** is calculated on the principal amount and also on the accumulated interest of previous periods, and can thus be regarded as "interest on interest."

There can be a big difference in the amount of interest payable on a loan if interest is calculated on a compound rather than simple basis. On the positive side, the magic of compounding can work to your advantage when it comes to your investments and can be a potent factor in wealth creation.

Simple Interest is calculated only on the principal amount (or on that portion of the principal amount which remains unpaid)

1) Simple Interest (SI) formula

$$SI = \frac{P \times R \times T}{100}$$

where,

P – Principal or the original sum borrowed

R – Rate of interest. It is the rate at which the interest is calculated on the original sum

T – Time for which the original sum is borrowed. It is also denoted as 'n'

2) Amount (A) = Principal + Simple Interest = P + (PTR)/100

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

Note: In simple interest, every year, the interest will be the same.

Compound Interest Formulas

In the case of compound interest, the interest is added to the principal at the end of each period to arrive at the new principal for the next period. Under compound interest, the amount at the end of the first year will become principal for the second year; the amount at the end of the second year becomes the principal for the third year and so on.

1) Compound Interest Formula

$$\text{Amount after 'n' years} = P \times \left[1 + \frac{R}{100}\right]^n$$

2) Given the amount and principal, the interest is

$$I = A - P = P \times \left[\left(1 + \frac{R}{100}\right)^n - 1\right]$$

3) Amount in Compound interest case is given by

$$A = P \times \left[1 + \frac{R}{100}\right]^T$$

4) When rates are different for different years, say r1, r2, r3 percent for 1st, 2nd and 3rd year respectively, the amount can be calculated as

$$A = P \left(\frac{1 + r1}{100}\right) \left(\frac{1 + r2}{100}\right) \left(\frac{1 + r3}{100}\right)$$