COMPOUND INTEREST

In simple interest the principal remains the same year after year but in compound interest, the interest earned in the first year of investment is added to the principal and the amount thus obtained becomes the principal for the second year. This is repeated year after year. When this happens we say that the investment is made at compound interest. To obtain the interest after a period of investment, we calculate the interest year by year. Unlike simple interest, compound interest changes year by year, even though the rate is the same. Compound interest is calculated like simple interest as long as it is remembered that the amount at the first year becomes the principal for the second year and so on. Since most commercial loans are done on compound interest, it is important to know how to calculate this kind of interest.

Deriving the Compound Interest Formula

At n = 0, $\mathrm{I} = 0,\ \mathrm{A} = \mathrm{P}$

At n =1, $\mathrm{I} = \frac{\mathrm{PR}}{100}, A = P + \frac{PR}{100}$

At n = 2, $\mathrm{I} = \left(P + \frac{PR}{100}\right)\frac{R}{100}, A = P + \frac{PR}{100} + \left(P + \frac{PR}{100}\right)\frac{R}{100}$

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

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

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

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

Note: in order to obtain the compound interest, we subtract the original principal from this amount.

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

$$\boldsymbol{CI = P\left(\left(1 + \frac{R}{100}\right)^n - 1\right)}$$