Compound Interest

Tuesday, May 18, 2021 10:11 AM

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

A → Amount

P → Principal

R = Rate of interest

n = no. of years

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

C.I = Compound Interest.

Ex: Find C.I on Rs 16000 at Rate of 5% p.c.p.a. for 2 years. Find C.I.?

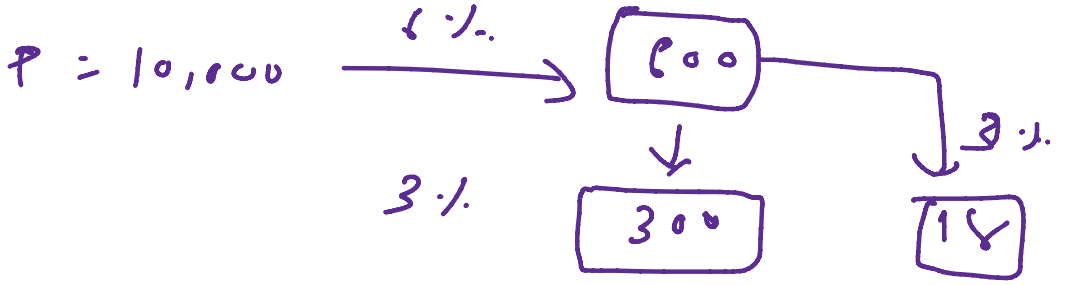
$$C.I = P\left[\left(1 + \frac{R}{100}\right)^n - 1\right]$$

$$= 16000\left[\left(1 + \frac{5}{\text{Time}\atop 20}\right)^2 - 1\right]$$

$$= 16000\left[\left(\frac{21 \times 21}{20 \times 20}\right) - 1\right]$$

$$= 16000 \times \left[\frac{41}{400}\right] = \text{Rs. } 1640.$$

Ex. find C.I on Rs. 10,000 at the rate of interest p.a. for 1 1/2 years, find C.I.



$$C.I = P\left[\left(1+\frac{r}{100}\right)^n - 1\right] \qquad 1\tfrac{1}{2} = \frac{3}{2}$$

$$= 10000\left[\left(1+\frac{4}{100}\right)^{3/2} - 1\right]$$

$$= 10,000\left[\left(1+\frac{4}{100}\right)^{1}\left(1+\frac{6}{100}\times\frac{1}{2}\right) - 1\right]$$

$$= 10,000\left[\left(\frac{104}{100}\right)\left(\frac{103}{100}\right) - 1\right]$$

$$= 10,000\left[\frac{10918 - 10000}{10000}\right] = 918 \text{ Rs//}$$

$\left[\frac{\qquad}{10000}\right]$ - 1 & Rs//

Imp formula :- If difference betn C.I & S.I is to find out.

Principal = P Rate of interest = R

Time = N

(1) When time is 2 years

$C.I - S.I = P\left(\frac{R}{100}\right)^2$

(2) When time is 3 years

$C.I - S.I = P\left(\frac{R}{100}\right)^2 \times \left(\frac{300 + R}{100}\right)$

Ex If the difference betn CI & SI on Rs. 1960 is Rs. 19.60 for 2 years

Ct certain Rate of interest. find R?

$$C.I - S.I = P\left(\frac{R}{100}\right)^2$$

$$\frac{\cancel{lg\,60}}{100} = \cancel{lg\,60}\left(\frac{R}{100}\right)^2$$

$$R^2 = \frac{10000}{100} = 100 \Rightarrow R = 10\%$$

Ex The difference between SI & CI on certain sum of money for 3 years at 10%. If Rs.31. find sum of money

$$C.I - SI = P\left(\frac{R}{100}\right)^2 \cdot \left(\frac{300+R}{100}\right)$$

$$31 = P\left(\frac{10}{100}\right)^2\left(\frac{300+10}{100}\right)$$

$$31 = P\left(\frac{1}{10}\right)\left(\frac{310}{100}\right)$$

$100 \times 100 \times 31$

$$P = \frac{100 \times 100 \times 31}{310} = 1000 \text{ Rs}$$

Ex: A sum of money doubles itself at compound interest in 15 years. In how many years will it become eight times.

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

$$2P = P\left(1 + \frac{R}{100}\right)^{15}$$

$$2 = \left(1 + \frac{R}{100}\right)^{15} \quad \text{..(1)}$$

$$8P = P\left(1 + \frac{R}{100}\right)^{n}$$

$$8 = \left(1 + \frac{R}{100}\right)^{n} \quad \text{..(2)}$$

$$\left(1+\frac{r}{100}\right)^n = 8 = (2)^3 = \left\{\left(1+\frac{r}{100}\right)^{15}\right\}^3$$

$$= \left(1+\frac{r}{100}\right)^{45}$$

$$n = 45 \text{ years} //$$

OR

$$n_2 = (n_1)^{t_2/t_1}$$

$n_1, n_2 \to$ no. of times

$t_1, t_2 \to$ no. of years

$$8 = (2)^{t_2/15}$$

$$(2)^3 = (2)^{t_2/15} \Rightarrow \frac{t_2}{15} = 3 \Rightarrow t_2 = 45 \text{ years} //$$

Ex A certain amount earns simple interest of Rs. 1750 at 6% in 7 years. Find the interest from 2 to make

the interest been 2% more, how much more interest would it have earned?

CNP