

H.W

Worksheet 2

① The CI on ₹ 30000 at 7% pa is ₹ 4347. What is the time period?

Sol: $P = ₹ 30000$, $CI = ₹ 4347$
 $S_o, A = ₹ 34347$; $R\% = 7\% \text{ pa}$ $t = ?$

$$A = P \left(1 + \frac{r}{100}\right)^t \quad \Rightarrow \therefore t = 2 \text{ yrs.}$$

$$₹ 34347 = 30000 \left(1 + \frac{7}{100}\right)^t$$

$$\frac{34347}{30000} = \left(\frac{107}{100}\right)^t$$

$$\frac{11449}{10000} = \left(\frac{107}{100}\right)^t$$

$$\left(\frac{107}{100}\right)^2 = \left(\frac{107}{100}\right)^t$$

② Find the CI ~~and SI~~ on a sum ~~for 9 yrs at 8% pa~~ ₹ 16000 at 9% pa for 9 months: compounded quarterly.

Sol: ~~CI for quarterly (9 months) = $P \left[1 + \frac{r}{100 \times 4}\right]^{4t}$~~
~~= 16000 $\left[1 + \frac{9}{100 \times 4}\right]^{36}$~~
~~= 16000 $\left[1 + \frac{1}{20}\right]^{36}$~~
 $CI = 18592$
 $- 16000$
 $₹ 2592$

$P = ₹ 16000$ $r = 9\% \text{ pa}$
 $= \frac{9}{4} = 2.25\% \text{ per quarter}$

Time = 9 months = $\frac{9}{12} \text{ yrs} \Rightarrow \frac{9}{12} \times 4 \text{ quarters} = 3 \text{ quarters}$

$$A = P \left(1 + \frac{R}{100}\right)^n \Rightarrow 16000 \left(1 + \frac{2.25}{100}\right)^3$$
$$= 16000 \times \left(\frac{21}{20}\right)^3 \Rightarrow ₹ 18592$$

Q) What is the difference between the CI's on ₹5000 for $1\frac{1}{2}$ yrs at 4% pa compounded yearly and half yearly?

Sol: $P = ₹5000$ $R\% = 4\% \text{ pa}$ $T = 1\frac{1}{2} \text{ yrs}$

~~CI yearly = $A = 5000 \left(1 + \frac{4}{100}\right) \left(1 + \frac{2}{100}\right)$~~

~~$\Rightarrow 5000 \times \frac{104}{100} \times \frac{102}{100}$~~

~~$\Rightarrow ₹5304$~~

~~Then, CI (yearly) = $₹5304 - 5000$
 $= ₹304$~~

Now for CI (half yearly),

$P = ₹5000$, $R\% = 4\% \text{ pa}$ $T =$

Sol: $P = ₹5000$ $R\% = 4\% \text{ pa}$ $T = 1\frac{1}{2} \text{ yrs}$

~~CI (yearly) $A_n = P \left(1 + \frac{r}{100}\right)^n$~~

~~$= 5000 \times \left(1 + \frac{4}{100}\right)^1 \times \left(1 + \frac{2 \times 1}{100 \times 2}\right)$~~

~~$= 5000 \times \frac{26}{25} \times \frac{51}{50}$~~

~~$= ₹5304$~~

~~CI = $5304 - 5000$
 $= ₹304$~~

~~Amount (half yearly) = $P \left(1 + \frac{r/2}{100}\right)^{2n}$~~

~~$= 5000 \left(1 + \frac{2}{100}\right)^3$~~

~~$= 5000 \left(\frac{51}{50}\right)^3$~~

~~$= 5000 \times \frac{51}{50} \times \frac{51}{50} \times \frac{51}{50} = \frac{51^3}{25} = ₹5306.04$~~

Diff = $3060.04 - 304$
 $= ₹2756.04$

Q) The difference between CI and SI on a sum for 2 yrs at 8% pa, where the interest is compounded ~~half yearly~~ annually is ₹16. What is the sum borrowed?

Let $P = x$

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

$$16 = x \left[\left(1 + \frac{8}{100} \right)^2 - 1 \right] - \frac{x \cdot 8 \cdot 2}{100}$$

$$16 = x \left[\left(\frac{27}{25} \right)^2 - 1 \right] - \frac{16x}{100}$$

$$16 = x \left[\frac{729}{625} - 1 \right] - \frac{16x}{100}$$

$$16 = \frac{104}{625} x - \frac{4}{25} x$$

$$16 = \frac{4}{625} x$$

$$x = \frac{16 \times 625}{4} = ₹2500$$

Q) If the SI on a sum of money at 5% pa for 3 yrs is ₹1200, find the CI on the same sum for the same period at same rate.

Let P be x .

sol: $SI = \frac{PRT}{100}$

$$1200 = \frac{x \times 5 \times 3}{100}$$

$$1200 = \frac{15x}{100}$$

$$x = \frac{100}{15} \times 1200 = ₹8000$$

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

$$= 8000 \left[\left(1 + \frac{5}{100} \right)^3 - 1 \right]$$

$$= 8000 \left[\left(\frac{21}{20} \right)^3 - 1 \right]$$

$$= 8000 \left(\frac{9261}{8000} - 1 \right)$$

$$= 8000 \times \frac{1261}{8000}$$

$$= ₹1261$$

⑥ A certain sum amounts to ₹ 7350 in 2 yrs and to ₹ 8575 in 3 yrs. Find the sum and rate percent.

sol: Interest for ~~1~~^{one} yr = $8575 - 7350$
= ₹ 1225

Interest for 2 yrs = 1225×2
= ₹ 2450

Amount for 2 yrs = ₹ 7350

Principal = $A - I$
= $7350 - 2450$
= ₹ 4900

$P = ₹ 4900$ Interest = ~~1225~~²⁴⁵⁰ $T = 2$ yrs

$SI = \frac{PRT}{100}$

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

$R = \frac{100 \times 2450}{4900 \times 2}$

$R = 9.5\%$

⑦ The difference between the SI on a certain sum at the rate of 10% pa for 2 yrs and CI which is compounded every 6 months is ₹ 194.05. What is the principal sum?

sol: For SI = Let $P = x$, $R = 10\%$ pa $T = 2$ yrs
For CI = Let $P = x$, $R = \frac{10}{2} = 5\%$ $T = 6$ months
 $CI - SI = ₹ 194.05$

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

$$\Rightarrow 124.05 = \frac{x \times 14 + x}{\frac{100}{5}} = x \left[\left(1 + \frac{5}{100} \right)^4 - 1 \right]$$

$$= 124.05 = \frac{x}{5} - x \left[\left(\frac{21}{20} \right)^4 - 1 \right]$$

$$= 124.05 = \frac{x}{5} - x \left[\frac{(194481)}{160000} - 1 \right]$$

$$= 124.05 = \frac{x}{5} - \frac{34481}{160000} x$$

$$= \cancel{124.05} = \frac{24481}{160000} x = 124.05$$

$$P = \frac{124.05 \times 160000}{24481} = \underline{\underline{28000}}$$