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SIMPLE & COMPOUND Interest

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$$SI = \frac{P \cdot r \cdot t}{100}$$

$$A = P + I$$

} simple interest

Compound Interest

$$CI - SI = \frac{P \cdot r^2}{10000}$$

$$CI = A - P$$

$$t = n$$

$$A = P + I$$

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

$$A = P \left(1 + \frac{r/2}{100}\right)^{2n} \quad - 6 \text{ month}$$

$$A = P \left(1 + \frac{r/4}{100}\right)^{4n} \quad - 3 \text{ month}$$

1) ~~25%~~ $SI = \frac{25\% \cdot P}{100} = \frac{P}{4}$ $r = t$

$\Rightarrow SI = \frac{P \cdot r \cdot t}{100}$
 $\frac{P}{4} = \frac{P \cdot r \cdot r}{100} \quad \because r = t$

$$r^2 = \frac{100}{4} = 25 \Rightarrow r = 5\%$$

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2) $t = 12, A = 2P, r = ?$

$\Rightarrow SI = \frac{Prt}{100} \quad A = P + I$

$2P = \frac{Prt}{100} \Rightarrow 100 = 12r$

$r = \frac{100}{12} = 8.33\%$

~~XXX~~
 $A = 2P$
 $A = 3P$
 $A = 4P$

4) $t = 8, A = 3P, SI = 2P$

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

$2P = \frac{P \times r \times 8}{100}$

$\frac{200}{8} = r$

$r = 25\%$

$4P = \frac{P \times 25 \times t}{100}$

$t = \frac{400}{25} = 16$

5) $C1 - S1 = 72, r = 12\%, t = 2$

$C1 - S1 = \frac{Prt}{100}$

$72 = \frac{P \times 12 \times 2}{100}$

$72 \times \frac{100}{24} = P \Rightarrow P = 3000$

6) $P = 1200, r = 5\%, t = 3, A = ?$

$I = \frac{Prt}{100} = \frac{1200 \times 5 \times 3}{100} = 180$

$A = P + I = 1200 + 180 = 1380$

7) $2100 = P$, $r = 5$, $t = 2$, $A = ?$ Compound interest
 $\Rightarrow CI = A - P$

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

$$A = 2100 \left(1 + \frac{5}{100}\right)^2$$

$$= 2100 \left(\frac{105}{100}\right)^2$$

$$= 2100 \left(\frac{21}{20}\right)^2$$

$$= 2100 \times \frac{21}{20} \times \frac{21}{20}$$

$$= 21 \times 21 \times 21$$

$$= 2315.25$$

$$\begin{array}{r} 21 \times 21 \\ 421 \\ 77 \times 21 \\ 1611 \\ 2315.25 \end{array}$$

8) $r = 5\%$, $t = 2$, $P = 2000$, $CI - SI = ?$

$$CI - SI = \frac{P r^2}{1000} = \frac{2000 \times 5^2}{10000}$$

$$CI - SI = 5$$

9) $P = 500$, $r_1 = 5$, $t_1 = 3$, $r_2 = 4$, $t_2 = 4$

$$I_1 = \frac{P r_1 t_1}{100} = \frac{500 \times 5 \times 3}{100} = 75$$

$$I_2 = \frac{P r_2 t_2}{100} = \frac{500 \times 4 \times 4}{100} = 80$$

$$I_1 - I_2 = 5$$

10) $P = 1000$, $n = 2000$,

$$CI = A - P$$

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

$$= 1000 \left(1 + \frac{1000}{100} \right)^{2000}$$

$$= 1000 \left(\frac{11}{10} \right)^{2000} = 1331$$

11) $P = 3300$, $A = 3399$, $n = 6\%$,

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

$$3399 = 3300 \left(1 + \frac{3}{100} \right)^{2n}$$

$$\frac{3399}{3300} = \left(\frac{103}{100} \right)^{2n}$$

$$\left(\frac{103}{100} \right)^1 = \left(\frac{103}{100} \right)^{2n}$$

$$1 = 2n$$

$$n = \frac{1}{2} = 6 \text{ monthly}$$

17) A sum of Rs 600 amount to Rs

$P = 600$, $A = 720$, $t = 4$, what is n ?

$$I = A - P = 120$$

$$120 = \frac{P \times n \times t}{100} = \frac{600 \times n \times 4}{100}$$

$$120 = 24 \times n \Rightarrow n = \frac{120}{24} = 5$$

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