

Chapter-8 / Simple and Compound Interest

Exercise-8A

Q.1. Find the simple interest and amount on:

(i) ₹ 4500 for $2\frac{1}{2}$ yrs. at $7\frac{2}{3}\%$ p.a

Solⁿ: $P = ₹ 4500$ / $r = 7\frac{2}{3}\%$ | $t = 2\frac{1}{2}$ yrs
 $= \frac{23}{3}\%$ | $= \frac{5}{2}$ yrs.

$$\therefore I = \frac{PRT}{100}$$

$$= \frac{4500 \times 23 \times 5}{100 \times 2 \times 100}$$

$$= ₹ \frac{1725}{2} = ₹ 862.50$$

75
23

225
1500

1725

$$\therefore A = P + I$$

$$= 4500 + 862.50$$

$$= ₹ 5362.50$$

(ii) Given: $P = ₹ 6360$

$T = 6$ yrs 3 months

$$= 6 \text{ yrs} + \frac{3}{12} \text{ yrs.}$$

$$= 6\frac{1}{4} \text{ yrs} = \frac{25}{4} \text{ yrs.}$$

$R = 8\%$ p.a.

$$\therefore I = \frac{PRT}{100} = \frac{6360 \times 8 \times 25}{4 \times 100} = ₹ 3180$$

$$\therefore A = P + I$$

$$= 6360 + 3180 = ₹ 9540$$

(11) Given: $P = ₹ 19200$ / $T = 11 \text{ months}$
 $= \frac{11}{12} \text{ yrs.}$

$$R = 9\frac{3}{4} \% \text{ p.a.}$$

$$= \frac{39}{4} \% \text{ p.a.}$$

$$\therefore I = \frac{PRT}{100} = \frac{19200 \times 39 \times 11}{4 \times 12 \times 100}$$

$$= ₹ 1716$$

$$\begin{array}{r} 39 \\ 44 \\ \hline 156 \\ 156 \times \\ \hline 1716 \end{array}$$

$$\therefore A = P + I = 19200 + 1716$$

$$= ₹ 20916$$

(12) Given: $P = ₹ 58400$

$$R = 6\frac{1}{2} \% \text{ p.a.} = \frac{13}{2} \% \text{ p.a.}$$

$$T = 75 \text{ days}$$

$$= \frac{75}{365} \text{ yrs.} = \frac{15}{73} \text{ yrs.}$$

$$\therefore I = \frac{PRT}{100} = \frac{58400 \times 13 \times 15}{2 \times 73 \times 100}$$

$$= \frac{292 \times 13 \times 15}{73}$$

$$= \frac{2 \times 2 \times 73 \times 13 \times 15}{73}$$

$$= ₹ 780$$

$$\begin{array}{r} 2 \overline{) 292} \\ \underline{2} \\ 146 \\ \underline{2} \\ 73 \end{array}$$

$$\begin{array}{r} 60 \\ 13 \\ \hline 780 \end{array}$$

$$\therefore A = P + I$$

$$= 58400 + 780$$

$$= ₹ 59180$$

Q.2. Find the simple interest on ₹ 8600 from 18th October, 2006 to 13th March 2007 at 8% p.a. Also find the amount.

Solⁿ: Given: P = ₹ 8600

R = 8%

T = Oct + Nov + Dec + Jan + Feb + Mar.

= (13 + 30 + 31 + 31 + 28 + 13) days

= 146 days

= $\frac{146}{365}$ yrs.

= $\frac{2 \times 73}{5 \times 73}$ yrs = $\frac{2}{5}$ yrs.

$$\therefore S.I = \frac{PRT}{100} = \frac{8600 \times 8 \times 2}{5 \times 100}$$

$$= \frac{1376}{5}$$

$$= ₹ 275.20$$

$$\begin{array}{r} 86 \\ 16 \\ \hline 516 \\ 86 \times \\ \hline 1376 \end{array}$$

$$\therefore A = P + I = 8600 + 275.20 = ₹ 8875.20$$

Q.3. Ashish lent ₹ 10500 to Sunidhi at 7% p.a simple interest. After 5 yrs., Sunidhi discharged the debt by giving a watch and ₹ 13000 in cash. What is the value of the watch?

⇒ Given: P = ₹ 10500

R = 7% p.a

T = 5 yrs.

$$\therefore I = \frac{PRT}{100} = \frac{10500 \times 7 \times 5}{100}$$

$$= \text{Rs } 3675$$

105
35
525
3150
3675

$$\therefore \text{Amount} = P + I$$

$$= 10500 + 3675$$

$$= \text{Rs } 14175$$

~~ATQ~~, let the cost of watch = Rs x

$$\therefore \text{ATQ}, 13000 + x = 14175$$

$$\Rightarrow x = \text{Rs } 1175$$

\therefore cost of watch = Rs 1175.

Q. 4. In what time will the simple interest on ₹ 7560 be ₹ 1102.50 at $6\frac{1}{4}\%$ p.a?

Soln.:- $P = ₹ 7560$
 $I = 1102.50$
 $R = 6\frac{1}{4}\% = \frac{25}{4}\%$ p.a.

$$\therefore I = \frac{PRT}{100} = ?$$

$$\Rightarrow 1102.50 = \frac{7560 \times 25 \times t}{4 \times 100}$$

$$\Rightarrow t = \frac{1102.50 \times 4 \times 100}{100 \times 7560 \times 25}$$

$$\frac{189}{210}$$

$$\therefore \frac{7}{3} \text{ yrs} = 2\frac{1}{3} \text{ yrs.}$$

$$= 2 \text{ yrs} + \frac{1}{3} \text{ months.}$$

$$= 2 \text{ yrs } 4 \text{ months}$$

5. In how much time will a ₹ 25600 amount to ₹ 35664, when money is worth $9\frac{1}{4}\%$ p.a simple interest?

⇒ Given: $P = ₹ 25600$

$A = ₹ 35664$

$r = 9\frac{1}{4}\% = \frac{37}{4}\% \text{ p.a.}$

Now, $I = A - P$

⇒ $\frac{Prt}{100} = 35664 - 25600$

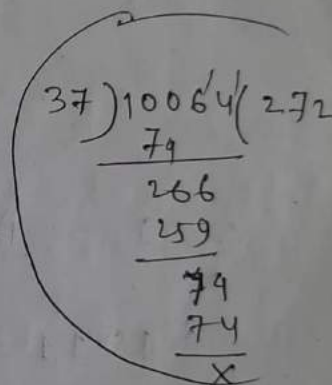
⇒ $\frac{25600 \times 37 \times t}{4 \times 100} = 10064$

⇒ $t = \frac{10064 \cdot 272}{64 \times 37}$

$= \frac{272 \cdot 158 \cdot 17}{64}$

$15 \frac{1}{2}$

$= \frac{17}{2} \text{ yrs} = 8\frac{1}{2} \text{ yrs.}$



Q. 6. A what rate percent per annum will ₹ 1625 amount to ₹ 2080 in $3\frac{1}{2}$ yrs?

Solⁿ $A = ₹ 2080$

$P = ₹ 1625$

$t = 3\frac{1}{2} \text{ yrs.} = \frac{7}{2} \text{ yrs.}$

∴ $I = A - P$

⇒ $\frac{Prt}{100} = 2080 - 1625$

$$\Rightarrow \frac{1625 \times r \times 7}{2 \times 100} = 455$$

$$\Rightarrow r = \frac{455 \times 2 \times 100}{1625 \times 7} = 8\% \text{ p.a.}$$

Q.7. At what rate per cent per annum will the simple interest on Rs 6720 be Rs 1911 in 3 yrs. 3 months?

solⁿ: Given: P = Rs 6720

I = ₹ 1911.

t = 3 yrs 3 months = $(3 + \frac{3}{12})$ yrs.

= $3\frac{1}{4}$ yrs. = $\frac{13}{4}$ yrs.

$$\therefore I = \frac{P \times t \times r}{100}$$

$$\Rightarrow 1911 = \frac{6720 \times \frac{13}{4} \times r}{100}$$

$$\Rightarrow 1911 = \frac{168 \times 13 \times r}{10}$$

$$\Rightarrow r = \frac{1911 \times 100}{168 \times 13}$$

$$= \frac{35}{4} \%$$

$$= 8\frac{3}{4} \% \text{ p.a.}$$

$$\begin{array}{r} 168 \\ \times 13 \\ \hline 504 \\ 1680 \\ \hline 2184 \end{array}$$

Q.8. At what rate percent of simple interest will a sum of money double itself in 12 yrs?

solⁿ: let, $P = Rs\ x$. / $t = 12$ yrs.
 $A = 2x$

Now, $I = A - P$

$$2) \frac{P \times t}{100} = 2x - x$$

$$2) \frac{x \times r \times 12}{100} = x$$

$$2) r = \frac{100 \times 25}{12 \times 3} = \frac{25}{3} = 8\frac{1}{3}\% \text{ p.a.}$$

Q.9. Simple interest on a certain sum is $\frac{9}{16}$ of the sum. Find the rate percent and the time if both are numerically equal.

solⁿ: let, $P = Rs\ x$.
 $I = \frac{9}{16}x$

ATQ, rate = time = y (say).

Now, $I = \frac{P \times t}{100}$

$$2) \frac{9}{16}x = \frac{x \times y \times y}{100}$$

$$2) y^2 = \frac{9 \times 100}{16}$$

$$2) y = \sqrt{\frac{9 \times 100}{16}}$$

$$= \frac{3 \times 10}{4}$$

$$= \frac{30}{4} = 7\frac{1}{2}$$

\therefore time = $7\frac{1}{2}$ yrs

rate = $7\frac{1}{2}\%$ p.a.

10. What sum will yield ₹ 406 as simple interest in 1 yr. 2 months at $6\frac{1}{4}\%$ p.a?

Solⁿ - Let, P = ₹ x

$$r = 6\frac{1}{4}\% = \frac{25}{4}\% \text{ p.a.}$$

$$t = 1 \text{ yr } 2 \text{ months} = \left(1 + \frac{2}{12}\right) \text{ yr.} = 1\frac{1}{6} \text{ yr.} = \frac{7}{6} \text{ yrs.}$$

$$\therefore I = \frac{x \times 25 \times 7}{4 \times 6 \times 100}$$

$$\Rightarrow 406 = \frac{x \times 7}{4 \times 4 \times 6}$$

$$\Rightarrow x = \frac{58 \times 406 \times 4 \times 4 \times 6}{7}$$

$$x = ₹ 5568$$

$$\begin{array}{r} 18 \\ \hline 96 \\ 58 \\ \hline 768 \\ 480 \times \\ \hline 5568 \end{array}$$

Q. 11 What sum will amount to ₹ 1748 in $2\frac{1}{2}$ yrs. at $7\frac{1}{2}\%$ p.a simple interest?

Solⁿ - Let P = ₹ x / A = 1748 / t = $2\frac{1}{2}$ yrs.

and r = $7\frac{1}{2}\%$

$$= \frac{15}{2}\% \text{ p.a}$$

Now, $I = A - P$

$$\Rightarrow \frac{P \times r \times t}{100} = 1748 - x$$

$$\Rightarrow \frac{x \times 15 \times 5}{2 \times 2 \times 100} = 1748 - x$$

$$\Rightarrow 75x = 400(1748 - x)$$

$$\Rightarrow 75x + 400x = 699200$$

$$\Rightarrow 475x = 699200 \Rightarrow x = 1472$$

$$\begin{array}{r} 27968 \\ 139840 \\ 699200 \\ \hline 475 \\ 95 \\ 19 \end{array}$$

$$\begin{array}{r} 19 \overline{) 27968} \quad (1472) \\ \underline{19} \\ 89 \\ \underline{76} \\ 136 \\ \underline{133} \\ 38 \\ \underline{38} \\ 0 \end{array}$$

Q.12. A sum of money becomes $\frac{8}{5}$ of itself in 5 yrs. at a certain rate of simple interest. Find the rate of interest.

Solⁿ + Let, $P = \text{Rs } x$.

$$\therefore \text{Amount} = \frac{8}{5}x.$$

$$\text{Time} = 5 \text{ yrs.}$$

$$\therefore I = A - P.$$

$$\Rightarrow \frac{I \times 100}{P \times T} = \frac{8x - x}{5}$$

$$\Rightarrow \frac{x \times r \times 5}{100} = \frac{3x}{5}$$

$$\Rightarrow r = \frac{3 \times 100 \times 5}{5 \times 5} = 12\% \text{ P.A.}$$

Q.13. What sum of money lent at $12\frac{1}{2}\%$ P.A. will produce the same interest in 4 yrs. as $\text{Rs } 8560$ produces in 5 yrs. at 12% P.A.?

Solⁿ + Case I

$$\text{Let } P = \text{Rs } x$$

$$r = 12\frac{1}{2}\% = \frac{25}{2}\% \text{ P.A.}$$

$$t = 4 \text{ yrs.}$$

$$I_1 = \frac{x \times 25 \times 4}{2 \times 100} = \frac{x}{2}$$

Case II

$$P = \text{Rs } 8560$$

$$r = 12\% \text{ P.A.}$$

$$t = 5 \text{ yrs.}$$

$$\therefore I_2 = \frac{8560 \times 12 \times 5}{100} = 6192$$

$$= 5136$$

$$\text{A.T.Q.}, I_1 = I_2$$

$$\Rightarrow \frac{x}{2} = 5136$$

$$\Rightarrow x = 10272$$

Q. 14. If Rs 1250 amount to Rs 1550 in 3 yrs. at simple interest, what will Rs 3200 amount to in 4 yrs. at the same rate?

Solⁿ:- Given: $P = \text{Rs } 1250$
 $A = \text{Rs } 1550$
 $t = 3 \text{ yrs.}$

$$\therefore I = A - P$$

$$\Rightarrow \frac{P \times r \times t}{100} = 1550 - 1250$$

$$\Rightarrow \frac{1250 \times r \times 3}{100} = 300$$

$$\Rightarrow r = \frac{300 \times 100}{125 \times 3} = 8\% \text{ p.a.}$$

Again, $P = \text{Rs } 3200$

$R = 8\% \text{ p.a.}$

$t = 4 \text{ yrs.}$

$$\therefore I = \frac{3200 \times 8 \times 4}{100}$$

$$= 1024.$$

$\therefore \text{Amount} = 3200 + 1024$

$= \text{Rs } 4224$

$$\begin{array}{r} 32 \\ 32 \\ \hline 64 \\ 96 \times \\ \hline 1024 \end{array}$$

15. A sum of money lent at simple interest amounts to Rs 3224 in 2 yrs and 24160 in 5 yrs. Find the sum and the rate of interest.

Solⁿ + case I
 let $A = 3224$.
~~Principle~~ $P = Rs\ x$.
 $t = 2$ yrs.
 rate = r .

$$\therefore I_1 = \frac{x \times r \times 2}{100 \times 50}$$

$$\Rightarrow A - P = \frac{xr}{50}$$

$$\Rightarrow 3224 - x = \frac{xr}{50}$$

$$\Rightarrow 161200 - 50x = xr \quad \text{--- (1)}$$

Comparing eqⁿ (1) and (2)

$$161200 - 50x = 83200 - 20x$$

$$\Rightarrow 161200 - 83200 = 50x - 20x$$

$$\Rightarrow 78000 = 30x$$

$$\Rightarrow x = \frac{78000}{30}$$

$$= Rs\ 2600.$$

case-II
 Again,
 $A = 4160$.
 $P = x$.
 $t = 5$ yrs.

$$I_2 = \frac{x \times r \times 5}{100 \times 20}$$

$$\Rightarrow 4160 - x = \frac{xr}{20}$$

$$\Rightarrow 83200 - 20x = xr \quad \text{--- (2)}$$

18. For the 1st sum

let, sum = Rs x .

$$R = 11\% \text{ p.a.}$$

$$t = 3\frac{1}{2} \text{ yrs} = \frac{7}{2} \text{ yrs.}$$

$$\therefore I_1 = \frac{x \times 11 \times 7}{2 \times 100} = \frac{77x}{200}$$

For the 2nd sum

$$\text{sum} = \text{Rs } x$$

$$R = 11\% \text{ p.a.}$$

$$t = 4\frac{1}{2} \text{ yrs} = \frac{9}{2} \text{ yrs.}$$

$$\therefore I_2 = \frac{x \times 11 \times 9}{2 \times 100} = \frac{99x}{200}$$

$$\text{ATQ, } I_2 - I_1 = 412.50$$

$$\Rightarrow \frac{99x}{200} - \frac{77x}{200} = \frac{41250}{100}$$

$$\Rightarrow 22x = \frac{41250 \times 200}{100}$$

$$\Rightarrow x = \frac{3750 \times 41250}{22} = \text{Rs } 3750$$

19. ~~Q~~

Total sum = Rs 13500

let 1st sum = Rs x .

$$\therefore \text{2nd sum} = \text{Rs } (13500 - x)$$

For 1st sum,

$$P = x,$$

$$R = 8\frac{1}{3}\% = \frac{25}{3}\% \text{ p.a.}$$

$$T = 2 \text{ yrs } 9 \text{ months}$$

$$= \left(2 + \frac{9 \times 3}{12}\right) \text{ yrs}$$

$$= \frac{11}{4} \text{ yrs.}$$

$$\therefore I_1 = \frac{x \times 25 \times 11}{3 \times 100 \times 4}$$

$$= \frac{11x}{48}$$

For 2nd sum,

$$P = 13500 - x$$

$$R = 7\frac{1}{2}\% \text{ p.a.} = \frac{15}{2}\%$$

$$T = 1 \text{ yr } 8 \text{ months}$$

$$= \left(1 + \frac{8 \times 3}{12}\right) \text{ yrs.}$$

$$= \frac{5}{3} \text{ yrs.}$$

$$\therefore I_2 = \frac{(13500 - x) \times 15 \times 5}{2 \times 100 \times 3}$$

$$= \frac{13500 - x}{8}$$

$$\text{ATQ, } I_1 + I_2 = 2375$$

$$\Rightarrow \frac{11x}{48} + \frac{13500 - x}{8} = 2375$$

$$\Rightarrow \frac{11x}{48} + \frac{81000 - 6x}{48} = 2375$$

$$\begin{array}{r} 2375 \\ \times 48 \\ \hline 19000 \\ 95000 \\ \hline 114000 \end{array}$$

$$\Rightarrow 11x + 81000 - 6x = 114000$$

$$\Rightarrow 5x = 33000$$

$$\Rightarrow x = \text{Rs } 6600$$

$$\therefore \text{1st sum} = \text{Rs } 6600$$

$$\begin{aligned} \text{2nd sum} &= 13500 - 6600 \\ &= \text{Rs } 6900 \end{aligned}$$

21. let, sum, $P = \text{Rs } x$,

$$\text{A.T.Q, } A = 4x.$$

$$R = 8\frac{1}{3}\% = \frac{25}{3}\%$$

$$\text{Now, } I = A - P.$$

$$\Rightarrow \frac{P \times t}{100} = 4x - x.$$

$$\Rightarrow \frac{x \times 25 \times t}{3 \times 100} = 3x.$$

$$\Rightarrow t = \frac{3 \times 100 \times 3}{25} = 12 \text{ yrs.}$$

So, in 12 yrs, a sum will be 4 times of it.

22. 1st case

$$\text{let the sum} = \text{Rs } x$$

$$R = 6\frac{2}{3}\% = \frac{20}{3}\%$$

$$t = 6 \text{ yrs.}$$

$$\therefore I_1 = \frac{x \times 20 \times 6}{3 \times 100} = \frac{2x}{5}$$

2nd case

$$P = \text{Rs } 3200$$

$$R = 8\frac{2}{5}\% = \frac{42}{5}\%$$

$$t = 7 \text{ yrs.}$$

$$\begin{aligned} I_2 &= \frac{3200 \times 42 \times 7}{5 \times 100} \\ &= \frac{9408}{5} \end{aligned}$$

$$\text{ATQ, } I_1 = I_2$$

$$\Rightarrow \frac{2x}{8} = \frac{9408}{8}$$

$$\Rightarrow x = \frac{9408}{2} = 4704$$

Q. 23. For Naveen

$$P = ₹ 42000$$

$$t = 3\frac{1}{2} \text{ yrs} = \frac{7}{2} \text{ yrs.}$$

$$\therefore I_1 = \frac{42000 \times r \times \frac{7}{2}}{2 \times 100}$$

$$= 1470r$$

For Praveen

$$P = ₹ 55000$$

$$t = 3\frac{1}{2} \text{ yrs} = \frac{7}{2} \text{ yrs.}$$

$$\therefore I_2 = \frac{55000 \times r \times \frac{7}{2}}{2 \times 100}$$

$$= 1925r.$$

$$\text{ATQ, } I_2 - I_1 = 3640$$

$$\Rightarrow 1925r - 1470r = 3640$$

$$\Rightarrow 455r = 3640$$

$$\Rightarrow r = \frac{3640}{455} = 8\%$$

$$= \frac{2 \times 2 \times 2 \times 91}{91} = 8\% \text{ p.a.}$$

$$\begin{array}{r} 2 \overline{) 728} \\ \underline{2 \overline{) 364}} \\ \underline{2 \overline{) 182}} \\ 91 \end{array}$$

24. 1st case

$$\text{let sum} = ₹ x$$

$$t = 2 \text{ yrs.}$$

$$\text{rate} = r$$

$$\therefore I_1 = \frac{x \times r \times 2}{100}$$

2nd case

$$P = ₹ x.$$

$$t = 2 \text{ yrs.}$$

$$\text{rate} = r + 3$$

$$\therefore I_2 = \frac{x \times (r+3) \times 2}{100}$$

ATQ,

$$I_2 - I_1 = 720$$

$$\Rightarrow \frac{2x(r+3)}{100} - \frac{2xr}{100} = 720$$

$$\Rightarrow 2xr + 6x - 2xr = 72000$$

$$\Rightarrow x = ₹ 12000$$

1st case

25. Let, sum = Rs x .

$R = 6\%$ p.a

$I = Rs\ 960$

Time = t yrs.

$$I = \frac{x \times 6 \times t}{100}$$

$$\Rightarrow 960 = \frac{6xt}{100}$$

$$\Rightarrow xt = \frac{96000}{6}$$

$$xt = 16000 \text{ --- (1)}$$

2nd case

$P = Rs\ x$, $I = 2160$

$R = 6\%$

Time = $(t+5)$ yrs.

$$I = \frac{x \times 6 \times (t+5)}{100}$$

$$\Rightarrow 2160 = \frac{6x(t+5)}{100}$$

$$\Rightarrow 6xt + 30x = 216000$$

$$\Rightarrow 6 \times 16000 + 30x = 216000$$

(from (1))

$$\Rightarrow 30x = 216000 - 96000$$

$$\Rightarrow 30x = 120000$$

$$\Rightarrow x = \frac{120000}{30}$$

$$x = 4000$$