

EXERCISE 10

PAGE: 116

1. Find the S.I. and the amount on:

- (i) ₹ 150 for 4 years at 5% per year.
(ii) ₹ 350 for 3½ years at 8% p.a.
(iii) ₹ 620 for 4 months at 8 p per rupee per month.
(iv) ₹ 3,380 for 30 months at 4½ % p.a.
(v) ₹ 600 from July 12 to Dec. 5 at 10% p.a.
(vi) ₹ 850 from 10th March to 3rd August at 2½ % p.a.
(vii) ₹ 225 for 3 years 9 months at 16% p.a.

Solution:

(i) ₹ 150 for 4 years at 5% per year

We know that

$$P = ₹ 150$$

$$R = 5\% \text{ per year}$$

$$T = 4 \text{ years}$$

Here

$$S.I = (P \times R \times T) / 100$$

Substituting the values

$$= (150 \times 5 \times 4) / 100$$

$$= ₹ 30$$

$$\text{Amount} = P + S.I$$

Substituting the values

$$= 150 + 30$$

$$= ₹ 180$$

(ii) ₹ 350 for 3½ years at 8% p.a.

We know that

$$P = ₹ 350$$

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

$$T = 3\frac{1}{2} \text{ years} = 7/2 \text{ years}$$

Here

$$S.I = (P \times R \times T) / 100$$

Substituting the values

$$= (350 \times 8 \times 7) / (100 \times 2)$$

$$= ₹ 98$$

$$\text{Amount} = P + S.I$$

Substituting the values

$$= 350 + 98$$

$$= ₹ 448$$

(iii) ₹ 620 for 4 months at 8 p per rupee per month

We know that

$$P = ₹ 620$$

$$R = 8 \text{ p per rupee per month} = 8\% \text{ p.m.}$$

T = 4 months

Here

$$\begin{aligned} \text{S.I} &= (P \times R \times T) / 100 \\ \text{Substituting the values} \\ &= (620 \times 8 \times 4) / 100 \\ &= ₹ 198.40 \end{aligned}$$

Amount = P + S.I

$$\begin{aligned} \text{Substituting the values} \\ &= 620 + 198.40 \\ &= ₹ 818.40 \end{aligned}$$

(iv) ₹ 3,380 for 30 months at $4\frac{1}{2}\%$ p.a.

We know that

$$P = ₹ 3,380$$

$$R = 4\frac{1}{2}\% \text{ p.a.} = 9/2\%$$

$$T = 30 \text{ months} = 30/12 \text{ years}$$

Here

$$\begin{aligned} \text{S.I} &= (P \times R \times T) / 100 \\ \text{Substituting the values} \\ &= (3380 \times 9 \times 30) / (100 \times 2 \times 12) \\ &= ₹ 380.25 \end{aligned}$$

Amount = P + S.I

$$\begin{aligned} \text{Substituting the values} \\ &= 3380 + 380.25 \\ &= ₹ 3760.25 \end{aligned}$$

(v) ₹ 600 from July 12 to Dec. 5 at 10% p.a.

We know that

$$P = ₹ 600$$

$$R = 10\% \text{ p.a.}$$

$$T = \text{July 12 to Dec 5}$$

$$\text{July} = 19 \text{ days}$$

$$\text{Aug} = 31 \text{ days}$$

$$\text{Sep} = 30 \text{ days}$$

$$\text{Oct} = 31 \text{ days}$$

$$\text{Nov} = 30 \text{ days}$$

$$\text{Dec} = 05 \text{ days}$$

$$\text{Total} = 146 \text{ days}$$

$$T = 146/365 \text{ years} = 2/5 \text{ years}$$

Here

$$\begin{aligned} \text{S.I} &= (P \times R \times T) / 100 \\ \text{Substituting the values} \\ &= (600 \times 10 \times 2) / (100 \times 5) \\ &= ₹ 24 \end{aligned}$$

$$\begin{aligned}\text{Amount} &= P + S.I \\ \text{Substituting the values} \\ &= 600 + 24 \\ &= ₹ 624\end{aligned}$$

(vi) ₹ 850 from 10th March to 3rd August at 2½% p.a.

We know that

$$P = ₹ 850$$

$$R = 2\frac{1}{2}\% = 5/2\% \text{ p.a.}$$

$$T = 10^{\text{th}} \text{ March to } 3^{\text{rd}} \text{ August}$$

$$\text{March} = 21 \text{ days}$$

$$\text{April} = 30 \text{ days}$$

$$\text{May} = 31 \text{ days}$$

$$\text{June} = 30 \text{ days}$$

$$\text{July} = 31 \text{ days}$$

$$\text{Aug} = 3 \text{ days}$$

$$\text{Total} = 146 \text{ days}$$

$$T = 146/365 = 2/5 \text{ years}$$

Here

$$S.I = (P \times R \times T) / 100$$

Substituting the values

$$= (850 \times 5 \times 2) / (100 \times 2 \times 5)$$

$$= ₹ 8.50$$

$$\text{Amount} = P + S.I$$

Substituting the values

$$= 850 + 8.50$$

$$= ₹ 858.50$$

(vii) ₹ 225 for 3 years 9 months at 16% p.a.

We know that

$$P = ₹ 225$$

$$R = 16\% \text{ p.a.}$$

$$T = 3 \text{ years } 9 \text{ months} = 3 \frac{9}{12} = 3 \frac{3}{4} \text{ years} = 15/4 \text{ years}$$

Here

$$S.I = (P \times R \times T) / 100$$

Substituting the values

$$= (225 \times 16 \times 15) / (100 \times 4)$$

$$= ₹ 135$$

$$\text{Amount} = P + S.I$$

Substituting the values

$$= 225 + 135$$

$$= ₹ 360$$

2. On what sum of money does the S.I. for 10 years at 5% become ₹ 1,600?

Solution:

It is given that

$$S.I = ₹ 1,600$$

$$R = 5\% \text{ p.a.}$$

$$T = 10 \text{ years}$$

We know that

$$P = (S.I \times 100) / (R \times T)$$

Substituting the values

$$= (1600 \times 100) / (5 \times 10)$$

So we get

$$= ₹ 3,200$$

3. Find the time in which ₹ 2,000 will amount to ₹ 2,330 at 11% p.a.

Solution:

It is given that

$$A = ₹ 2,330$$

$$P = ₹ 2,000$$

We know that

$$S.I = A - P$$

Substituting the values

$$= 2330 - 2000$$

$$= ₹ 330$$

Here

$$\text{Time} = (S.I \times 100) / (P \times R)$$

Substituting the values

$$= (330 \times 100) / (2000 \times 11)$$

So we get

$$= 3/2$$

$$= 1 \frac{1}{2} \text{ years}$$

4. In what time will a sum of money double itself at 8% p.a.

Solution:

Consider the principal

$$P = ₹ 100$$

It is given that

$$A = 100 \times 2 = ₹ 200$$

We know that

$$S.I = A - P$$

Substituting the values

$$= 200 - 100$$

$$= ₹ 100$$

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

Here

$$\text{Time} = (S.I \times 100) / (P \times R)$$

Substituting the values

$$\begin{aligned} &= (100 \times 100) / (100 \times 8) \\ \text{So we get} \\ &= 25/2 \\ &= 12 \frac{1}{2} \text{ years} \end{aligned}$$

5. In how many years will ₹ 870 amount to ₹ 1,044, the rate of interest being $2 \frac{1}{2}\%$ p.a.?

Solution:

It is given that
 $P = ₹ 870$
 $A = ₹ 1044$
We know that
 $S.I = P - A$
Substituting the values
 $= 1044 - 870$
 $= ₹ 174$
 $R = 2 \frac{1}{2} = 5/2 \% \text{ p.a.}$

We know that
 $\text{Time} = (S.I \times 100) / (P \times R)$
Substituting the values
 $= (174 \times 100 \times 2) / (870 \times 5)$
So we get
 $= 8 \text{ years}$

6. Find the rate percent, if the S.I. on ₹ 275 in 2 years is ₹ 22.

Solution:

It is given that
 $P = ₹ 275$
 $S.I = ₹ 22$
 $T = 2 \text{ years}$

We know that
 $\text{Rate} = (S.I \times 100) / (P \times T)$
Substituting the values
 $= (22 \times 100) / (275 \times 2)$
So we get
 $= 4\% \text{ p.a.}$

7. Find the sum which will amount to ₹ 700 in 5 years at 8% p.a.

Solution:

It is given that
Amount = ₹ 700
 $R = 8\% \text{ p.a.}$
 $T = 5 \text{ years}$
Consider $P = ₹ 100$

We know that

$$\begin{aligned} \text{S.I} &= (P \times R \times T) / 100 \\ \text{Substituting the values} \\ &= (100 \times 8 \times 5) / 100 \\ &= ₹ 40 \end{aligned}$$

Here

$$\begin{aligned} A &= P + \text{S.I} \\ \text{Substituting the values} \\ &= 100 + 40 \\ &= ₹ 140 \end{aligned}$$

If the amount is ₹ 140 then the principal is ₹ 100

If the amount is ₹ 700 then the principal = $(100 \times 700) / 140 = ₹ 500$

8. What is the rate of interest, if ₹ 3,750 amounts to ₹ 4,650 in 4 years?

Solution:

It is given that

$$P = ₹ 3,750$$

$$A = ₹ 4,650$$

We know that

$$\text{S.I} = A - P$$

Substituting the values

$$= 4650 - 3750$$

$$= ₹ 900$$

$$T = 4 \text{ years}$$

Here

$$\text{Rate} = (\text{S.I} \times 100) / (P \times T)$$

Substituting the values

$$= (900 \times 100) / (3750 \times 4)$$

So we get

$$= 6\% \text{ p.a.}$$

9. In 4 years, ₹ 6,000 amounts to ₹ 8,000. In what time will ₹ 525 amount to ₹ 700 at the same rate?

Solution:

It is given that

$$P = ₹ 6,000$$

$$A = ₹ 8,000$$

We know that

$$\text{S.I} = A - P$$

Substituting the values

$$= 8000 - 6000$$

$$= ₹ 2000$$

$$T = 4 \text{ years}$$

Here

$$\text{Rate} = (\text{S.I} \times 100) / (P \times T)$$

Substituting the values
 $= (2000 \times 100) / (6000 \times 4)$
So we get
 $= 25/3\%$
 $= 8 \frac{1}{3}\%$ p.a.

It is given that
 $P = ₹ 525$
 $A = ₹ 700$
We know that
 $S.I = A - P$
Substituting the values
 $= 700 - 525$
 $= ₹ 175$
 $R = 25/3\%$ p.a.

Here
Time $= (S.I \times 100) / (P \times R)$
Substituting the values
 $= (175 \times 100 \times 3) / (525 \times 25)$
So we get
 $= 4$ years

10. The interest on a sum of money at the end of $2 \frac{1}{2}$ years is $\frac{4}{5}$ of the sum. What is the rate percent?

Solution:

Consider the sum $P = ₹ 100$
 $S.I = 100 \times \frac{4}{5} = ₹ 80$
 $T = 2 \frac{1}{2} = \frac{5}{2}$ years

We know that
Rate $= (S.I \times 100) / (P \times T)$
Substituting the values
 $= (80 \times 100 \times 2) / (100 \times 5)$
So we get
 $= 32\%$ p.a.

11. What sum of money lent out at 5% for 3 years will produce the same interest as ₹ 900 lent out at 4% for 5 years?

Solution:

It is given that
 $P = ₹ 900$
 $R = 4\%$
 $T = 5$ years

We know that
 $S.I = (P \times R \times T) / 100$
Substituting the values
 $= (900 \times 4 \times 5) / 100$

$$= ₹ 180$$

It is given that

$$S.I = ₹ 180$$

$$R = 5\%$$

$$T = 3 \text{ years}$$

We know that

$$\text{Sum } P = (S.I \times 100) / (R \times T)$$

Substituting the values

$$= (180 \times 100) / (5 \times 3)$$

So we get

$$= ₹ 1200$$

12. A sum of ₹ 1,780 becomes ₹ 2,316 in 4 years. Find:

(i) the rate of interest.

(ii) the sum that will become ₹ 810 in 7 years at the same rate of interest.

Solution:

(i) It is given that

$$P = ₹ 1780$$

$$A = ₹ 2136$$

We know that

$$S.I = A - P$$

Substituting the values

$$= 2136 - 1780$$

$$= ₹ 356$$

$$T = 4 \text{ years}$$

Here

$$\text{Rate} = (S.I \times 100) / (P \times T)$$

Substituting the values

$$= (356 \times 100) / (1780 \times 4)$$

So we get

$$= 5\% \text{ p.a.}$$

(ii) Consider $P = ₹ 100$

$$R = 5\% \text{ p.a.}$$

$$T = 7 \text{ years}$$

We know that

$$S.I = (P \times R \times T) / 100$$

Substituting the values

$$= (100 \times 5 \times 7) / 100$$

$$= ₹ 35$$

Here amount = $P + S.I$

Substituting the values

$$= 100 + 35$$

$$= ₹ 135$$

If the amount is ₹ 135 then the principal is ₹ 100

If the amount is ₹ 810 then principal = $(100 \times 810) / 135 = ₹ 600$

13. A sum amounts to ₹ 2,652 in 6 years at 5% p.a. simple interest. Find:

(i) the sum

(ii) the time in which the same sum will double itself at the same rate of interest.

Solution:

(i) Consider $P = ₹ 100$

$R = 5\%$ p.a.

$T = 6$ years

We know that

$$S.I = (P \times R \times T) / 100$$

Substituting the values

$$= (100 \times 5 \times 6) / 100$$

$$= ₹ 30$$

Here amount = $100 + 30 = ₹ 130$

If the amount is ₹ 130 then principal is ₹ 100

If the amount is ₹ 2652 then principal = $(100 \times 2652) / 130 = ₹ 2040$

Consider sum $P = ₹ 100$

Amount = $100 \times 2 = ₹ 200$

We know that

$$S.I = A - P$$

Substituting the values

$$= 200 - 100$$

$$= ₹ 100$$

$R = 5\%$ p.a.

Here

$$T = (S.I \times 100) / (P \times R)$$

Substituting the values

$$= (100 \times 100) / (100 \times 5)$$

So we get

$$= 20 \text{ years}$$

14. P and Q invest ₹ 36,000 and ₹ 25,000 respectively at the same rate of interest per year. If at the end of 4 years, P gets ₹ 3,080 more interest than Q, find the rate of interest.

Solution:

It is given that

P's investment (P_1) = ₹ 36,000

Q's investment (P_2) = ₹ 25,000

$T = 4$ years

Consider the rate of interest = $x\%$

So we get

$$P's \text{ interest } (S.I) = (P \times R \times T) / 100$$

Substituting the values

$$= (36000 \times x \times 4) / 100$$

$$= ₹ 1440x$$

$$Q's \text{ interest} = (P \times R \times T) / 100$$

Substituting the values

$$= (25000 \times x \times 4) / 100$$

$$= ₹ 1000x$$

$$\text{Here the difference in their interest} = 1440x - 1000x = ₹ 440x$$

$$\text{The difference given} = ₹ 3080$$

So we get

$$440x = 3080$$

$$x = 3080/440$$

$$x = 7\%$$

$$\text{So the rate of interest} = 7\% \text{ p.a.}$$

15. A sum of money is lent for 5 years at R% simple interest per annum. If the interest earned be one-fourth of the money lent, find the value of R.

Solution:

$$\text{Consider the sum } P = ₹ 100$$

We know that

$$S.I = 1/4 \times 100 = ₹ 25$$

$$T = 5 \text{ years}$$

Here

$$\text{Rate} = (S.I \times 100) / (P \times T)$$

Substituting the values

$$= (25 \times 100) / (100 \times 5)$$

So we get

$$= 5\%$$

16. The simple interest earned on a certain sum in 5 years is 30% of the sum. Find the rate of interest.

Solution:

$$\text{Consider sum } P = ₹ 100$$

We know that

$$SI = 30/100 \times 100 = ₹ 30$$

$$T = 5 \text{ years}$$

Here

$$\text{Rate} = (S.I \times 100) / (P \times T)$$

Substituting the values

$$= (30 \times 100) / (100 \times 5)$$

So we get

$$= 6\%$$