

Simple Interest

Exercise 12B

Q1

Answer :

(a) Rs. 125

Principal = Rs. 6250

Simple Interest = 4% per annum

Time = 6 months = $\frac{1}{2}$ years

$$\text{Simple Interest} = \frac{P \times R \times T}{100}$$

$$\text{Simple Interest} = \frac{6250 \times 4 \times 1}{100 \times 2}$$

$$\text{Simple Interest} = \frac{250}{2} = \text{Rs. 125}$$

Q2

Answer :

(b) Rs. 3500

Amount = Rs. 3605

Time = $\frac{219}{365}$ days = $\frac{219}{365}$ days

Rate = 5% per annum

$$\text{Amount} = \text{Sum} + \frac{\text{Sum} \times \text{Rate} \times \text{Time}}{100}$$

$$\text{Amount} = \text{Sum} \left(1 + \frac{\text{Rate} \times \text{Time}}{100} \right)$$

$$\text{Sum} = \frac{3605}{1 + \frac{5}{100} \times \frac{219}{365}} = \frac{3605 \times 36500}{37595}$$

Sum = Rs. 3500

Q3

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Answer :

(c) 8%

Let the sum be Rs. x .

Rate of interest = $r\%$

Time = $2\frac{1}{2}$ years = $\frac{5}{2}$ years

Amount = $\frac{6}{5} \times \text{Sum}$

Rate = ?

Amount = $\frac{6}{5} \times \text{Sum}$

Principal + S.I. = Amount

Principal + $\frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100} = \frac{6}{5} \times \text{Principal}$

$$\Rightarrow x + \frac{xr \times 5}{100 \times 2} = \frac{6}{5}x$$

$$\Rightarrow x \left(1 + \frac{5r}{100 \times 2} \right) = \frac{6}{5}x$$

$$\Rightarrow 1 + \frac{r}{40} = \frac{6}{5}$$

$$\Rightarrow r = 40 \times \frac{1}{5}$$

$$\Rightarrow r = 8$$

So, the rate of interest is 8%.

Q4

Answer :

(b) 9 months

4. (b)

Let the time be t years.

Principal = Rs. 8000

Amount = Rs. 8360

Rate = 6% per annum

Amount = Principal $\left(1 + \frac{\text{Rate} \times \text{Time}}{100} \right)$

$$\frac{8360}{8000} = 1 + \frac{6 \times t}{100}$$

$$\Rightarrow \frac{8360}{8000} - 1 = \frac{6t}{100}$$

$$\Rightarrow t = \left(\frac{8360 - 8000}{8000} \right) \times \frac{100}{6}$$

$$= \frac{360}{8000} \times \frac{100}{6}$$

$$= \frac{6}{8} \times 12 \text{ months}$$

$$= 9 \text{ months}$$

Q5

Answer :

(b) 10%

Let the sum be Rs. x and the rate be $r\%$.

A/Q:

Amount = $2x$

$$\Rightarrow P + S.I. = 2x$$

$$\Rightarrow P + \frac{P \times R \times T}{100} = 2x$$

$$\Rightarrow x \left(1 + \frac{r \times 10}{100} \right) = 2x$$

$$\Rightarrow \frac{100 + 10r}{100} = 2$$

$$\Rightarrow 10r = 200 - 100$$

$$\Rightarrow 10r = 100$$

$$\Rightarrow r = \frac{100}{10}$$

$$\Rightarrow r = 10$$

Q6

Answer :

(c) Rs. $\left(\frac{100}{x}\right)$

Simple Interest = Rs. x

Rate = $x\%$ per annum

Time = x years

$$\text{Simple Interest} = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$$

$$\Rightarrow x = \frac{\text{Principal} \times x \times x}{100}$$

$$\Rightarrow \text{Principal} = \text{Rs. } \frac{100}{x}$$

Q7

Answer :

(b) 8%

Time = 5 years

$$\text{Simple interest} = \frac{2}{5} P$$

$$\Rightarrow \frac{P \times \text{Rate} \times \text{Time}}{100} = \frac{2}{5} P$$

$$\Rightarrow \frac{\text{Rate} \times 5}{100} = \frac{2}{5}$$

$$\Rightarrow \text{Rate} = \frac{2 \times 100}{5 \times 5}$$

$$\Rightarrow \text{Rate} = 8\%$$

Q8

Answer :

(c) 22 years

$$R_1 = 12\%$$

$$R_2 = 10\%$$

$$P_1 = \text{Rs. } 8000$$

$$P_2 = \text{Rs. } 9100$$

Let their amounts be equal in T years.

$$\begin{aligned} \text{Amount}_1 &= S.I._1 + P_1 \\ &= \frac{P_1 \times R_1 \times T}{100} + P_1 \\ &= \frac{8000 \times 12 \times T}{100} + 8000 \\ &= 960T + 8000 \end{aligned}$$

$$\begin{aligned} \text{Amount}_2 &= S.I._2 + P_2 \\ &= \frac{P_2 \times R_2 \times T}{100} + P_2 \\ &= \frac{9100 \times 10 \times T}{100} + 9100 \\ &= 910T + 9100 \end{aligned}$$

$$\begin{aligned} \text{Amount}_1 &= \text{Amount}_2 \\ \Rightarrow 960T + 8000 &= 910T + 9100 \\ \Rightarrow 960T - 910T &= 9100 - 8000 \\ \Rightarrow 50T &= 1100 \\ \Rightarrow T &= 22 \end{aligned}$$

Hence, after 22 years their amounts will be equal.

Q9

Answer :

(c) Rs. 768

Let the rate be $R\%$.

$$\begin{aligned} S.I. &= A - P \\ &= 720 - 600 \\ &= \text{Rs. } 120 \end{aligned}$$

Time = 4 years

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

$$R = \frac{100 \times 120}{600 \times 4}$$

$$= 5$$

Rate of interest = 5%

Now, $R = (5 + 2)\% = 7\%$

$$S.I. = \frac{P \times R \times T}{100}$$

$$= \frac{600 \times 7 \times 4}{100}$$

$$= \text{Rs. } 168$$

Amount = $SI + P$

$$= 600 + 168$$

$$= \text{Rs. } 768$$

Q10

Answer :

(d) $y^2 = zx$

$$y = \text{S.I. on } x = \frac{x \times R \times T}{100} \quad \dots (i)$$

$$z = \text{S.I. on } y = \frac{y \times R \times T}{100} \quad \dots (ii)$$

Dividing equation (i) by (ii) :

$$\Rightarrow \frac{y}{z} = \left(\frac{x \times R \times T}{100} \times \frac{100}{y \times R \times T} \right)$$

$$\Rightarrow \frac{y}{z} = \frac{x}{y}$$

$$\Rightarrow y^2 = xz$$

Q11

Answer :

(a) $1\frac{1}{4}$ years

Rate = 10% per annum

Simple Interest = $0.125 \times \text{Principal}$

$$\Rightarrow \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100} = 0.125 \times \text{Principal}$$

$$\Rightarrow \frac{\text{Time}}{10} = 0.125$$

$$\Rightarrow \text{Time} = 1.25 = 1\frac{1}{4} \text{ years}$$

Q12

Answer :

(b) Rs 2400

Rate = $3\frac{3}{4}\%$ per annum

$$= \frac{15}{4}\% \text{ per annum}$$

Time = $2\frac{1}{3}$ years

$$= \frac{7}{3} \text{ years}$$

$$S.I. = \frac{P \times \frac{15}{4} \times \frac{7}{3}}{100}$$

$$\Rightarrow P = \frac{210 \times 100}{\left(\frac{15}{4} \times \frac{7}{3}\right)}$$

$$\Rightarrow P = 600 \times 4$$

$$\Rightarrow P = \text{Rs } 2400$$