

Chapter 9: Commercial Mathematics

EXERCISE 9.1 [PAGE 124]

Exercise 9.1 | Q 1 | Page 124

Find 77% of 580 + 34% of 390.

SOLUTION

$$\begin{aligned} & 77\% \text{ of } 580 + 34\% \text{ of } 390 \\ &= \frac{77}{100} \times 580 + \frac{34}{100} \times 390 \\ &= \frac{77}{5} \times 29 + \frac{17}{5} \times 39 \\ &= \frac{2233 + 663}{5} \\ &= \frac{2896}{5} \\ &= 579.2 \end{aligned}$$

Exercise 9.1 | Q 2 | Page 124

240 candidates appeared for an examination, of which 204 passed. What is the pass percentage?

SOLUTION

We find the pass percentage using unitary method

Total number of students	Number of students passed
240	204
100	$= \frac{204 \times 100}{240}$
	$= \frac{51 \times 100}{60}$
	$= \frac{17 \times 10}{2}$
	$= 85$

∴ Pass percentage for the examination is 85%

Exercise 9.1 | Q 3 | Page 124

What percent of 8.4 kg are 168 grams?

SOLUTION

Let 168 gms be $x\%$ of 8.4 kg

i.e., let 168 gms be $\frac{x}{100}$ of 8400 gms

$$\therefore 168 = \frac{x}{100} \times 8400$$

$$\therefore x = \frac{168}{84} = 2$$

∴ 168 gms is 2% of 8.4 kg.

Exercise 9.1 | Q 4 | Page 124

If the length of a rectangle is decreased by 20%, what should be the increase in the breadth of the rectangle so that the area remains the same?

SOLUTION

Let x and y represent the length and breadth of the rectangle respectively.

∴ The original area of the rectangle = xy

There is a 20% decrease in length.

$$\begin{aligned}\therefore \text{New length} &= x - \frac{20}{100}x = x - \frac{1}{5}x \\ &= x\left(1 - \frac{1}{5}\right) = x\left(\frac{5-1}{5}\right) = \frac{4}{5}x\end{aligned}$$

Let $k\%$ be the required increase in breadth

$$\begin{aligned}\therefore \text{New breadth} &= y + \frac{k}{100}y \\ &= y\left(1 + \frac{k}{100}\right)\end{aligned}$$

Given that the new and old areas should be equal.

$$\therefore \left(\frac{4}{5}x\right)\left(1 + \frac{k}{100}\right)y = xy$$

$$\therefore \left(\frac{4}{5}\right)\left(\frac{100+k}{100}\right) = 1$$

$$\therefore \frac{100+k}{100} = \frac{5}{4}$$

$$\therefore 100 + k = 125$$

$$\therefore k = 125 - 100 = 25$$

Breadth should be increased by 25% so that the area remains same.

Exercise 9.1 | Q 5 | Page 124

The price of rice increased by 20%, as a result, a person can have 5 kg of rice for ₹ 600. What was the initial price of rice per kg?

SOLUTION

A person can buy 5 kg of rice for ₹ 600 after the increase in price

$$\therefore \text{The new price of rice} = \frac{600}{5} = ₹ 120/\text{kg} \dots(i)$$

Let 'x' be the initial price per kg of rice.

There is a 20% increase in the price of rice.

Thus the new price of the rice will be given as

$$x \left(1 + \frac{20}{100} \right)$$

Equation with (i), we get

$$x \left(1 + \frac{20}{100} \right) = 120$$

$$\therefore x \left(\frac{100 + 20}{100} \right) = 120$$

$$\therefore \frac{120x}{100} = 120$$

$$\therefore x = 100$$

\therefore The initial price of rice is ₹ 100 per kg

Exercise 9.1 | Q 6 | Page 124

What percent is 3% of 5%?

SOLUTION

Let 3% be x% of 5%.

$$\text{Then } \frac{3}{100} = \frac{x}{100} \times \frac{5}{100}$$

$$\therefore x = \frac{3 \times 100}{5} = 60$$

\therefore 3% is 60% of 5%.

Exercise 9.1 | Q 7 | Page 124

After availing two successive discounts of 20% each, Madhavi paid Rs 64 for a book. If she would have got only one discount of 20%, how much additional amount would she have paid?

SOLUTION

Let the price of the book be ₹ x .

After the first 20% discount, the price of the book becomes

$$\begin{aligned} &= x \left(1 - \frac{20}{100} \right) \\ &= x \left(1 - \frac{1}{5} \right) \\ &= \frac{4x}{5} \dots\dots\dots(i) \end{aligned}$$

After another 20% discount, the price of the book becomes

$$\begin{aligned} &= \left(1 - \frac{20}{100} \right) \left(\frac{4}{5} x \right) \\ &= \left(1 - \frac{1}{5} \right) \left(\frac{4}{5} x \right) \\ &= \left(\frac{4}{5} \right) \left(\frac{4}{5} \right) x \\ &= \frac{16}{25} x \end{aligned}$$

This price = ₹ 64[Given]

$$\therefore \frac{16}{25} x = 64$$

$$\therefore x = 4 \times 25 = 100$$

Thus, Amount of the book after one discount

$$= \frac{4}{5}(100) = 80 \quad \dots[\text{from(i)}]$$

\therefore The additional amount that Madhavi would have paid = $80 - 64 = ₹ 16$.

Exercise 9.1 | Q 8 | Page 124

The price of the table is 40% more than the price of a chair. By what percent price of a chair is less than the price of a table?

Let ₹ x and ₹ y be the price of a table and chair respectively.

The price of the table is 40% more than the price of a chair

$$\therefore \frac{x - y}{y} \times 100 = 40$$

$$\therefore \frac{x - y}{y} = \frac{40}{100} = \frac{2}{5}$$

$$\therefore \frac{x}{y} - \frac{y}{y} = \frac{2}{5}$$

$$\therefore \frac{x}{y} - 1 = \frac{2}{5}$$

$$\therefore \frac{x}{y} = 1 + \frac{2}{5}$$

$$\therefore \frac{x}{y} = \frac{7}{5} \quad \dots\dots\dots(i)$$

We need to find by how much percent is price of chair less than that of a table.

$$\text{i.e.} \left(\frac{x - y}{x} \right) \times 100 = \left(\frac{x}{x} - \frac{y}{x} \right) \times 100$$

$$\begin{aligned}
&= \left(1 - \frac{y}{x}\right) \times 100 \\
&= \left(1 - \frac{5}{7}\right) \times 100 \quad \dots\dots\dots \left[\because \frac{x}{y} = \frac{7}{5}\right] \\
&= \left(\frac{7-5}{7}\right) \times 100 \\
&= \frac{2 \times 100}{7} = 28.57\%
\end{aligned}$$

\therefore The price of chair is 28.57% less than the price of a table

Exercise 9.1 | Q 9 | Page 124

A batsman scored 92 runs which included 4 boundaries 5 sixes. He scored other runs by running between the wickets. What percent of his total score did he make by running between the wickets?

SOLUTION

Batsman scores 4 fours (boundaries) and 5 sixes in 92 runs,

5 sixes in 92 runs,

Number of runs scored by fours and sixes = $4 \times 4 + 5 \times 6 = 46$

$\therefore 92 - 46 = 46$

Let 46 be x% of 92.

Then $46 = \frac{x}{100} \times 92$

$$\therefore x = \frac{46 \times 100}{92} = \frac{100}{2} = 50$$

\therefore 50% of the total runs were scored by running between the wickets.

EXERCISE 9.2 [PAGE 127]

Exercise 9.2 | Q 1 | Page 127

Mr. Sarad purchased a laptop for Rs. 24000 and sold it for Rs. 30000. What was the profit percentage?

SOLUTION

Cost price (C.P.) = ₹ 24000

Selling price (S. P.) = ₹ 30,000

Profit = S.P. – C.P.

= 30,000 - 24,000

= 6,000

$$\text{Profit\%} = \frac{\text{Profit} \times 100}{\text{C.P.}}$$

$$= \frac{6000 \times 100}{24000}$$

$$= \frac{6}{24} \times 100 = \frac{100}{4} = 25$$

∴ Profit Percentage = 25%

Exercise 9.2 | Q 2 | Page 127

Shraddha purchases a mobile phone and refrigerator for Rs. 18000 and 15,000 respectively. She sold the refrigerator at a loss of 20% and the mobile at a profit of 20%. What is her overall profit or loss?

SOLUTION

C.P. of mobile phone = ₹ 18,000

Profit percentage on mobile phone = 20%

∴ Selling price (S.P.) of mobile phone

$$= 18,000 \left(1 + \frac{20}{100} \right) = 18,000 \left(1 + \frac{1}{5} \right)$$

$$= 18,000 \times \frac{6}{5} = ₹ 21,600$$

C.P. of refrigerator = 15,000

Loss percentage on refrigerator = 20%

$$\therefore \text{Selling price (S.P.)} = 15000 \left(1 - \frac{20}{100} \right)$$

$$= 15,000 \left(1 - \frac{1}{5} \right)$$

$$= 15,000 \times \frac{4}{5}$$

$$= ₹ 12,000$$

\therefore Total selling price for the transaction

$$= 21,600 + 12,000$$

$$= ₹ 33,600$$

Total cost price (purchase price) for the transaction = 18,000 + 15,000 = ₹ 33,000

\therefore Overall profit made by Shraddha

$$= \text{Total S.P.} - \text{Total C.P.}$$

$$= 33,600 - 33,000$$

$$= ₹ 600$$

Thus, Shraddha made an overall profit of ₹ 600.

Exercise 9.2 | Q 3 | Page 127

A vendor bought toffees at 6 for Rs.10. How many for Rs.10 must he sell to gain 20%?

SOLUTION

The vendor bought toffees at the rate of 6 for ₹ 10

$$\therefore \text{The cost price of one toffee} = \frac{10}{6}$$

$$\text{i.e. C.P.} = \frac{10}{6} \dots\dots\dots(i)$$

Let x be the number of toffees he must sell in ₹ 10 to gain 20%

$$\therefore \text{i.e. S.P.} = \frac{10}{x} \dots\dots\dots(ii)$$

$$\text{Profit percentage} = \frac{\text{S.P.} - \text{C.P.}}{\text{C.P.}}$$

Using (i) and (ii) we have

$$20\% = \frac{\frac{10}{x} - \frac{10}{6}}{\frac{10}{6}}$$

$$\therefore \frac{20}{100} = 10 \left(\frac{1}{x} - \frac{1}{6} \right) \times \frac{6}{10}$$

$$\therefore \frac{1}{5} = \left(\frac{1}{x} - \frac{1}{6} \right) 6$$

$$\therefore \frac{1}{x} - \frac{1}{6} = \frac{1}{30}$$

$$\therefore \frac{6 - x}{6x} = \frac{1}{30}$$

$$\therefore 30(6 - x) = 6x$$

$$\therefore 180 - 30x = 6x$$

$$\therefore 36x = 180$$

$$\therefore x = 5$$

The vendor must sell 5 toffees for ₹ 10 in order to gain 20%

Exercise 9.2 | Q 4 | Page 127

The percentage profit earned by selling an article for Rs. 2880 is equal to the percentage loss incurred by selling the same article for Rs. 1920. At what price the article should be sold to earn a 25% profit?

SOLUTION

Let x be C.P. of the article

Let $y\%$ be both, the gain and loss made when the article is sold at ₹ 2,880 and ₹ 1,920 respectively. Then

$$x + \frac{y}{100}x = 2880 \text{(i)}$$

$$x - \frac{y}{100}x = 1920 \text{(ii)}$$

Adding (i) and (ii), we get

$$2x = 4800$$

$$\therefore x = 2400$$

i.e. C.P. of the article = ₹ 2400

Required profit percentage = 25%

$$\therefore \text{S.P.} = \text{C.P.} \left[1 + \frac{\text{Profit}\%}{100} \right]$$

$$= 2400 \left[1 + \frac{25}{100} \right]$$

$$= 2400 \left[1 + \frac{1}{4} \right]$$

$$= 2400 \times \frac{5}{4}$$

$$= 3000$$

\therefore The article should be sold at ₹ 3000 to earn 25% profit.

Exercise 9.2 | Q 5 | Page 127

A cloth merchant advertises selling cloth at a 4% loss. By using a faulty meter scale, he is earning a profit of 20%. What is the actual length of the scale?

SOLUTION

Let the cost price of the cloth be ₹ ' x ' per meter

He claims a loss of 4%

∴ The selling price of the cloth

$$\text{S.P.} = \text{C.P.} \left(1 - \frac{\text{loss}\%}{100} \right)$$

$$= x \left(1 - \frac{4}{100} \right)$$

$$= 0.96x \text{(i)}$$

The actual cost price of the cloth is lower as the cloth is measured by a faulty meter scale.

Given that shopkeeper's profit = 20%

$$\text{Now, S.P.} = \text{C.P.} \left(1 + \frac{\text{Profit}\%}{100} \right)$$

$$\therefore \text{S.P.} = \text{C.P.} \div \left(1 + \frac{\text{Profit}\%}{100} \right)$$

$$\therefore \text{Actual C.P.} = 0.96x \div \left(1 + \frac{20}{100} \right) \text{[From (i)]}$$

$$= 0.96x \div \left(1 + \frac{1}{5} \right)$$

$$= 0.96x \div \frac{6}{5}$$

$$= 0.96x \times \frac{5}{6}$$

$$= 0.8x$$

∴ The actual cost price is 0.8 times the cost price as advertised. In other words, the meter scale used for the fraud is 0.8 times the meter scale that should have been used.

∴ The length of the faulty meter scale used

$$= 0.8 \times 1$$

$$= 0.8 \text{ meter}$$

∴ The actual length of the scale is 0.8 meters.

Exercise 9.2 | Q 6 | Page 127

Sunil sells his bike worth Rs. 25000 to Rohit at a profit of 20%. After 6 months Rohit sells the bike back to Sunil at a loss of 20%. Find the total profit percent of Sunil considering both the transactions.

SOLUTION

Sunil sells his bike to Rohit at 20% profit.

So S.P. of the bike for Sunil

$$= 25000 + \frac{20}{100} \times 25000$$

$$= 25000 + 5000$$

$$= 30000$$

∴ The cost price of a bike to Rohit = ₹ 30000

Rohit sells the bike back to Sunil at a 20% loss

∴ S.P. of the bike for Rohit

$$= 30000 - \frac{20}{100} \times 30000$$

$$= 30000 - 6000$$

$$= 24000$$

∴ In the second transaction, Sunil pays 24000 to Rohit

In the first transaction, he had received 30000 from Rohit

∴ Sunil made a profit of ₹ (30000 – 24000)

$$= ₹ 6000$$

Sunil earned this profit on the bike which cost him ₹ 25000

∴ Total profit % that Sunil makes

$$= \frac{6000}{25000} \times 100$$

$$= \frac{600}{25}$$

$$= 24$$

∴ Sunil makes a 24% profit considering both the transactions.

Exercise 9.2 | Q 7 | Page 127

By selling a book at Rs. 405 bookseller incurs a loss of 25%. Find the cost price of the book.

SOLUTION

$$\text{S.P.} = ₹ 405$$

$$\text{Loss\%} = 25$$

S.P., when there is a loss, is given by

$$\text{S.P.} = \text{C.P.} \times \left[1 - \frac{\text{loss\%}}{100} \right]$$

$$\therefore 403 = \text{C.P.} \times \left[1 - \frac{25}{100} \right]$$

$$\therefore 403 = \frac{100 - 25}{100} \times \text{C.P.}$$

$$\therefore \text{C.P.} = \frac{405 \times 100}{75}$$

$$= \frac{405 \times 4}{3}$$

$$= 135 \times 4$$

$$= 540$$

∴ The cost price of the book is ₹ 540.

Exercise 9.2 | Q 8 | Page 127

A cloth costs Rs. 675. If it is sold at a loss of 20%, what is its cost price as a percentage of its selling price?

SOLUTION

$$\text{C.P.} = ₹ 675$$

$$\text{Loss\%} = 20\%$$

$$\therefore \text{Loss made in selling} = \frac{20}{100} \times 675 = ₹ 135$$

$$\text{S.P.} = \text{C.P.} - \text{Loss}$$

$$= 675 - 135$$

$$= ₹ 540$$

Let C.P. be $x\%$ S.P.,

$$\text{Then } 675 = \frac{x}{100} \times 540$$

$$\therefore x = \frac{675 \times 100}{540}$$

$$= \frac{5}{4} \times 100 = 125$$

\therefore The cost price is 125% of the selling price.

Exercise 9.2 | Q 9 | Page 127

Ashwin buys an article for Rs. 500. He marks it for sale at 75% more than the cost price. He offers a 25% discount on the marked price to his customer. Calculate the actual percentage of profit made by Ashwin.

SOLUTION

$$\text{C.P.} = ₹ 500$$

$$\text{Marked price} = \text{C.P.} + \frac{75}{100} \times \text{C.P.}$$

$$= 500 + \frac{75}{100} \times 500$$

$$= 500 + 75 \times 5$$

$$= 500 + 375$$

$$= 875$$

25 % discount was given on marked price

$$\therefore \text{Discount} = \frac{25}{100} \times 875$$

$$= \frac{875}{4}$$

Selling price = marked price – discount

$$= 875 - \frac{875}{4}$$

$$= 875 \left(1 - \frac{1}{4} \right)$$

$$= \frac{875 \times 3}{4}$$

Profit = S.P. – C.P.

$$= \frac{875 \times 3}{4} - 500$$

$$= \frac{2625 - 2000}{4}$$

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

$$\text{Profit percentage} = \frac{\text{Profit}}{\text{cost price}} \times 100$$

$$= \frac{625}{\frac{4}{500}} \times 100$$

$$= \frac{625}{4 \times 5}$$

$$= \frac{125}{4}$$

$$= 31.25$$

∴ Ashwin makes 31.25% profit.

Exercise 9.2 | Q 10 | Page 127

The combined cost price of a refrigerator and a mixture is Rs. 12400. If the refrigerator costs 600% more than the mixer, find the cost price of the mixture.

SOLUTION

Let ₹ x be the cost price of the mixer.

The cost price of the refrigerator

$$= x + \frac{600}{100}x = x + 6x = 7x$$

Total cost price = 12400[Given]

$$\text{i.e. } x + 7x = 12400$$

$$\text{i.e. } 8x = 12400$$

$$\therefore x = \frac{12400}{8} = 1550$$

∴ The cost price of mixer is ₹ 1550.

Exercise 9.2 | Q 11 | Page 127

Find the single discount equivalent to the discount series of 5%, 7%, and 9%.

SOLUTION

Let the marked price be ₹ 100

$$\text{After 1}^{\text{st}} \text{ discount the price} = 100 \left(1 - \frac{5}{100} \right) = 95$$

$$\text{After the 2}^{\text{nd}} \text{ discount the price} = 95 \left(1 - \frac{7}{100} \right)$$

$$= \frac{95 \times 93}{100}$$

$$\text{After 3}^{\text{rd}} \text{ discount the price} = \frac{95 \times 93}{100} \left(1 - \frac{9}{100} \right)$$

$$= \frac{95 \times 93 \times 91}{100 \times 100}$$

$$= \frac{803985}{10000}$$

$$= 80.3985$$

$$\approx 80.4$$

The selling price after 3 discounts is ₹ 80.4

∴ Single equivalent discount

$$= \text{Marked price} - \text{Selling price}$$

$$= 100 - 80.4$$

$$= ₹ 19.6$$

∴ Single equivalent discount is 19.6%

Exercise 9.2 | Q 12 | Page 127

The printed price of a shirt is Rs. 390. Lokesh pays Rs. 175.50 for it after getting two successive discounts. If the first discount is 10%, find the second discount.

SOLUTION

Marked price = ₹ 390

After the first discount of 10%, the price of the shirt

$$\begin{aligned} &= 390 - \frac{10}{100}(390) \\ &= 390 \left(1 - \frac{1}{10} \right) \\ &= 390 \left(\frac{9}{10} \right) \end{aligned}$$

Let the second discount be x %. Then

$$390 \left(\frac{9}{10} \right) \left(1 - \frac{x}{100} \right) = 175.5 \quad \text{.....[Given that Lokesh bought the shirt for ₹ 175.50]}$$

$$\begin{aligned} \therefore 1 - \frac{x}{100} &= \frac{175.5 \times 10}{390 \times 9} \\ &= \frac{19.5 \times 10}{390} \\ &= \frac{195}{390} \\ &= \frac{1}{2} \end{aligned}$$

$$\therefore \frac{x}{100} = 1 - \frac{1}{2} = \frac{1}{2}$$

$$\therefore x = 50$$

\therefore The second discount is 50%

Exercise 9.2 | Q 13 | Page 127

Amar, a manufacturer, gives a discount of Rs. 25% on the list price to his distributor Akbar, Akbar sales at a 10% discount on the list price to his customer Anthony. Anthony paid Rs 540 for the article. What is the profit percentage of Akbar on his cost price?

SOLUTION

Let ₹ 'x' be the list price of the article.

Amar gives a discount of 25% on the list price.

$$\begin{aligned}\therefore \text{Selling price for Amar} &= x \left(1 - \frac{25}{100} \right) \\ &= x \left(1 - \frac{1}{4} \right) \\ &= ₹ \frac{3x}{4}\end{aligned}$$

Amar sells the article to Akbar

$$\therefore \text{Cost price of article for Akbar} = ₹ \frac{3x}{4} \dots\dots(i)$$

Akbar sells the article to Anthony at 10% discount on list price

$$\begin{aligned}\therefore \text{Selling price for Akbar} &= x \left(1 - \frac{10}{100} \right) \\ &= x \left(1 - \frac{1}{10} \right) \\ &= ₹ \frac{9x}{10} \dots\dots(ii)\end{aligned}$$

$$\text{Profit percentage} = \frac{\text{S.P.} - \text{C.P.}}{\text{C.P.}} \times 100$$

Using (i) and (ii), we have the profit percentage for Akbar as,

$$\begin{aligned}\text{Profit percentage} &= \frac{\frac{9x}{10} - \frac{3x}{4}}{\frac{3x}{4}} \times 100 \\ &= \frac{36x - 30x}{40} \times \frac{4}{3x} \times 100\end{aligned}$$

$$= \frac{6x}{40} \times \frac{4}{3x} \times 100$$

$$= 20\%$$

∴ Akbar gets a profit of 20% on his cost price.

Exercise 9.2 | Q 14 | Page 127

A man sells an article at a profit of 25%. If he had bought it at 10% less and sold it for Rs 7 less, he would have gained 35%. Find the cost price of the article.

SOLUTION

Let ₹ 'x' be the C.P. of the article

∴ The article was sold at 25% profit

$$\therefore \text{S.P. of the article} = x \left(1 + \frac{25}{100} \right)$$

$$= x \left(1 + \frac{1}{4} \right)$$

$$= x \times \frac{5}{4}$$

$$= 1.25x$$

If the article was bought at a 10% loss

$$\text{i.e. the new C.P.} = x \left(1 - \frac{10}{100} \right)$$

$$= x \left(\frac{9}{10} \right) = 0.9x$$

and sold at ₹ 7 less

$$\therefore \text{New S.P.} = 1.25x - 7$$

Then, the profit would have been 35%

$$\text{Using profit percentage} = \frac{\text{S.P.} - \text{C.P.}}{\text{C.P.}} \times 100$$

$$\therefore 35 = \frac{(1.25x - 7) - 0.9x}{0.9x} \times 100$$

$$\therefore \frac{35}{100} = \frac{0.35x - 7}{0.9x}$$

$$\therefore \frac{7}{20} = \frac{0.35x - 7}{0.9x}$$

$$\therefore 6.3x = 20(0.35x - 7)$$

$$\therefore 6.3x = 7x - 140$$

$$\therefore 7x - 6.3x = 140$$

$$\therefore 0.7x = 140$$

$$\therefore x = \frac{140}{0.7}$$

$$\therefore x = 200$$

\therefore Cost price of the article is ₹ 200

Required Probability that the room is lit is

$$\therefore P(A') = 1 - P(A)$$

$$= 1 - \frac{1}{6}$$

$$= \frac{5}{6}.$$

Exercise 9.2 | Q 15 | Page 127

Mr. Mehta sold his two luxury cars at Rs. 39,10,000 each. On one he gains 15% but on the other, he loses 15%. How much does he gain or lose in the whole transaction?

SOLUTION

Let x, y be the C.P. of two cars.

S.P. of both the cars = 39,10,000 ...[Given]

∴ One car is sold at a 15% loss

$$\therefore \text{S.P. of the first car} = x - \frac{15}{100}x$$

$$\therefore \frac{85}{100}x = 39,10,000$$

$$\begin{aligned}\therefore x &= \frac{39,10,000 \times 100}{85} \\ &= \frac{2,30,000 \times 100}{5}\end{aligned}$$

$$= 46,000 \times 100$$

$$= 46,00,000$$

Other car is sold at 15% gain

$$\therefore \text{S.P. of second car} = y + \frac{15}{100}y$$

$$\therefore y + \frac{15}{100}y = 39,10,000$$

$$\therefore \frac{115}{100}y = 39,10,000$$

$$\begin{aligned}\therefore y &= \frac{39,10,000 \times 100}{115} \\ &= \frac{7,82,000 \times 100}{23}\end{aligned}$$

$$= 34,000 \times 100$$

$$= 34,00,000$$

$x + y = \text{Total C.P. of two cars}$

$$= 46,00,000 + 34,00,000$$

$$= 80,00,000$$

$$\text{Total S.P.} = 39,10,000 + 39,10,000$$

$$= 78,20,000$$

$$\therefore \text{S.P.} < \text{C.P.}$$

\therefore There is a loss of ₹ $(80,00,000 - 78,20,000)$

$$\therefore = ₹ 1,80,000$$

$$\therefore \text{Loss\%} = \frac{1,80,000}{80,00,000} \times 100$$

$$= \frac{18}{8}$$

$$= \frac{9}{4}$$

$$= 2.25$$

\therefore Mr. Mehta bears a 2.25% loss in the whole transaction.

EXERCISE 9.3 [PAGE 130]

Exercise 9.3 | Q 1 | Page 130

What would be the simple interest on an amount of Rs. 9600 at the rate of 6% per annum after 3 years?

SOLUTION

Given Principal $P = ₹ 9600$

Rate of interest $R = 6\% \text{ p.a.}$

Number of years $= T = 3$

$$\text{Simple Interest } I = \frac{PRT}{100} = \frac{9600 \times 3 \times 6}{100}$$

$$= 96 \times 18$$

$$= 1728$$

∴ Simple interest after 3 years would be ₹ 1728

Exercise 9.3 | Q 2 | Page 130

What would be the simple interest at the rate of $9\frac{1}{2}\%$ per annum on Rs. 6000 for $2\frac{1}{2}$ years?

SOLUTION

$$\text{Rate of interest per annum } R = 9\frac{1}{2}\% = \frac{19}{2}\%$$

$$\text{Principal } P = ₹ 6000$$

$$\text{Duration } T = 2\frac{1}{2} = \frac{5}{2} \text{ years}$$

∴ Simple Interest,

$$I = \frac{PRT}{100} = 6000 \times \frac{19}{2} \times \frac{5}{2} \times \frac{1}{100}$$

$$= 15 \times 19 \times 5$$

$$= 1425$$

∴ The simple interest would be ₹ 1425.

Exercise 9.3 | Q 3 | Page 130

What would be the simple interest on Rs. 8400 in 9 months at the rate of 8.25 percent per annum?

SOLUTION

Principal $P = ₹ 8400$

Rate of interest $R = 8.25\%$

Duration $T = 9 \text{ months} = \frac{3}{4} \text{ years}$

$$\begin{aligned}\text{Simple interest} &= \frac{PRT}{100} \\ &= \frac{8400 \times 8.25}{100} \times \frac{3}{4} \\ &= 21 \times \frac{33}{4} \times 3 = \frac{99 \times 21}{4} \\ &= \frac{2079}{4} \\ &= 519.75\end{aligned}$$

\therefore Simple interest would be ₹ 519.75.

Exercise 9.3 | Q 4 | Page 130

What would be the compound interest on Rs 4200 for 18 months at 10% per annum compounded half-yearly?

SOLUTION

Principal P = ₹ 4200

Rate of interest R = 10%

Duration T = 18 months = 1.5 years compounding is done half-yearly

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

$$= 4200 \left(1 + \frac{10}{200} \right)^3$$

$$= 4200 \left(\frac{21}{20} \right)^3$$

$$= \frac{4200 \times 21^3}{20^3}$$

$$= \frac{4200 \times 21}{2000}$$

$$= 4862.025$$

$$I = A - P$$

$$= 4862.025 - 4200$$

$$= 662.025$$

∴ Compound interest would be ₹ 662.025.

Exercise 9.3 | Q 5 | Page 130

Find the compound interest on Rs.10000 for 2 years at 8% per annum compounded half-yearly.

SOLUTION

Principal P = ₹ 10,000

Rate of interest R = 8% p.a. compounded half-yearly

Duration T = 2 years

$$\begin{aligned} A &= P \left(1 + \frac{\left(\frac{R}{2} \right)}{100} \right)^{2T} \\ &= 10000 \left(1 + \frac{\frac{8}{2}}{100} \right)^4 \\ &= 10000 \left(1 + \frac{4}{100} \right)^4 \end{aligned}$$

$$= 10000(1.04)^4$$

$$= 11698.58$$

$$I = A - P$$

$$= 11648.58 - 10000$$

$$= 1698.58$$

∴ Compound interest is ₹ 1698.58.

Exercise 9.3 | Q 6 | Page 130

In how many years Rs. 1,00,000 will become Rs. 1,33,100 at a compound interest rate of 10% per annum?

SOLUTION

Principal P = ₹ 1,00,000

Amount A = ₹ 1,33,100

Rate of interest R = 10% p.a.

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

$$\therefore 133100 = 100000 \left(1 + \frac{10}{100} \right)^T$$

$$\therefore \frac{1331}{1000} = \left(1 + \frac{10}{100} \right)^T = \left(\frac{11}{10} \right)^T$$

$$\therefore \left(\frac{11}{10} \right)^3 = \left(\frac{11}{10} \right)^T$$

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

\therefore ₹ 1,00,000 will become ₹ 1,33,100 after 3 years.

Exercise 9.3 | Q 7 | Page 130

A certain sum of money becomes three times itself in 20 years at simple interest. In how many years does it become double of itself at the same rate of simple interest?

SOLUTION

Given that, the sum of money triples itself in 20 years

$$\therefore P + I = 3P$$

$$\therefore I = 2P$$

and $T = 20$ years

$$\text{Now simple interest } I = \frac{PRT}{100}$$

$$\therefore 2P = \frac{P \times R \times 20}{100}$$

$$\therefore R = 10$$

\therefore Rate of interest = 10% per annum

The time period is to be calculated for the condition that the sum doubles itself i.e. for the condition

$$P + I = 2P$$

$$\text{i.e. } I = P$$

$$\text{i.e. } \frac{P \times R \times T}{100} = P$$

$$\therefore \frac{10 \times T}{100} = 1$$

$$\therefore T = 10$$

\therefore The sum will become double of itself in 10 years.

Exercise 9.3 | Q 8 | Page 130

A person borrows 10000 for 2 years at 4% p a simple interest he immediately lends it to another person at 6.5 % p. a. for 2 years. Find his total gain in the transaction.

SOLUTION

A person borrows money at 4% per annum and lends it at 6.5% per annum.

\therefore His gain is $(6.5 - 4) = 2.5\%$ on ₹ 10000 for 2 years

$$\text{i.e. gain} = \frac{1000 \times 2.5 \times 2}{100}$$

$$= 100 \times 5$$

$$= ₹ 500$$

\therefore The person will gain ₹ 500 in this transaction.

Exercise 9.3 | Q 9 | Page 130

A man deposits Rs 200 at the end of each year in a recurring account at 5% compound interest. How much will it become at the end of 3 years?

SOLUTION

At end of 1st year, 2nd year, and 3rd year ₹ 200 were deposited.

Rate of interest $R = 5\%$ p.a.

At end of 3 years, amount

$$\begin{aligned}
&= 200 + 200 \left[1 + \frac{5}{100} \right] + 200 \left[1 + \frac{5}{100} \right]^2 \\
&= 200 \left[1 + 1.05 + (1.05)^2 \right] \\
&= 200[2.05 + 1.1025] \\
&= 200 [3.1525] = 630.5
\end{aligned}$$

At end of 3 years, the account will have a balance of ₹ 630.5.

Exercise 9.3 | Q 10 | Page 130

A man gets a simple interest of Rs. 2,000 on a certain principal at the rate of 5% p.a. in 4 years. What compound interest will the man get on twice the principal in 2 years at the same rate?

SOLUTION

Let the Principal amount = P

Simple Interest I = ₹ 2000

Rate of interest R = 5% p.a.

Time duration = T = 4 years

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

$$\therefore 2000 = \frac{P \times 5 \times 4}{100}$$

$$\therefore P = 10000$$

Twice the principal was invested for compound interest with the same rate of interest for 2 years.

Here, P = 2 × 10,000

= ₹ 20,000

∴ Amount received,

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

$$\therefore A = 20000 \left(1 + \frac{5}{100} \right)^2$$

$$= 20000 \times \frac{21}{20} \times \frac{21}{20}$$

$$= 50 \times 441 = 22050$$

$$I = A - P = 22050 - 20000 = 2050$$

The man will receive ₹ 2050 as compound interest.

Exercise 9.3 | Q 11 | Page 130

The difference between simple interest and compound interest on a certain sum of money is Rs.32 at 8% per annum for 2 years. Find the amount.

SOLUTION

$$\text{Compound Interest} = A - P$$

$$= P \left(1 + \frac{R}{100} \right)^T - P$$

$$\text{Simple interest} = \frac{PRT}{100}$$

Given $R = 8\%$, $T = 2$ years and

compound interest – simple interest = ₹ 32

$$\therefore P \left[\left(1 + \frac{R}{100} \right)^T - 1 \right] - \frac{PRT}{100} = 32$$

$$\text{i.e. } P \left(\left[\left(1 + \frac{8}{100} \right)^2 - 1 \right] - \frac{8 \times 2}{100} \right) = 32$$

$$P[(1.08)^2 - 1 - 0.16] = 32$$

$$P[1.1664 - 1.16] = 32$$

$$\therefore 0.0064 P = 32$$

$$P = \frac{32}{0.0064} = 5000$$

\therefore The man will receive a compound interest of ₹ 5000

EXERCISE 9.4 [PAGE 132]

Exercise 9.4 | Q 1 | Page 132

Kanchan purchased a Maruti car for Rs.2,45,000/- and the rate of depreciation is

$14\frac{2}{7}\%$ per annum. Find the value of the car after two years?

SOLUTION

Given, the purchase price of the car = V

$$= ₹ 2,45,000$$

Rate of depreciation per annum = r

$$= 14\frac{2}{7}\%$$

$$= \frac{100}{7}\%$$

$$\therefore \text{Value of the car after two years} = V\left(1 - \frac{r}{100}\right)^n$$

$$= 2,45,000 \left(1 - \frac{\frac{100}{7}}{100}\right)^2$$

$$= 2,45,000 \left(1 - \frac{1}{7}\right)^2$$

$$= 2,45,000 \times \frac{36}{49}$$

$$= 1,80,000$$

∴ Value of the car after two years is ₹ 1,80,000.

Exercise 9.4 | Q 2 | Page 132

The value of a machine depreciates from Rs.32768 to Rs.21,952/- in three years. What is the rate of depreciation?

SOLUTION

Given, the initial value of machine = V

$$= ₹ 32,768/-$$

The depreciated value of the machine = D.V.

$$= ₹ 21,952/-$$

Number of years = n = 3

$$\text{Using D.V.} = V \left(1 - \frac{r}{100}\right)^n$$

$$21,952 = 32,768 \left(1 - \frac{r}{100}\right)^3$$

$$\therefore \left(1 - \frac{r}{100}\right)^3 = \frac{21,952}{32,768}$$

$$\therefore 1 - \frac{r}{100} = \sqrt[3]{\frac{21,952}{32,768}}$$

$$= \sqrt[3]{\frac{2^6 \times 7^3}{2^{15}}}$$

$$= \sqrt[3]{\left(\frac{2^2 \times 7}{2^5}\right)^3}$$

$$\therefore \frac{100 - r}{100} = \frac{7}{8}$$

$$800 - 8r = 700$$

$$r = \frac{100}{8}$$

$$\therefore r = 12.5\%$$

\therefore The rate of depreciation is 12.5% per annum.

Exercise 9.4 | Q 3 | Page 132

The value of a machine depreciates at a rate of 10% every year. It was purchased 3 years ago. Its present value is Rs.2,18,700/-. What was the purchase price of the machine?

SOLUTION

Given, the rate of depreciation per annum = $r = 10\%$

Number of years = $n = 3$

Present value of the machine = P.V.

= ₹ 2,18,700/-

\therefore Purchase price of the machine

$$\begin{aligned} &= P.V \div \left(1 - \frac{r}{100}\right)^n \\ &= 2,18,700 \div \left(1 - \frac{10}{100}\right)^3 \\ &= 2,18,700 \div \left(\frac{9^3}{10^3}\right) \\ &= \frac{2,18,700 \times 1000}{729} \\ &= 3,00,000 \end{aligned}$$

\therefore The purchase price of the machine is ₹ 3,00,000.

Exercise 9.4 | Q 4 | Page 132

Mr. Manish purchased a motorcycle at Rs.70,000/-. After some years he sold his motorcycle at the exact depreciated value of it that is Rs.51,030/-. The rate of depreciation was taken as 10%. Find after how many years he sold his motorcycle.

SOLUTION

Given, purchase price of the motorcycle = V

= ₹ 70,000/-

Depreciated value of the motorcycle = D.V. = ₹ 51,030/-

∴ Rate of depreciation = r = 10%

$$\text{Using, D.V.} = V \left(1 - \frac{r}{100} \right)^n$$

$$\therefore 51,030 = 70,000 \left(1 - \frac{10}{100} \right)^n$$

$$\therefore \left(1 - \frac{10}{100} \right)^n = \frac{51,030}{70,000}$$

$$\therefore \left(\frac{90}{100} \right)^n = \frac{5103}{7000} = \left(\frac{9}{10} \right)^3$$

$$\therefore n = 3$$

∴ Manish sold his motorcycle after 3 years.

Exercise 9.4 | Q 5 | Page 132

Mr. Chetan purchased furniture for her home at Rs.5,12,000/-. Considering the rate of depreciation as 12.5%, what will be the value of furniture after 3 years.

SOLUTION

Given, purchase price of furniture = V

= ₹ 5,12,000/-

Rate of depreciation = r = 12.5%

Number of years = n = 3 years

$$\therefore \text{Value of furniture after 3 years} = V \left(1 - \frac{r}{100} \right)^n$$

$$= 5,12,000 \left(1 - \frac{12.5}{100} \right)^3$$

$$= 5,12,000 \left(1 - \frac{1}{8} \right)^3$$

$$= 5,12,000 \left(\frac{7}{8} \right)^3$$

$$= 5,12,000 \times \frac{343}{512}$$

$$= 3,43,000$$

\therefore The value of furniture will be ₹ 3,43,000/-

Exercise 9.4 | Q 6 | Page 132

Grace Fashion Boutique purchased a sewing machine at Rs.25,000/-. After 3 years machine was sold at a depreciated value Rs.18,225/- Find the rate of depreciation.

SOLUTION

Given, purchase price of sewing machine = $V = ₹ 25,000/-$

Selling price of machine = D.V. = ₹ 18,225/-

Number of years = $n = 3$ years

By using, $D.V. = V \left(1 - \frac{r}{100} \right)^n$

$$18,225 = 25,000 \left(1 - \frac{r}{100} \right)^3$$

$$\left(1 - \frac{r}{100} \right)^3 = \frac{18,225}{25,000} = \frac{729}{1000} = \left(\frac{9}{10} \right)^3$$

$$\frac{100 - r}{100} = \frac{9}{10}$$

$$\therefore 100 - r = 90$$

$$\therefore r = 10\%$$

\therefore The rate of depreciation is 10% per annum.

Exercise 9.4 | Q 7 | Page 132

Mr. Pritesh reduced the value of his assets by 5% each year, which were purchased for Rs.50,00,000/-. Find the value of assets after 2 years.

SOLUTION

Given, initial value of assets = V

$$= ₹ 50,00,000/-$$

Rate of depreciation per annum = $r = 5\%$

Number of years = $n = 2$ years

$$\therefore \text{Value of assets after two years} = V \left(1 - \frac{r}{100} \right)^n$$

$$= 50,00,000 \left(1 - \frac{5}{100} \right)^2$$

$$= 50,00,000 \left(\frac{19}{20} \right)^2$$

$$= \frac{50,00,000 \times 361}{400}$$

$$= 12,500 \times 361$$

$$= ₹ 45,12,500$$

\therefore The value of assets after two years is ₹ 45,12,500/-.

Exercise 9.4 | Q 8 | Page 132

A manufacturing company is allowed to charge a 10% depreciation on its stock. The initial value of the stock was Rs.60,000/-. After how many years the value of the stock will be 39366?

SOLUTION

Given, rate of depreciation = $r = 10\%$

Initial value of stock = $V = ₹ 60,000$

The depreciated value of stock = D.V.

= ₹ 39,366/-

By using,

$$D.V. = V \left(1 - \frac{r}{100} \right)^n$$

$$39,366 = 60,000 \left(1 - \frac{10}{100} \right)^n$$

$$\left(1 - \frac{10}{100} \right)^n = \frac{39,366}{60,000}$$

$$\left(\frac{9}{10} \right)^n = \frac{6,561}{10,000} = \left(\frac{9}{10} \right)^4$$

$$\therefore n = 4$$

\therefore The value of the stock will be ₹ 39,366/- after 4 years.

EXERCISE 9.5 [PAGES 133 - 134]**Exercise 9.5 | Q 1 | Page 133**

Three partners shared the profit in a business in the ratio 5 : 6 : 7 . They had partnered for 12 months, 10 months, and 8 months respectively. What was the ratio of their investments?

SOLUTION

Let the ratio of investments of the three partners be $p : q : r$.

They partnered for 12 months, 10 months, and 8 months respectively.

\therefore The profit shared by the partners will be in proportion of the product of capital invested and their respective time periods.

$$\therefore 12 \times p : 10 \times q : 8 \times r = 5 : 6 : 7$$

$$\text{Now, } \frac{12p}{10q} = \frac{5}{6}$$

$$\therefore \frac{p}{q} = \frac{50}{72} \dots\dots\dots(i)$$

$$\text{and } \frac{10q}{8r} = \frac{6}{7}$$

$$\therefore \frac{q}{r} = \frac{48}{70} = \frac{24}{35} \times \frac{3}{3}$$

$$\therefore \frac{q}{r} = \frac{72}{105} \dots\dots\dots(ii)$$

From (i) & (ii), we have

$$p : q : r = 50 : 72 : 105$$

\therefore The ratio of their investments was 50 : 72 : 105.

Exercise 9.5 | Q 2 | Page 134

Kamala, Vimala, and Pramila enter into a partnership. They invest in Rs. 40,000, Rs. 80,000 and Rs. 1,20,000 respectively. At the end of the first year, Vimala withdraws Rs. 40,000, while at the end of the second year, Pramila withdraws Rs. 80,000. In what ratio will the profit be shared at the end of 3 years?

SOLUTION 1

Given that, Kamala, Vimala, and Pramila invest ₹ 40,000, ₹ 80,000, and ₹ 1,20,000 respectively.

The ratio of profits is to be calculated at the end of 3 years.

Vimala withdraws ₹ 40,000 at the end of the first year

\therefore Vimala invested 80,000 for one year and 40,000 for 2 years.

Pramila withdraws 80,000 at the end of the second year.

\therefore Pramila invested 1,20,000 for two years and 40,000 for one year.

Kamala invested 40,000 for all the 3 years.

\therefore The ratio of profits to be shared at the end of 3 years will be.

$$= 40,000 \times 3 : 80,000 \times 1 + 40,000 \times 2 : 1,20,000 \times 2 + 40,000 \times 1$$

$$\text{i.e. } 1,20,000 : 1,60,000 : 2,80,000$$

$$\text{i.e., } 12 : 16 : 28$$

i.e., 3 : 4 : 7

SOLUTION 2

Given that, Kamala, Vimala and Pramila invest ₹ 40,000, ₹ 80,000 & ₹ 1,20,000 respectively.

Given, information can be tabulated as:

	Kamala	Vimala	Pramila
Year 1	40,000	80,000	1,20,000
Year 2	40,000	40,000	1,20,000
Year 3	40,000	40,000	40,000
Total	1,20,000	1,60,000	2,80,000

∴ The profits to be shared at the end of 3 years will be

1,20,000 : 1,60,000 : 2,80,000

i.e., 12 : 16 : 28

i.e., 3 : 4 : 7

Exercise 9.5 | Q 3 | Page 134

Sanjeev started a business investing Rs.25,000 in 1999. In 2000, he invested an additional amount of Rs. 10,000 and Rajeev joined him with an amount of Rs. 35,000. In 2001, Sanjeev invested another additional amount of Rs.10,000 and Pawan joined them with an amount of Rs.35,000. What will be Rajeev's share in the profit of Rs.1,50,000 earned at the end of 3 years from the start of the business in 1999?

SOLUTION

The given information can be tabulated as:

Year ↓	Investment in ₹		
	Sanjeev	Rajeev	Pawan
1999	25,000/-	0	0
2000	(25,000+ 10,000) 35,000/-	35,000/-	0
2001	(35,000 + 10,000) 45,000/-	35,000/-	35,000/-

Total	1,05,000/-	70,000/-	35,000/-
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∴ The ratio of profits to be shared at the end of 3 years will be 1,05,000 : 70,000 : 35,000

i.e. in the proportion 3 : 2 : 1

Given, profit earned ₹ 1,50,000/-

$$\therefore \text{Rajeev's share in the profit} = \frac{2}{6} \times 1,50,000$$

$$= ₹ 50,000/-$$

Exercise 9.5 | Q 4 | Page 134

Teena, Leena, and Meena invest in a partnership in the ratio: 7/2, 4/3, 6/5. After 4 months, Teena increases her share by 50%. If the total profit at the end of one year is Rs.21,600, then what is Leena's share in the profit?

SOLUTION

Investment of Teena, Leena, and Meena are in the ratio $\frac{7}{2} : \frac{4}{3} : \frac{6}{5}$.

After 4 months, Teena's share increases by 50%.

$$\text{i.e. } \frac{7}{2} + \left(\frac{7}{2} \times \frac{50}{100} \right) = \frac{7}{2} + \frac{7}{4}$$

$$\text{i.e. } \frac{21}{4}$$

The profit will be shared in the proportion of products of capital and respective time periods in months.

$$\text{i.e. } \frac{7}{2} \times 4 + \frac{21}{4} \times 8 : \frac{4}{3} \times 12 : \frac{6}{5} \times 12$$

$$\text{i.e. } 56 : 16 : \frac{72}{5} \quad \text{i.e. } 7 : 2 : \frac{9}{5}$$

i.e. in the proportion 35 : 10 : 9[[Multiplying throughout by 5]

Given that profit at the end of one year = ₹ 21,600/-

$$\therefore \text{Leena's share in the profit} = \frac{10}{54} \times 21,600$$

$$= \frac{5}{27} \times 21,600 = 5 \times 800 = 4000$$

∴ Leena's share in the profit is ₹ 4000/-.

Exercise 9.5 | Q 5 | Page 134

Dilip and Pradeep invested amounts in the ratio 2:1, whereas the ratio between amounts invested by Dilip and Sudip was 3:2. If Rs. 1,49,500 was their profit, how much amount did Sudip receive?

SOLUTION

Let the amounts invested by Dilip, Pradeep, and Sudip be ₹ 'd', ₹ 'p', and ₹ 's' respectively.

Given that, $d : p = 2 : 1$

∴ $d : p = 6 : 3$... (i)

and $d : s = 3 : 2$

∴ $d : s = 6 : 4$... (ii)

From (i) and (ii),

$d : p : s = 6 : 3 : 4$

∴ The ratio of profits to be shared among Dilip, Pradeep and Sudip will be 6 : 3 : 4.

Given, profit earned = ₹ 1,49,500/-

$$\therefore \text{Sudip's share in the profit} = \frac{4}{13} \times 1,49,500$$

$$= 4 \times 11,500$$

$$= ₹ 46,000/-$$

Exercise 9.5 | Q 6 | Page 134

The ratio of investments of two partners Jatin and Lalit is 11:12 and the ratio of their profits is 2 : 3. If Jatin invested the money for 8 months, find for how much time Lalit invested his money.

SOLUTION

Let 'x' be the time in months for which Lalit invested his money

Jatin and Lalit invested their money in the ratio 11 : 12.

Jatin invested his money for 8 months and the ratio of their profits is 2 : 3.

$$\therefore 11 \times 8 : 12 \times x = 2:3$$

$$\therefore \frac{88}{12x} = \frac{2}{3}$$

$$x = \frac{88 \times 3}{2 \times 12}$$

$$\therefore x = 11$$

\therefore Lalit invested his money for 11 months.

Exercise 9.5 | Q 7 | Page 134

Three friends had dinner at a restaurant $\frac{2}{3}$ When the bill was received, Alpana paid as much as Beena paid and Beena paid $\frac{1}{2}$ as much as Catherin paid. What fraction of the bill did Beena pay?

SOLUTION

Let 'T' be the total bill amount at the restaurant and 'a', 'b', and 'c' be the share of Alpana, Beena, and Catherin respectively.

Given, that Alpana paid rd $\frac{2^{\text{rd}}}{3}$ as much as Beena paid

$$\therefore a = \frac{2}{3}b \quad \dots\dots\dots(i)$$

Also, Beena paid $\frac{1}{2}$ as much as Catherin paid.

$$\therefore b = \frac{1}{2}c \text{ i.e. } c = 2b \quad \dots\dots\dots(ii)$$

\therefore Three friends paid the total bill amount.

$$\therefore a + b + c = T \quad \dots\dots\dots(iii)$$

Using (i) and (ii) in (iii), we get

$$\frac{2}{3}b + b + 2b = T$$

$$\therefore b\left(\frac{2}{3} + 1 + 2\right) = T$$

$$\therefore b \left(\frac{2 + 3 + 6}{3} \right) = T$$

$$\therefore \frac{11b}{3} = T$$

$$\therefore b = \frac{3}{11}T$$

Thus, Beena paid $\left(\frac{3}{11} \right)^{\text{th}}$ fraction of the total bill amount.

Exercise 9.5 | Q 8 | Page 134

Roy starts a business with Rs. 10000, Shikha joins him after 2 months with 20% more investment than Roy, after 2 months Tariq joins him with 40% less than Shikha. If the profit earned by them at the end of the year is equal to twice the difference between the investment of Roy and ten times the investment of Tariq. Find the profit of Roy?

SOLUTION

Given, Roy starts the business with ₹ 10,000.

Shikha joins him after 2 months with 20% more investment than Roy.

$$\therefore \text{Shikha's investment} = 10,000 + \left(10,000 \times \frac{20}{100} \right)$$

$$= ₹ 12,000$$

Tariq joins after two more months with an investment 40% less than Shikha.

$$\therefore \text{Tariq's investment} = 12,000 - \left(12,000 \times \frac{40}{100} \right)$$

$$= ₹ 7,200$$

Now, the profit will be shared in the proportion of products of capital and respective periods in months.

$$\text{i.e. } 10,000 \times 12 : 12,000 \times 10 : 7,200 \times 8$$

i.e. in the proportion,

$$25 : 25 : 12 \dots (i) \quad [\text{Dividing throughout by 4,800}]$$

Given that, profit at the end of the year = twice of the difference between the investment of Roy and ten times the investment of Tariq.

$$\begin{aligned}\therefore \text{Profit} &= 2 [(10 \times 7,200) - 10,000] \\ &= 2[72,000 - 10,000] \\ &= 2 \times 62,000 \\ &= ₹ 1,24,000\end{aligned}$$

$$\begin{aligned}\therefore \text{Roy's share of profit} &= \frac{25}{62} \times 1,24,000 \quad \text{.....[From(i)]} \\ &= ₹ 50,000/-\end{aligned}$$

Exercise 9.5 | Q 9 | Page 134

If $4(P\text{'s Capital}) = 6(Q\text{'s Capital}) = 10(R\text{'s Capital})$, then out of the total profit of Rs 5580, what is R's share?

SOLUTION

Let 'p', 'q' and 'r' be P, Q, and R's Capital for the business respectively.

$$\therefore 4p = 6q = 10r$$

$$\text{L.C.M of 4, 6, 10} = 60$$

$$\therefore \text{We take } 4p = 6q = 10r = 60x$$

$$\therefore p = 15x, q = 10x, r = 6x$$

$$\therefore p : q : r = 15 : 10 : 6$$

Given that total profit = ₹ 5580,

$$\begin{aligned}\text{R's share in the profit} &= \frac{6}{31} \times 5580 \\ &= ₹ 1080/-\end{aligned}$$

Exercise 9.5 | Q 10 | Page 134

A and B start a business, with A investing the total capital of Rs.50000, on the condition that B pays A interest at the rate of 10% per annum on his half of the capital. A is a working partner and receives Rs.1500 per month from the total profit and any profit remaining is equally shared by both of them. At the end of the year, it was found that the income of A is twice that of B. Find the total profit for the year?

SOLUTION

Let 'x' and 'y' be the profits earned by A and B respectively and let 'z' be the total profit for the year.

A is the working partner and receives ₹ 1500 per month from the total profit

i.e. $12 \times 1500 = ₹ 18,000$ at the end of the year.

The remaining profit is shared between A and B equally.

$$\therefore y = \frac{z - 18000}{2} \quad \dots\dots(i)$$

Thus, profit earned by A at the end of that year is given by

$$x = 18000 + \left(\frac{z - 18000}{2} \right)$$

$$\therefore x = \frac{z + 18000}{2} \quad \dots(ii)$$

A invests the entire capital on the condition that B pays A interest at the rate of 10% per annum on his half of the capital.

\therefore At the end of the first year, A will receive $\frac{10}{100} \times 25,000$ i.e. ₹ 2500/- over and above his share of profit.

$$\therefore \text{A's income} = \text{Profit of A} + 2500 = x + 2500$$

Given that,

the income of A = twice the income of B.

$$\therefore x + 2500 = 2y \quad \dots(iii)$$

Using (i) and (ii) in (iii), we get

$$\frac{z + 18000}{2} + 2500 = 2 \left(\frac{z - 18000}{2} \right)$$

$$z + 18000 + 5000 = 2(z - 18000)$$

$$z + 23000 = 2z - 36000$$

$$\therefore z = 59,000$$

∴ The total profit for the year = ₹ 59,000/-

EXERCISE 9.6 [PAGES 138 - 139]

Exercise 9.6 | Q 1 | Page 138

M/s Janaseva sweet mart sold sweets of Rs.3,86,000. What CGST and SGST he will pay if the rate of GST is 5%?

SOLUTION

Given that M/s Janaseva sweet mart sold sweets of ₹ 3,86,000

∴ Bill amount = ₹ 3,86,000

GST payable at the rate 5%

∴ CGST and SGST applicable is 2.5% each

$$\therefore \text{CGST on the bill} = \frac{2.5}{100} \times 3,86,000$$

$$= ₹ 9650$$

$$\text{and SGST on the bill} = \frac{2.5}{100} \times 3,86,000$$

$$= ₹ 9650$$

Exercise 9.6 | Q 2 | Page 138

Janhavi Gas Agency purchased some gas cylinders for Rs. 500000 and sold them to the customers for Rs. 590000. Find the amount of GST payable and the amount of ITC 5% GST is applicable.

SOLUTION

Given that, Janhavi Gas Agency purchased some gas cylinders for ₹ 5,00,000, and GST applicable is 5%.

$$\therefore \text{Input tax (ITC)} = 5\% \text{ of } 5,00,000$$

$$= \frac{5}{100} \times 5,00,000$$

$$= ₹ 25,000$$

Janhavi Gas Agency sold the gas cylinders for ₹ 5,90,000

∴ Output tax for Janhavi Gas Agency

$$= 5\% \text{ of } 5,90,000$$

$$= \frac{5}{100} \times 5,90,000$$

$$= ₹ 29,500$$

GST payable = Output tax – Input tax (ITC)

$$= 29,500 - 25,000$$

$$= ₹ 4,500$$

∴ GST payable for Janhavi Gas Agency is ₹ 4,500 and ITC is ₹ 25,000.

Exercise 9.6 | Q 3 | Page 138

A company dealing in mobile phones purchased mobile phones worth Rs500000 and sold the same to customers at Rs.6,00,000. Find the amount Of ITC and the amount of GST if the rate of GST is 12%.

SOLUTION

Given that the rate of GST applicable is 12%.

The company purchased mobile phones worth ₹ 5,00,000.

∴ Input tax (ITC) = 12% of 5,00,000

$$= \frac{12}{100} \times 5,00,000$$

$$= ₹ 60,000$$

The company dealing in mobile phones sold the same to customers at ₹ 6,00,000.

∴ Output tax of the company = 12% of 6,00,000

$$= \frac{12}{100} \times 6,00,000$$

$$= ₹ 72,000$$

GST payable for the company

= Output tax – Input tax (ITC)

$$= 72,000 - 60,000$$

$$= ₹ 12,000$$

∴ The ITC for the company is ₹ 60,000 and GST payable is ₹ 12,000.

Exercise 9.6 | Q 4 | Page 138

Prepare Business to customers (B2C) tax invoice using the given information. Write the name of the supplier, address, state, Date, Invoice Number, GSTIN, etc. as per your choice

Supplier: M/s _____ Address: _____ State: _____
Date: _____ Invoice No: _____ GSTIN: _____

Particular: Rate of Sarees – Rs.2750 Rate of GST 5% HSN 5407–2 pcs
Rate of Kurta – Rs. 750 Rate of GST 12% HSN 5408.

SOLUTION

Supplier: M/s Swaglife Fashions

Address: 143, Shivaji Rasta, Mumbai 400001

Mobile No. 9263692111

Email: abc@gmail.com

State: Maharashtra

Date: 31/08/19

Invoice No: GST/110

GSTIN: 27ABCDE1234HIZS

Sr no.	HSN Code	Name of product	Rate	Quantity	Taxable amount	CGST		SGST		Total
						Rate	Tax	Rate	Tax	
1	5407	Sarees	₹ 2750	2 Pcs	₹ 5500	6%	₹ 330	6%	₹ 330	₹ 6160
2	5408	Kurta	₹ 750	1 Pcs	₹ 750	6%	₹ 45	6%	₹ 45	₹ 840
Total							₹ 375		₹ 375	₹ 7000

Rate of 1 saree = ₹ 2750

∴ Rate of 2 sarees = 2 × 2750 = ₹ 5500

∴ GST on sarees = 12% of 5500 = $\frac{12}{100} \times 5500 = ₹ 660$

∴ CGST = SGST = ₹ 330

Rate of 1 Kurta = ₹ 750

∴ GST on Kurta = 12% of 750 = $\frac{12}{100} \times 750 = ₹ 90$

∴ CGST = SGST = ₹ 45

Exercise 9.6 | Q 5 | Page 139

Heena Enterprise sold cosmetics worth Rs. 25000 to Leena traders, a retailer. Leena Traders sold it further to Meena Beauty Products for Rs. 30000. Meena Beauty Product sold it further to the customers for Rs. 40000. The rate of GST is 18%

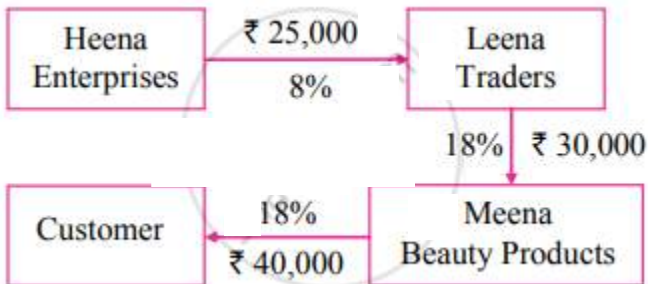
Find

i) GST Payable by each party

ii) CGST and SGST

SOLUTION

The trading chain,



∴ Output tax for Heena Enterprises = 18% of 25,000

$$= \frac{18}{100} \times 25,000$$

$$= ₹ 4,500$$

∴ GST payable by Heena Enterprises

Now output tax for Leena traders

$$= 18\% \text{ of } 30,000 = \frac{18}{100} \times 30,000 = ₹ 5,400$$

∴ GST payable by Leena traders

$$= \text{Output tax} - \text{Input tax}$$

$$= 5,400 - 4,500$$

$$= ₹ 900$$

∴ Output tax for Meena beauty products

$$= 18\% \times 40,000$$

$$= \frac{18}{100} \times 40,000$$

$$= ₹ 7,200$$

∴ GST payable by Meena beauty products

$$\begin{aligned}
 &= \text{Output tax} - \text{Input tax} \\
 &= 7,200 - 5,400 \\
 &= ₹ 1,800
 \end{aligned}$$

$$\text{ii. Now, CGST} = \text{SGST} = \frac{\text{GST}}{2} = 9\%$$

∴ Statement of GST payable at each stage can be tabulated as:

Party	GST payable	CGST payable	SGST payable
Heena Enterprises	₹ 4,500	₹ 2,250	₹ 2,250
Leena traders	₹ 900	₹ 450	₹ 450
Meena beauty products	₹ 1,800	₹ 900	₹ 900

Exercise 9.6 | Q 6 | Page 139

‘Chitra furnishings’ purchased tapestry (curtain cloth) for Rs. 2800000 and sold for Rs.4480000 Rate of GST is 5%.

Find,

- i) Input Tax
- ii) Output Tax
- iii) ITC
- iv) CGST and SGST

SOLUTION

Given, that ‘Chitra furnishings’ purchased tapestry (curtain cloth) for ₹ 28,00,000 and the rate of GST is 5%

$$\therefore \text{Input tax} = 5\% \text{ of } 28,00,000$$

$$= \frac{5}{100} \times 28,00,000$$

$$= ₹ 1,40,000$$

The tapestry was sold at ₹ 44,80,000

∴ Output tax = 5% of 44,80,000

$$= \frac{5}{100} \times 44,80,000$$

$$= ₹ 2,24,000$$

Now ITC = Input tax = ₹ 1,40,000

GST payable = Output tax – ITC

$$= 2,24,000 - 1,40,000$$

$$= ₹ 84,000$$

$$\therefore \text{CGST} = \text{SGST} = \frac{\text{GST Payable}}{2}$$

$$= \frac{84,000}{2}$$

$$= ₹ 42,000$$

$$\therefore \text{CGST} = \text{SGST} = ₹ 42,000$$

Exercise 9.6 | Q 7 | Page 139

Two friends 'Aditi' and 'Vaishali' went to a restaurant. They ordered 2 Masala Dosa costing Rs. 90 each 2 coffee costing Rs.60 each and 1 sandwich costing Rs. 80. If GST is charged at 5% Find the Total amount of the bill including GST.

SOLUTION

Aditi and Vaishali ordered for 2 Masala Dosas, 2 Coffees, and 1 Sandwich

∴ The total price of their order

$$= 2 \times 90 + 2 \times 60 + 80$$

$$= ₹ 380$$

GST is charged at 5%

∴ GST on the total order = 5% × 380

$$= \frac{5}{100} \times 380$$

$$= ₹ 19$$

∴ Total bill amount including GST = 380 + 19

$$= ₹ 399$$

EXERCISE 9.7 [PAGES 141 - 142]

Exercise 9.7 | Q 1 | Page 141

Shantanu has a choice to invest in Rs.10 shares of two firms at Rs.13 or at Rs.16. If the first firm pays a 5% dividend and the second firm pays a 6% dividend per annum,

find:

(i) Which firm is paying better?

(ii) If Shantanu invests equally in both the firms and the difference between the return from them is Rs. 30. Find how much, in all, does he invest.

SOLUTION

i. For firm 1:

Face value of the share (F.V.) = ₹ 10

The market value of the share (M.V.) = ₹ 13

Dividend = 5%

$$\therefore \text{Annual income from the share} = \frac{5}{100} \times 10$$

$$= ₹ 0.5$$

$$\text{Profit percentage} = \frac{\text{Annual income}}{\text{Market value}} \times 100$$

$$= \frac{0.5}{13} \times 100$$

$$= \frac{50}{13} \dots\dots\dots(i)$$

$$\approx 3.85\%$$

For firm 2:

Face value of the share (F.V.) = ₹ 10

Market value of the share (M.V.) = ₹ 16

Dividend = 5%

$$\therefore \text{Annual income from the share} = \frac{6}{100} \times 10$$

$$= ₹ 0.6$$

$$\text{Profit percentage} = \frac{\text{Annual income}}{\text{Market value}} \times 100$$

$$= \frac{0.6}{16} \times 100$$

$$= \frac{60}{16} \dots\dots\dots(ii)$$

$$= 3.75\%$$

Since the profit percentage from firm 1 > the profit percentage from firm 2, the first firm is paying better.

(ii) Let 'X' be the amount of Shantanu invests in each of the firms.

Given that difference between the return from them is ₹ 30, we have

$$\frac{\frac{50}{13}}{100} \times X - \frac{\frac{60}{16}}{100} \times X = 30 \text{[From (i) and (ii)]}$$

$$\therefore X \left(\frac{50}{13} - \frac{60}{16} \right) = 30 \times 100$$

$$\therefore X \left(\frac{50 \times 16 - 60 \times 13}{13 \times 16} \right) = 3000$$

$$\therefore X \left(\frac{800 - 780}{13 \times 16} \right) = 3000$$

$$\therefore X = \frac{3000 \times 13 \times 16}{20}$$

$$\therefore X = 31,200$$

In all, Shantanu invests $2X = 2 \times 31,200$

= ₹ 62,400 /-

Exercise 9.7 | Q 2 | Page 141

A dividend of 9% was declared on Rs.100 shares selling at a certain price in the stock market. If the rate of return is 7.5%, calculate

- The market price of each share, and
- The amount to be invested to obtain an annual dividend of Rs. 630.

SOLUTION

i. Given that,

Face value of the share (F.V) = ₹ 100

Dividend = 9%

Rate of return = 7.5%

Annual income from the share = $\frac{9}{100} \times 100$

$$= ₹ 9$$

$$\text{Rate of return} = \frac{\text{Annual income}}{\text{Market price}} \times 100$$

$$\therefore 7.5 = \frac{9}{\text{Market price}} \times 100$$

$$\therefore \text{Market price} = \frac{900}{7.5}$$

$$= ₹ 120$$

\therefore The market price of the share is ₹ 120.

ii. Let 'X' be the amount to be invested to obtain an annual dividend of ₹ 630.

\therefore 7.5% of X is ₹ 630

$$\therefore \frac{7.5}{100} \times X = 630$$

$$\therefore X = \frac{630 \times 100}{7.5}$$

$$\therefore X = 8400$$

\therefore ₹ 8400 need to be invested to obtain an annual dividend of ₹ 630.

Exercise 9.7 | Q 3 | Page 141

Nilesh has the option of investing his money in 8% Rs. 10 shares at a premium of Rs.3.50 or 7% Rs. 100 shares at a premium of 20%. Which of the two investments will be more profitable for him?

SOLUTION**For share 1:**

Face value of the share (F.V.) = ₹ 10

Premium = ₹ 3.5

∴ Market value of the share (M.V.) = 10 + 3.5

= ₹ 13.5

Dividend = 8 %

∴ Annual income from the share = $\frac{8}{100} \times 10$

= ₹ 0.8

Profit percentage = $\frac{\text{Annual income}}{\text{Market value}} \times 100$

= $\frac{0.8}{13.5} \times 100$

= $\frac{800}{135}$

≈ 5.93%

For share 2

Face value of the share (F.V.) = ₹ 100

Premium = 20%

∴ Market value of the share (M.V.) = 100 + $\left(\frac{20}{100} \times 100 \right)$

= ₹ 120

Dividend = 7 %

Annual income from the share = $\frac{7}{100} \times 100$

$$= ₹ 7$$

$$\text{Profit percentage} = \frac{\text{Annual income}}{\text{Market value}} \times 100$$

$$= \frac{7}{120} \times 100$$

$$\approx 5.833\%$$

Since, profit percentage from share 1 > profit percentage from share 2, investing in the first kind of shares will be more profitable for Nilesh.

Exercise 9.7 | Q 4 | Page 141

Sudhakar invests Rs. 1344 in buying shares of face value Rs.24 selling at 12% premium. The dividend on the shares is 15% per annum. Calculate

- (i) The number of shares Sudhakar buys, and
- (ii) The dividend he receives annually.

SOLUTION

Given that,

Face value of the share (F.V.) = ₹ 24

Premium = 12%

∴ The market value of the share (M.V.)

$$= 24 + \left(\frac{12}{100} \times 24 \right)$$

$$= ₹ 26.88$$

i. Sudhakar invests ₹ 1344 in the shares

∴ Number of shares purchased by Sudhakar

$$= \frac{1344}{26.88} = 50$$

∴ Sudhakar buys 50 shares.

ii. Dividend on the share = 15%

$$= ₹ 3.6.$$

∴ The total dividend he receives annually

$$= 50 \times 3.6 = ₹ 180$$

∴ Sudhakar receives ₹ 180 as his annual dividend.

Exercise 9.7 | Q 5 | Page 141

Sameer invests Rs. 5625 in a company paying 7% per annum when the share of Rs. 10 stands for Rs.12.50. Find Sameer's income from this investment. If he sells 60 % of these shares for Rs.10 each, find his gain or loss in this transaction.

SOLUTION

Given:

Face value of the share (F.V.) = ₹ 10

The market value of the share (M.V.) = ₹ 12.5

Amount invested in shares = ₹ 5625

∴ Number of shares purchased by Sameer

$$= \frac{5625}{12.5} = 450$$

Dividend = 7%

$$\text{Annual income from one share} = \frac{7}{100} \times 10$$

$$= ₹ 0.7$$

∴ Sameer's income from this investment = number of shares × annual income from one share

$$= 450 \times 0.7 = ₹ 315$$

Sameer sells 60 % of these shares i.e. $\frac{60}{100} \times 450 = 270$ shares

Sameer purchased these shares at ₹ 12.5 per share.

∴ The purchase price for these shares = 270×12.5

$$= ₹ 3375$$

If he sells these shares at ₹ 10 per share, he would receive $270 \times 10 = ₹ 2700$

∴ In this transaction, Sameer would incur a loss of $3375 - 2700 = ₹ 675$

Exercise 9.7 | Q 6 | Page 141

Geeta buys Rs.100 shares of a company that pays a 15 % dividend. She buys the shares at a price from the market that gives her a 10% return on her investment. At what price did she buy each share?

SOLUTION

Given that,

Face value of the share (F.V.) = ₹ 100

Dividend = 15%

$$\therefore \text{Annual income from the share} = \frac{15}{100} \times 100$$

$$= ₹ 15$$

Rate of return on investment = 10%

$$\text{Rate of return} = \frac{\text{Annual income}}{\text{Market price}} \times 100$$

$$\therefore 10 = \frac{15}{\text{Market price}} \times 100$$

$$\therefore \text{Market price} = \frac{1500}{10} = ₹ 150$$

\therefore Geeta bought each share from the market at ₹ 150.

Exercise 9.7 | Q 7 | Page 142

Tejas invests in 9% Rs. 100 shares at Rs. 145 but Shail invests in 7% Rs. 100 shares at Rs.116. whose investment is better?

SOLUTION

Investment of Tejas:

Given that, the Face value of the share (F.V.) = ₹ 100

The market value of the share (M.V.) = ₹ 145

Dividend = 9%

$$\text{Annual income from the share} = \frac{9}{100} \times 100$$

$$= ₹ 9$$

$$\text{Rate of return} = \frac{\text{Annual income}}{\text{Market value}} \times 100$$

$$= \frac{9}{145} \times 100$$

$$= \frac{900}{145}$$

$$\approx 6.2\%$$

Investment of Shail:

Face value of the share (F.V.) = ₹ 100

The market value of the share (M.V.) = ₹ 116.

Dividend = 7%

$$\text{Annual income from the share} = \frac{7}{100} \times 100$$

$$= ₹ 7$$

$$\text{Rate of return} = \frac{\text{Annual income}}{\text{Market value}} \times 100$$

$$= \frac{7}{116} \times 100$$

$$\approx 6.03\%$$

Since the rate of return for Tejas's investment is greater than that for Shail's, Tejas's investment is better.

Exercise 9.7 | Q 8 | Page 142

A 6% share yields 8%. Find the market value of a Rs 100 share.

SOLUTION

Given that,

Face value of the share = ₹ 100

Dividend = 6%

Yield = 8%

$$\begin{aligned}\text{Annual income on the share} &= \frac{6}{100} \times 100 \\ &= ₹ 6\end{aligned}$$

$$\text{Yield} = \frac{\text{Annual income}}{\text{Market value}} \times 100$$

$$\therefore 8 = \frac{6}{\text{Market value}} \times 100$$

$$\therefore \text{Market value} = \frac{600}{8}$$

$$= ₹ 75$$

$$\therefore \text{Market value of the share} = ₹ 75$$

Exercise 9.7 | Q 9 | Page 142

Ashwini bought Rs. 40 shares at a premium of 40%. Find the income, if Ashwini invests Rs. 14000 in these shares and receives a dividend at the rate of 8% on the nominal value of the shares.

SOLUTION

Given,

Face value of the shares (F.V.) = ₹ 40

Premium = 40%

∴ The market value of the shares (M.V.)

$$= 40 + \left(40 \times \frac{40}{100} \right)$$

$$= 40 + 16$$

$$= ₹ 56$$

Ashwini invests ₹ 14000 in these shares

$$\therefore \text{Number of shares bought by Ashwini} = \frac{\text{Amount invested}}{\text{Market value of one share}} = \frac{14000}{56} = 250$$

Dividend = 8%

$$\therefore \text{Annual income on one share} = \frac{8}{100} \times 40$$

$$= ₹ 3.2$$

$$\therefore \text{Income of Ashwini on 250 shares} = 250 \times 3.2$$

$$= ₹ 800$$

\therefore Ashwini earns ₹ 800 on her investment.

Exercise 9.7 | Q 10 | Page 142

Mr. Rutvik invests Rs. 30,000 in buying shares of a company that pays a 12 % dividend annually on Rs. 100 shares selling at a premium of Rs. 50. Find

- (i) The number of shares bought by Mr. Rutvik, and
- (ii) His annual income from the shares.

SOLUTION

Given that,

Face value of a share (F.V.) = ₹ 100

Premium = ₹ 50

$$\therefore \text{Market value of a share (M.V.)} = 100 + 50$$

$$= ₹ 150$$

Dividend = 12%

Mr. Rutvik invests ₹ 30,000 in the shares.

i. \therefore Number of shares bought by Mr. Rutvik

$$\begin{aligned}
 &= \frac{\text{Amount invested}}{\text{Market value}} \\
 &= \frac{30000}{150} \\
 &= 200
 \end{aligned}$$

ii. Dividend on the share = 12%

$$\therefore \text{Annual income from one share} = \frac{12}{100} \times 100$$

$$= ₹ 12$$

\therefore His annual income from shares

$$= \text{number of shares} \times \text{income from one share}$$

$$= 200 \times 12$$

$$= ₹ 2400$$

Exercise 9.7 | Q 11 | Page 142

Rasika bought Rs. 40 shares at a discount of 40%. Find the income, if she invests Rs.12000 in these shares and receives a dividend at the rate of 11% on the nominal value of the shares.

SOLUTION

Given,

the Face value of the shares (F.V.) = ₹ 40

Discount = 40%

∴ The market value of the shares (M.V.)

$$= 40 - \left(40 \times \frac{40}{100} \right)$$

$$= 40 - 16$$

$$= ₹ 24$$

Rasika invests ₹ 12,000 in these shares.

∴ Number of shares bought by Rasika

$$= \frac{\text{Amount invested}}{\text{Market value of one share}}$$

$$= \frac{12000}{24}$$

$$= 500$$

Dividend = 11%

$$\therefore \text{Annual income on one share} = \frac{11}{100} \times 40$$

$$= ₹ 4.4$$

∴ Rasika's income on 200 such shares

$$= 500 \times 4.4$$

$$= ₹ 2200$$

∴ Rasika earns ₹ 2200 from her investment

Exercise 9.7 | Q 12 | Page 142

Nisha invests Rs. 15840 in buying shares of nominal value Rs.24 selling at a premium of 10%. The company pays a 15% dividend annually.

Find

- (i) The dividend she receives annually, and
- (ii) The rate of return from her investment.

SOLUTION

Given that,

Face value of the share (F.V.) = ₹ 24

Premium = 10%

∴ The market value of the share (M.V.)

$$= 24 + \left(24 \times \frac{10}{100} \right)$$

$$= 24 + 2.4$$

$$= ₹ 26.4$$

Dividend = 15%

$$\therefore \text{Annual income on the share} = \frac{15}{100} \times 24$$

$$= ₹ 3.6$$

Nisha invests ₹ 15,840 in these shares.

$$\therefore \text{Number of shares bought by Nisha} = \frac{\text{Amount invested}}{\text{Market value of one share}}$$

$$= \frac{15840}{26.4}$$

$$= 600$$

Annual dividend received by Nisha

$$= \text{Number of shares} \times \text{annual income from one share}$$

$$= 600 \times 3.6$$

$$= ₹ 2160$$

Rate of return from the investment

$$= \frac{\text{Annual dividend}}{\text{Amount invested}} \times 100$$

$$= \frac{2160}{15840} \times 100$$

$$= 13.64 \%$$

Exercise 9.7 | Q 13 | Page 142

Ashutosh buys 400, Rs. 100 shares at a discount of 20 % and receives a return of 12% on his money. Calculate:

- (i) The amount invested by Ashutosh.
- (ii) The rate of dividend paid by the company.

SOLUTION

Given

Face value of the shares (F.V.) = ₹ 100

Discount = 20%

∴ The market value of the shares (M.V.)

$$= 100 - \left(100 \times \frac{20}{100} \right)$$

$$= ₹ 80$$

i. Amount invested by Ashutosh = number of shares × market value of the shares

$$= 80 \times 80$$

$$= ₹ 6400$$

ii. Ashutosh receives a return of 12% on his money.

$$\therefore \text{Ashutosh's income from shares} = \frac{12}{100} \times 6400$$

$$= ₹ 768$$

\therefore Ashutosh's annual income from one share

$$= ₹ \frac{768}{80} = ₹ 9.6$$

Annual income from one share

$$= \frac{\text{Dividend}}{100} \times \text{Face value}$$

$$\therefore 9.6 = \frac{\text{Dividend}}{100} \times 100$$

$$\therefore \text{Rate of dividend} = 9.6\%$$

Exercise 9.7 | Q 14 | Page 142

Vaishnavi bought 1000, Rs.100 shares from the stock market carrying an 8% dividend quoted at Rs.130. A few days later the market value of the shares went up by 10%. Vaishnavi sold all her shares. What was her total income from this transaction?

SOLUTION

Given that,

Face value of the shares (F.V.) = ₹ 100

The market value of the shares (M.V.) = ₹ 130

Dividend = 8%

$$\text{Income from each share} = \frac{8}{100} \times 100 = ₹ 8$$

Number of shares bought by Vaishnavi = 1000

∴ Vaishnavi's income from dividend

$$= 1000 \times 8 = ₹ 8000$$

The price of the shares went up by 10%

The new market value of the shares.

$$= 130 + \left(130 \times \frac{10}{100} \right) = ₹ 143$$

Vaishnavi sold the shares at ₹ 143 which she bought at ₹ 130 each.

$$\therefore \text{Vaishnavi's profit on one share} = 143 - 130 = ₹ 13$$

$$\therefore \text{Vaishnavi's profit after selling all her shares} = 1000 \times 13$$

$$= ₹ 13,000$$

Vaishnavi's total income from this transaction = Income from dividend + income from the sale of shares

$$= 8,000 + 13,000$$

$$= ₹ 21,000$$

∴ Vaishnavi's total income from this transaction was ₹ 21,000.

Exercise 9.7 | Q 15 | Page 142

Mr. Dinesh invests Rs. 20800 in 6% Rs. 100 shares at Rs. 104, and Rs. 14300 in 10.5% Rs. 100 shares at Rs.143. What will be his annual income from the shares?

SOLUTION

For 1st kind of shares,

Face value of shares (F.V.) = ₹ 100

Dividend = 6%

$$\therefore \text{Annual income from one share} = \frac{6}{100} \times 100$$

$$= ₹ 6$$

Market value of the share (M.V.) = ₹ 104

Total amount invested = ₹ 20,800

$$\therefore \text{Number of shares} = \frac{\text{Amount invested}}{\text{Market value}}$$

$$= \frac{20,800}{104}$$

$$= 200$$

$$\therefore \text{Total income from 1st kind of shares} = 200 \times 6$$

$$= ₹ 1200$$

For 2nd kind of shares,

Face value of shares (F.V.) = ₹ 100

Dividend = 10.5%

$$\therefore \text{Annual income from one share} = \frac{10.5}{100} \times 100$$

$$= ₹ 10.5$$

Market value of the share (M.V.) = ₹ 143

Total amount invested = ₹ 14300

$$\begin{aligned}\therefore \text{Number of shares} &= \frac{\text{Amount invested}}{\text{Market value}} \\ &= \frac{14300}{143} \\ &= 100\end{aligned}$$

\therefore Total income from 2nd kind of shares

$$= 100 \times 10.5 = ₹ 1050$$

\therefore Total annual income of Dinesh from both these shares = 1200 + 1050

$$= ₹ 2250$$

Exercise 9.7 | Q 16 | Page 142

A company declares a semi-annual dividend of 5%. Daniel has 400 shares of the company. If Daniel's annual income from the shares is Rs. 1000, find the face value of each share.

SOLUTION

Given that,

Semi-annual dividend = 5%

\therefore Annual dividend = 10%

Number of shares with Daniel = 400

Daniel's annual income from the shares = ₹ 1000

$$\begin{aligned}\therefore \text{Annual income from one share} &= \frac{1000}{400} \\ &= ₹ 2.5\end{aligned}$$

But annual income from one share

$$= \frac{\text{Annual dividend}}{100} \times \text{Face value}$$

$$\therefore 2.5 = \frac{10}{100} \times \text{Face value of the share}$$

$$\therefore \text{Face value of the share} = ₹ 25$$

Exercise 9.7 | Q 17 | Page 142

Bhargav buys 400, twenty-dollar shares at a premium of Rs. 4 each and receives a dividend of 12%.

Find:

- (i) The amount invested by Bhargav
- (ii) His total income from the shares.
- (iii) Percentage return on his money.

SOLUTION

Given that,

Face value of the shares (F.V.) = ₹ 20

Premium = ₹ 4

\therefore The market value of the shares (M.V.) = ₹ 24

Dividend = 12 %

$$\therefore \text{Annual income from the share} = \frac{12}{100} \times 20$$

$$= ₹ 2.4$$

Bhargav buys 400 shares

i. The amount invested by Bhargav

= number of shares \times market value

$$= 400 \times 24 = ₹ 9600$$

ii. Bhargav's income from the shares

= number of shares \times annual income from one share

$$= 400 \times 2.4 = ₹ 960$$

iii. Percentage return on Bhargav's money

$$\begin{aligned} &= \frac{\text{Total annual income}}{\text{Total amount invested}} \times 100 \\ &= \frac{960}{9600} \times 100 \\ &= 10\% \end{aligned}$$

∴ Bhargav gets 10% as the rate of return on his money.

Exercise 9.7 | Q 18 | Page 142

Anil buys 350 Rs 100 shares of a company at a premium of 20% from the market. The company pays a 12% dividend annually.

Find

- (i) the investment made by the Anil,
- (ii) his annual income from the shares, and
- (iii) the rate of return from the shares.

SOLUTION

Given that,

Face value of shares (F.V.) = ₹ 100

Premium = 20%

∴ The market value of shares (M.V.)

$$= 100 + \left(\frac{20}{100} \times 100 \right) = ₹120$$

Dividend = 12%

$$\therefore \text{Annual income from one share} = \frac{12}{100} \times 100 = ₹ 12$$

Anil buys 350 shares.

i. Amount invested by Anil

= number of shares \times market value

$$= 350 \times 120$$

$$= ₹ 42,000$$

ii. Anil's annual income from the shares = number of shares \times annual income from one share

$$= 350 \times 12$$

$$= ₹ 4200$$

$$\text{iii. Rate of return from shares} = \frac{\text{Total annual income}}{\text{Total annual invested}} \times 100$$

$$= \frac{4200}{42000} \times 100$$

$$= 10\%$$

\therefore The rate of return from Anil's shares is 10%.

MISCELLANEOUS EXERCISE 9 [PAGES 143 - 144]

Miscellaneous Exercise 9 | Q 1 | Page 143

A man buys a house for Rs 10 lakh and rents it. He puts 10% of the annual rent aside for repairs, Pays Rs. 1000 as annual taxes and realizes 8% on his investment thereafter. Find the annual rent of the house.

SOLUTION

Let ₹ 'x' be the annual rent of the house.

The man keeps 10% of the annual rent aside for repairs.

$$\text{i.e., } \frac{10}{100} \times x \text{ or } ₹ \frac{x}{10} \text{ aside for repairs.}$$

In addition, he pays ₹ 1000 as annual taxes.

After incurring these expenses he is left with an amount which is 8% of his investment for the house.

$$\text{i.e., } \frac{8}{100} \times 10,00,000$$

$$\text{i.e., ₹ 80,000}$$

$$\therefore x - \left(\frac{x}{10} + 1000 \right) = 80,000$$

$$\therefore x - \frac{x}{10} = 81,000$$

$$\therefore \frac{10x - x}{10} = 81,000$$

$$\therefore 9x = 8,10,000$$

$$\therefore x = 90,000$$

\therefore The annual rent of the house is ₹ 90,000.

Miscellaneous Exercise 9 | Q 2 | Page 144

Rose got 30% of the maximum marks in an examination and failed by 10 marks. However, Lily who appeared for the same examination got 40% of the total marks and got 15 marks more than the passing marks. What were the passing marks in the examination?

SOLUTION

Let maximum marks be x

Rose scored 30% of maximum marks

$$\text{i.e. Rose scored } \frac{30}{100} x$$

Rose failed by 10 marks

$$\therefore \text{passing marks} = \frac{30}{100} x + 10 \dots\dots(i)$$

Lily scored 40% of the maximum marks

$$\text{i.e. Lily scored } \frac{40}{100} x$$

Lily scored 15 marks more than passing marks

$$\therefore \text{passing marks} = \frac{40x}{100} - 15 \quad \dots(\text{ii})$$

equating (i) and (ii),

$$\frac{30x}{100} + 10 = \frac{40x}{100} - 15$$

$$\therefore 10 + 15 = \frac{40x - 30x}{100}$$

equating (i) and (ii),

$$\frac{30x}{100} + 10 = \frac{40x}{100} - 15$$

$$\therefore 10 + 15 = \frac{40x - 30x}{100}$$

$$\therefore 10x = (25)(100)$$

$$x = 250$$

$$\text{From (i), passing marks} = \frac{30}{100}(250) + 10$$

$$= 75 + 10 = 85$$

\therefore Passing marks for the examination were 85.

Miscellaneous Exercise 9 | Q 3 | Page 144

Ankita's Salary was reduced by 50%. Again the reduced salary was increased by 50%. Find loss in terms of percentage.

SOLUTION

Let Ankita's initial salary be ₹ 'x'.

Her salary was reduced by 50%.

\therefore Ankita's salary after the reduction

$$= x \left(1 - \frac{50}{100} \right) = x \left(1 - \frac{1}{2} \right)$$

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

Ankita's reduced salary was then increased by 50%

∴ Ankita's final salary after the increase

$$= \frac{x}{2} \left(1 + \frac{50}{100} \right) = \frac{x}{2} \left(1 + \frac{1}{2} \right)$$

$$= \frac{x}{2} \times \frac{3}{2}$$

$$= \frac{3x}{4}$$

∴ Loss in Ankita's salary after the decrease and increase

$$= x - \frac{3x}{4} = \frac{x}{4}$$

$$\text{Percentage loss} = \frac{\text{loss in salary}}{\text{initial salary}} \times 100$$

$$= \frac{\frac{x}{4}}{x} \times 100$$

$$= \frac{1}{4} \times 100$$

$$= 25$$

∴ Ankita lost 25% of her salary.

Miscellaneous Exercise 9 | Q 4 | Page 144

By selling 300 lunch boxes, a shopkeeper gains the selling price of 100 lunch boxes. Find his gain percentage.

SOLUTION

Let ₹ x be the selling price (S.P.) of one lunch box.

∴ S.P. of 300 lunch boxes = $300x$

and S.P. of 100 lunch boxes = $100x$

Gain = $100x$ [given]

C.P. of 300 lunch boxes = S.P. – Gain

= $300x - 100x$

= $200x$

$$\text{Profit\%} = \frac{\text{Profit} \times 100}{\text{C.P.}}$$

$$\text{Profit\%} = \frac{100x}{200x} \times 100 = 50$$

∴ Shopkeeper's gain percentage is 50%.

Miscellaneous Exercise 9 | Q 5 | Page 144

A salesman sold an article at a loss of 10%. If the selling price has been increased by Rs. 80, there would have been a gain of 10%. What was the cost of the article?

SOLUTION

Let ₹ x be the cost price of the article.

$$\text{S.P. of the article} = x - \frac{10}{100}x = \frac{9x}{10} \quad \dots(i)$$

Given that, S.P. increased by ₹ 80 would have given a 10% gain

$$\text{i.e. S.P.} + 80 = x + \frac{10}{100}x$$

$$\therefore \frac{9x}{10} + 80 = \frac{11x}{10} \quad \dots\dots[\text{From (i)}]$$

$$\therefore \frac{(11 - 9)x}{10} = 80$$

$$\therefore x = \frac{80 \times 10}{2} = 40 \times 10 = 400$$

\therefore The cost price of the article is ₹ 400.

Miscellaneous Exercise 9 | Q 6 | Page 144

Find the single discount equivalent to a series discount of 10%, 20%, and 15%.

SOLUTION

Let the marked price be ₹ 100

$$\text{After 1}^{\text{st}} \text{ discount the price} = 100 \left(1 - \frac{10}{100} \right)$$

$$= 90$$

$$\text{After 2}^{\text{nd}} \text{ discount the price} = 90 \left(1 - \frac{20}{100} \right)$$

$$= 72$$

$$\text{After 3}^{\text{rd}} \text{ discount the price} = 72 \left(1 - \frac{15}{100} \right)$$

$$= 72 \times \frac{85}{100}$$

$$= 61.2$$

\therefore The selling price after 3 discounts is ₹ 61.2.

\therefore Single equivalent discount

= marked price – selling price

$$= 100 - 61.2$$

$$= ₹ 38.8$$

\therefore The single equivalent discount is ₹ 38.8 on ₹ 100.

i.e. The single equivalent discount is 38.8%.

Miscellaneous Exercise 9 | Q 7 | Page 144

Reshma put an amount at simple interest at a certain rate for 3 years. Had she been put at a 2% higher rate, she would have received Rs 360 more. Find the sum.

SOLUTION

Let P and R represent the principal amount and rate of interest p.a. respectively.

Given duration = T = 3 years

$$\text{Simple interest} = \frac{PRT}{100} = \frac{3PR}{100}$$

Given that, had the amount been kept at 2% more, then gain would have been ₹ 360 more.

$$\text{i.e. } \frac{P(R + 2)(3)}{100} = \frac{3PR}{100} + 360$$

$$\therefore \frac{3PR}{100} + \frac{6P}{100} = \frac{3PR}{100} + 360$$

$$\therefore \frac{6P}{100} = 360$$

$$\therefore P = 6000$$

\therefore The sum of money is ₹ 6,000.

Miscellaneous Exercise 9 | Q 8 | Page 144

The compound interest on Rs. 30000 at 7% p.a. is Rs. 4347. What is the period in years?

SOLUTION

Given that,

Principal (P) = ₹ 30,000

Rate of interest (R) = 7% p.a.

Compound interest = ₹ 4,347

Amount after compound interest

$$A = P \left(1 + \frac{R}{100} \right)^T \text{ and}$$

$$I = A - P$$

$$\therefore 4,347 = 30,000 \left(1 + \frac{7}{100} \right)^T - 30,000$$

$$= 30,000[(1.07)^T - 1]$$

$$\therefore 4,347 = 30,000[(1.07)^T - 1]$$

$$\therefore (1.07)^T = \frac{4347}{30000} + 1$$

$$= \frac{1449}{10000} + 1$$

$$= \frac{11449}{10000}$$

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

$$= (1.07)^2$$

$$\therefore T = 2$$

\therefore Amount is invested for 2 years.

Miscellaneous Exercise 9 | Q 9 | Page 144

The value of the machine depreciates at the rate of 15% p.a. It was purchased 2 years ago. Its present value is Rs. 7225. What was the purchase price of the machine?

SOLUTION

Given,

Rate of depreciation = $r = 15\%$

Number of years = $n = 2$ years.

Present value of machine = P.V. = ₹ 7,225

The purchase price (V) of the machine can be found out using

$$P.V. = V\left(1 - \frac{r}{100}\right)^n$$

$$\therefore 7225 = V\left(1 - \frac{15}{100}\right)^2$$

$$\therefore V\left(\frac{100 - 15}{100}\right)^2 = 7225$$

$$\therefore V\left(\frac{85}{100}\right)^2 = 7225$$

$$\therefore V\left(\frac{17}{20}\right)^2 = 7225$$

$$\therefore V = \frac{7225 \times 20 \times 20}{17 \times 17}$$

$$\therefore V = 10,000$$

\therefore The purchase price of the machine was ₹ 10,000/-.

Miscellaneous Exercise 9 | Q 10 | Page 144

A tree increases annually by $\frac{1}{8}$ of its height. By how much will it increase after $2\frac{1}{2}$ years. If its length today is 8 m.?

SOLUTION

The height of the tree today is 8 m.

The height of the tree increases by $\left(\frac{1}{8}\right)^{\text{th}}$ of its height every year.

At the end of the 1st year, the height of the tree will be

$$= 8 + \frac{1}{8} \times 8$$

$$= 9 \text{ m}$$

And, at the end of the 2nd year, the height of the tree will be

$$= 9 + \frac{1}{8} \times 9 = 9 \left(1 + \frac{1}{8} \right)$$

$$= 9 \times \frac{9}{8} = \frac{81}{8}$$

$$\text{After six more months, the height of the tree will be} = \frac{81}{8} + \frac{1}{16} \left(\frac{81}{8} \right)$$

$$= \frac{81}{8} \left(1 + \frac{1}{16} \right)$$

$$= \frac{81}{8} \times \frac{17}{16}$$

$$= 10.75 \text{ m}$$

$$\therefore \text{Increase in the height of the tree after } 2\frac{1}{2} \text{ years} = 10.75 - 8 = 2.75 \text{ m.}$$

Miscellaneous Exercise 9 | Q 11 | Page 144

A building worth Rs. 121000 is constructed on land worth Rs. 81000. After how many years will the value of both be the same if land appreciates at 10% pa. and buildings depreciate at 10% p.a.

SOLUTION

Given,

Value of the building = V.B. = ₹ 1,21,000

Value of land = V.L. = ₹ 81,000/-

Rate of appreciation of land = rate of depreciation of building = $r = 10\%$.

For the value of building and land to be the same.

$$V.L. \left(1 + \frac{r}{100} \right)^n = V.B. \left(1 - \frac{r}{100} \right)^n$$

$$\therefore 81,000 \left(1 + \frac{10}{100} \right)^n = 1,21,000 \left(1 - \frac{10}{100} \right)^n$$

$$81,000 \left(\frac{11}{10} \right)^n = 1,21,000 \left(\frac{9}{10} \right)^n$$

$$\therefore \frac{11^n}{10^n} \times \frac{10^n}{9^n} = \frac{1,21,000}{81,000}$$

$$\therefore \frac{11^n}{9^n} = \frac{11^2}{9^2}$$

$$\therefore n = 2 \text{ years.}$$

\therefore After two years the value of the building and land will be the same.

Miscellaneous Exercise 9 | Q 12 | Page 144

Varun invested 25%, 30%, and 20% of his savings in buying shares of three different companies. 'A', 'B' and 'C' which declared dividends. 10%, 12% and 15% respectively. If his total income on account of dividends is Rs. 6370/-, find the amount he invested in buying shares of company 'B'.

SOLUTION

Let 'T' be Varun's total savings.

\therefore Investment of Varun in:

$$\text{Company A} = 25\% \text{ of } T = \frac{25}{100} \times T = \frac{T}{4},$$

$$\text{Company B} = 30\% \text{ of } T = \frac{30}{100} \times T = \frac{3T}{10} \text{ and}$$

$$\text{Company C} = 20\% \text{ of } T = \frac{20}{100} \times T = \frac{T}{5}$$

Company A, B, and C declared dividends 10%, 12%, and 15% respectively.

$$\therefore \text{Dividend from company A} = 10\% \text{ of } \frac{T}{4}$$

$$= \frac{10}{100} \times \frac{T}{4} = \frac{T}{40} \quad \dots\dots(i)$$

$$\text{Dividend from company B} = 12\% \text{ of } \frac{3T}{10}$$

$$= \frac{12}{100} \times \frac{3T}{10} = \frac{9T}{500} \dots\dots(ii)$$

Dividend from company C = 15% of $\frac{T}{5}$

$$= \frac{15}{100} \times \frac{T}{5} = \frac{3T}{100} \dots\dots(iii)$$

Total income on account of dividend = ₹ 6,370 .

$$\frac{T}{40} + \frac{9T}{250} + \frac{3T}{100} = 6,370 \dots [From (i), (ii) and (iii)]$$

$$\therefore T \left(\frac{25 + 36 + 30}{1,000} \right) = 6,370$$

$$\therefore \frac{91T}{1,000} = 6,370$$

$$\therefore T = \frac{6,370 \times 1000}{91} = 70,000$$

\therefore Amount invested by Varun in company B

$$= \frac{3T}{10}$$

$$= \frac{3 \times 70,000}{10} = ₹21,000.$$

\therefore Varun invested ₹ 21,000 in company B.

Miscellaneous Exercise 9 | Q 13 | Page 144

Find the annual dividend received from Rs. 25000, 8% stock at 108.

SOLUTION

Amount invested = ₹ 25,000

Dividend = 8%

Assuming face value F.V. as ₹ 100

Annual income per share

$$= \frac{\text{Dividend}}{100} \times \text{Face value}$$

$$= \frac{8}{100} \times 100$$

$$= ₹ 8$$

The market value of the share M.V. = ₹ 108

$$\therefore \text{Rate of return} = \frac{\text{Annual income per share}}{\text{Market value}} \times 100$$

$$\text{Rate of return} = \frac{8}{108} \times 100 = 7.4\%$$

Annual dividend on amount invested

$$= \text{Rate of return} \times \text{amount invested}$$

$$= \frac{7.4}{100} \times 25,000$$

$$= ₹ 1850$$

\therefore Annual dividend of ₹ 1850 is received from 8% stock at ₹ 108.

Alternate approach

Assuming ₹ 25,000 as the total face value of all the shares. Since the dividend is 8%,

$$\text{Annual dividend} = \frac{8}{100} \times 25,000 = ₹ 2,000$$

Miscellaneous Exercise 9 | Q 14 | Page 144

A, B, and C enter into a partnership. A invests 3 times as much as B invests and B invests two-thirds of what 'C' invests. At the end of the year, the profit earned is Rs. 8800. What is the share of 'B'?

SOLUTION

Let 'a', 'b', and 'c' be the amounts invested by A, B, and C respectively.

Given that, A invests 3 times as much as B and B invests two-thirds of what 'C' invests.

$$\therefore a = 3b \text{ and } b = \frac{2}{3}c$$

$$\therefore \frac{a}{b} = \frac{3}{1} \text{ and } \frac{b}{c} = \frac{2}{3}$$

$$\text{Or } \frac{a}{b} = \frac{6}{2} \text{ and } \frac{b}{c} = \frac{2}{3}$$

$$\therefore a : b = 6 : 2 \text{ and } b : c = 2 : 3$$

$$\therefore a : b : c = 6 : 2 : 3$$

Given that profit earned = ₹ 8800

$$\therefore \text{Share of 'B' in profit} = \frac{2}{11} \times 8800 = ₹1600$$

\therefore B's share in profit is ₹ 1600.

Miscellaneous Exercise 9 | Q 15 | Page 144

The ratio of investment of two partners Santa and Banta is 11 : 12 and the ratio of their profits is 2 : 3. If Santa invested the money for 8 months, then for how much time Banta his money?

SOLUTION

Let 'x' be the time in months for which banta invested his money

Santa and banta invested their money in the ratio 11 : 12.

Santa invested his money for 8 months and the ratio of their profits is 2 : 3.

$$\therefore 11 \times 8 : 12 \times x = 2 : 3$$

$$\therefore \frac{88}{12x} = \frac{2}{3}$$

$$x = \frac{88 \times 3}{2 \times 12}$$

$$\therefore x = 11$$

\therefore banta invested his money for 11 months.

Miscellaneous Exercise 9 | Q 16 | Page 144

Akash, Sameer, and Sid took a house on rent for once a year for Rs.16236. They stayed together for 4 months and then sid left the house. After 5 more months. Sameer also left the house. How much rent should each pay?

SOLUTION

Let 'R' be the rent per month to be paid to the landlord.

Given that, Sid left the house after 4 months

$$\therefore \text{Rent paid by Sid} = \frac{R}{3} \times 4 = \frac{4R}{3}$$

Sameer left the house after another 5 months,

$$\therefore \text{Rent paid by Sameer} = \frac{R}{2} \times 5 + \frac{R}{3} \times 4$$

$$= R \left(\frac{5}{2} + \frac{4}{3} \right)$$

$$= \frac{23R}{6}$$

Akash stayed in the house for the entire year.

$$\therefore \text{Rent paid by Akash} = 3R + \frac{R}{2} \times 5 + \frac{R}{3} \times 4$$

$$= R \left(3 + \frac{5}{2} + \frac{4}{3} \right)$$

$$= \frac{41R}{6}$$

∴ The rent paid by the three of them, over that period of one year must be in proportion.

$$\frac{41R}{6} : \frac{23R}{6} : \frac{4R}{3}$$

i.e. in the proportion

$$41 : 23 : 8 \text{(multiplying throughout by } \frac{6}{R} \text{)}$$

Let x be the constant of proportionality.

Rent to be paid by Akash = ₹ 41x

Rent to be paid by Sameer = 23x

and rent to be paid by Sid = 8x

The total rent for the house was ₹ 16236.

$$\therefore 41x + 23x + 8x = ₹16236$$

$$\therefore 72x = 16236$$

$$x = 225.5$$

$$\therefore \text{Akash should pay } 41x = 41 \times 225.5$$

$$= ₹ 9245.5$$

$$\text{Sameer should pay } 23x = 23 \times 225.5$$

$$= ₹ 5186.5$$

$$\text{and Sid should pay } 8x = 8 \times 225.5 = ₹ 1804$$

Miscellaneous Exercise 9 | Q 17 | Page 144

Ashwin Auto Automobiles sold 10 motorcycles. The total sales amount was Rs. 680000. 18% of GST is applicable. Calculate how much CGST and SGST the firm has to pay.

SOLUTION

Given, the total sales amount for Ashwin Automobiles was ₹ 6,80,000. 18% of GST is applicable.

∴ GST payable = 18% of 6,80,000

$$= \frac{18}{100} \times 6,80,000 = ₹ 1,22,400$$

Now CGST = SGST = 9%

$$= \frac{\text{GST payable}}{2}$$

$$= \frac{1,22,400}{2}$$

$$= ₹ 61,200$$

∴ CGST = SGST = ₹ 61,200

Miscellaneous Exercise 9 | Q 18 | Page 144

‘Sweet 16’ A ready-made garments shop for Women's garments, purchased stock for Rs. 400000 and sold that stock for 550000 (12% GST is applicable)

Find,

i) Input Tax Credit

ii) CGST and SGST paid by the firm.

SOLUTION

Given that, a stock purchased by ‘Sweet 16’ was worth ₹ 4,00,000

GST applicable is 12%.

∴ Input tax = 12% of 4,00,000

$$= \frac{12}{100} \times 4,00,000$$

$$= ₹ 48,000$$

∴ Input tax Credit (ITC) = ₹ 48,000

The garment stock was sold for ₹ 5,50,000

∴ Output tax = 12% of 5,50,000

$$= \frac{12}{100} \times 5,50,000$$

$$= ₹ 66,000$$

$$\therefore \text{GST payable} = \text{output tax} - \text{ITC}$$

$$= 66,000 - 48,000$$

$$= ₹ 18,000$$

$$\therefore \text{CGST} = \text{SGST} = \frac{\text{GST payable}}{2} = ₹ 9,000$$