Direct Proportion and Inverse Proportion

PRACTICE SET 37 [PAGE 64]

Practice Set 37 | Q 1 | Page 64

If 7 kg onions cost 140 rupees, how much must we pay for 12 kg onions?

Solution: Let us suppose the cost of 12 kg onions is x rupees.

The number of onions and their cost vary in direct proportion.

$$\therefore \frac{7}{140} = \frac{12}{x}$$

$$\Rightarrow x = \frac{12 \times 140}{7}$$

$$= 240 \text{ rupees}$$

Hence, the cost of 12 kg onions is 240 rupees.

Practice Set 37 | Q 2 | Page 64

If 600 rupees buy 15 bunches of feed, how many will 1280 rupees buy?

Solution: Let us suppose x bunches of feed can be bought in 1280 rupees.

The number of bunches of feed and their cost vary in direct proportion.

$$\therefore \frac{15}{600} = \frac{x}{1280}$$

$$\Rightarrow x = \frac{15 \times 1280}{600}$$

$$x = 32$$

Hence, 32 bunches of feed can be bought in 1280 rupees.

Practice Set 37 | Q 3 | Page 64

For 9 cows, 13 kg 500 g of food supplements are required every day. In the same proportion, how much will be needed for 12 cows?

Solution: Let us suppose x kg of food supplement required for 12 cows.

The quantity of food supplement and the number of cows vary in direct proportion.

$$\therefore \frac{9}{13.5} = \frac{12}{x}$$

$$\Rightarrow x = \frac{12 \times 13.5}{9}$$

x = 18 kg

Hence, 18 kg of food supplement required for 12 cows.

Practice Set 37 | Q 4 | Page 64

The cost of 12 quintals of soyabean is 36,000 rupees. How much will 8 quintals cost?

Solution: Let us suppose the cost of 8 quintals of soyabean is x rupees.

The number of soyabeans and their cost vary in direct proportion.

$$\therefore \frac{12}{3600} = \frac{8}{x}$$

$$\Rightarrow x = \frac{8 \times 3600}{12}$$

x = 24000 rupees

Hence, the cost of 8 quintals of soyabean is 24000 rupees.

Practice Set 37 | Q 5 | Page 64

Two mobiles cost 16,000 rupees. How much money will be required to buy 13 such mobiles?

Solution: Let us suppose the cost of 13 mobiles is x rupees.

The number of mobiles and their cost vary in direct proportion.

$$\therefore \frac{2}{16000} = \frac{13}{x}$$

$$\Rightarrow x = \frac{13 \times 16000}{2}$$

x = 104000 rupees

Hence, the cost of 13 mobiles is 104000 rupees.

PRACTICE SET 38 [PAGE 66]

Practice Set 38 | Q 1 | Page 66

Five workers take 12 days to weed a field. How many days would 6 workers take? How many would 15 take?

Solution: Let us suppose 6 workers will take x days to weed a field.

As the number of workers increases, the number of days decreases.

So, the number of workers and number of days are in inverse proportion.

$\therefore 5 \times 12 = 6 \times x$

$\Rightarrow x = 60/6$

$\Rightarrow x = 10$ days

Let us suppose 15 workers will take y days to weed a field.

$\therefore 5 \times 12 = 15 \times y$

$\Rightarrow y = 60/15$

$\Rightarrow y = 4$ days

Hence, 6 workers will take 10 days, while 15 workers will take 4 days to weed a field.

Practice Set 38 | Q 2 | Page 66

Mohanrao took 10 days to finish a book, reading 40 pages every day. How many pages must be read in a day to finish it in 8 days?

Solution: Let us suppose Mohanrao will have to read x pages every day to finish the book in 8 days.

As the number of days decreases, the number of pages increases.

So, the number of days and number of pages are in inverse proportion.

$\therefore 10 \times 40 = 8 \times x$

$\Rightarrow x = 400/8$

$\Rightarrow x = 50$ pages

Hence, Mohanrao will have to read 50 pages every day to finish the book in 8 days

Practice Set 38 | Q 3 | Page 66

Mary cycles at 6 km per hour. How long will she take to reach her Aunt's house which is 12 km away? If she cycles at a speed of 4 km/hr, how long would she take?

Solution: Given,

Case 1:

Speed = 6 km/hr

Distance = 12 km

∴ Time = Distance/speed

= 12/6

= 2 hours

Case 2:

Speed = 4 km/hr

Distance = 12 km

∴ Time = Distance/Speed

= 12/4

= 3 hours

Hence, if the speed of cycle is 6 km/hr then, Marry will take 2 hours and if the speed of cycle is 4 km/hr then, she will take 3 hours to reach her Aunt's house.

Practice Set 38 | Q 4 | Page 66

The stock of grain in a government warehouse lasts 30 days for 4000 people. How many days will it last for 6000 people?

Solution: Let us suppose the stock of grain in a government warehouse lasts x days for 6000 people.

As the number of people increases, the number of days decreases.

So, the number of days and number of people are in inverse proportion.

∴ 30 × 4000 = 6000 × x

⇒ x = 120000/6000

⇒ x = 20 days

Hence, the stock of grain in a government warehouse lasts 20 days for 6000 people.

PRACTICE SET 39 [PAGE 68]

Practice Set 39 | Q 1 | Page 68

Suresh and Ramesh together invested 144000 rupees in the ratio 4:5 and bought a plot of land. After some years they sold it at a profit of 20%. What is the profit each of them got?

Solution: The proportion of Suresh's and Ramesh’s investment is 4:5.

The profit is shared in the same proportion as the investment, hence, the proportion of profit is 4:5.

Now, profit = 20/100 × 144000

= 28800 rupees

Therefore, the profit of Suresh and Ramesh is given by

Suresh's profit = 4/9 × 28800

= 12800 rupees

Ramesh's profit = 5/9 × 28800

= 16000 rupees

Hence, Suresh and Ramesh got a profit of 12800 and 16000 rupees respectively.

Practice Set 39 | Q 2 | Page 68

Virat and Samrat together invested 50000 and 120000 rupees to start a business. They suffered a loss of 20%. How much loss did each of them incur?

Solution: The proportion of Virat's and Samrat’s investment is given by 50000:120000 = 5:12

The loss is shared in the same proportion as the investment, hence, the proportion of profit is 5:12.

Now, Loss = 20/100 × (50000+120000)

= 20/100 × (170000)

= 34000 rupees

Therefore, the loss incurred by Virat and Samrat is given by

Virat's loss = 5/17 × 34000

= 10000 rupees

Samrat's loss = 12/17 × 34000

= 24000 rupees

Hence, Virat and Samrat incurred the loss of 10000 and 24000 rupees respectively.

Practice Set 39 | Q 3 | Page 68

Shweta, Piyush, and Nachiket together invested 80000 rupees and started a business of selling sheets and towels from Solapur. Shweta's share of the capital was 30000 rupees and Piyush's 12000. At the end of the year, they had made a profit of 24%. What was Nachiket's investment and what was his share of the profit?

Solution: Nachiket's investment = Total investment − (Shweta's investment + Piyush's investment)
= 80000 − (30000 + 12000)
= 80000 − 42000
= 38000 rupees

The proportion of Shweta's, Piyush's and Nachiket's investment is given by
30000:12000:38000 = 15:6:19

The profit is shared in the same proportion as the investment, hence, the proportion of profit is 15:6:19.

Now, Profit = 24/100 × (80000)
= 19200 rupees

Therefore, Nachiket's share of the profit is given by
= 19/40 × 19200
= 9120 rupees

Hence, Nachiket's investment and his share of the profit are 38000 and 9120 rupees respectively.

Practice Set 39 | Q 4 | Page 68

A and B shared a profit of 24500 rupees in the proportion 3:7. Each of them gave 2% of his share of the profit to the Soldiers' Welfare Fund. What was the actual amount given to the Fund by each of them?

Solution: Amount of share to the Soldiers' Welfare Fund = 2% of 24500
= 490 rupees
The profit is shared in the proportion of 3:7.
Therefore, A's share of the Fund is given by
= 3/10 × 490
= 147 rupees
Therefore, B's share of the Fund is given by
= 7/10 × 490
= 343 rupees

Hence, A's and B's share to the fund are 147 and 343 rupees respectively.

Practice Set 39 | Q 5 | Page 68

Jaya, Seema, Nikhil, and Neelesh put in altogether 360000 rupees to form a partnership, with their investments being in the proportion 3: 4: 7: 6. What was Jaya’s actual share in the capital? They made a profit of 12%. How much profit did Nikhil make?

Solution: Total investment = 360000 rupees

Total profit = 12/100 × 360000
= 43200 rupees

The profit is shared in the same proportion as the investment, hence, the proportion of profit is 3:4:7:6.

Jaya's share is given by
3/20 × 360000
= 54000 rupees

Nikhil's share in the profit is given by
7/20 × 43200
= 15120 rupees

Hence, Jaya's share and Nikhil's profits are 54000 and 15120 rupees respectively.