

CHAIN RULE

EXERCISE:

1. If the cost of x metres of wire is a rupees, then what is the cost of y metres of wire at the same rate?

SOL:- cost of x metres = Rs. a cost of 1 metre = Rs. $\left(\frac{a}{x}\right)$.

$$\text{cost of } y \text{ metres} = \text{Rs. } \left(\frac{a}{x} \times y\right) = \text{Rs. } \left(\frac{ya}{x}\right).$$

2. If the price of 6 toys is Rs. 264.37, what will be the approximate price of 5 toys?

SOL: Let the required price be Rs. x then, Less toys, Less cost (Direct proportion).

$$\therefore 6 : 5 :: 264.37 : x \Rightarrow 6x = (5 \times 264.37) \Leftrightarrow x \geq$$

$$\Leftrightarrow x = \frac{(5 \times 264.37)}{6} \Leftrightarrow x = 220.306.$$

\therefore Approximate price of 5 toys = Rs. 220.

3. The price of 357 mangoes is Rs. 1517.25. what will be the approximate price of 9 dozens of such mangoes?

SOL: Let the required price be Rs. x then, More mangoes, More price (Direct proportion)

$$\therefore 357 : (49 \times 12) :: 1517.25 : x$$

$$\Leftrightarrow 357x = (49 \times 12 \times 1517.25) \Leftrightarrow x = \left(\frac{49 \times 12 \times 1517.25}{357}\right)$$

$$\Leftrightarrow x = 2499$$

Hence, the approximate price is Rs. 2500

4. If a quarter kg of potato costs 60 paise, how many paise will 200 gm cost?

SOL: Let the required cost be x paise. Less weight

Less cost (Direct proportion)

$$\therefore 250 : 200 :: 60 : x \Leftrightarrow 250 \times x = (200 \times 60) \Leftrightarrow x = \left(\frac{200 \times 60}{250} \right)$$

$$\Leftrightarrow x = 48.$$

5. If 11.25 m of a uniform iron rod weighs 42.75 kg, what will be the weight of 6 m of the same rod?

SOL: Let the required weight be x kg. Then less

length, less weight (Direct proportion)

$$\therefore 11.25 : 6 :: 42.75 : x \Leftrightarrow 11.25 \times x = 6 \times 42.75 \Leftrightarrow$$

$$\Leftrightarrow x = \frac{6 \times 42.75}{11.25} \Leftrightarrow x = 22.8.$$

6. On a scale of map, 0.6 cm represents 6.6 km. If the distance between the points on the map is 80.5 cm, the actual distance between these points is:

SOL: Let the actual distance be x km, then

More distance on the map, More is the actual distance (Direct proportion)

$$\therefore 0.6 : 80.5 :: 6.6 : x \Leftrightarrow 0.6x = 80.5 \times 6.6$$

$$\Leftrightarrow x = \frac{80.5 \times 6.6}{0.6} \Leftrightarrow x = 885.5.$$

7. An industrial loom weaves 0.128 metres of cloth every second. Approximately, how many seconds will it take for the loom to weave 25 metres of cloth?

SOL: Let the required time be x seconds. Then,
More metres, more time (Direct proportion)

$$\therefore 0.128 : 25 :: 1 : x$$

$$\Leftrightarrow 0.128 \times x = 25 \times 1 \quad \Leftrightarrow x = \frac{25}{0.128} = \frac{25 \times 1000}{128}$$

$$\Leftrightarrow x = 195.31.$$

\therefore Required time = 195 sec (approximately)

8. A flagstaff 17.5 m high casts a shadow of length 40.25 m. The height of the building which casts a shadow of length 28.75 m under similar conditions will be:

SOL: Let the height of the building be x metres.
Less lengthy shadow, less is the height (Direct proportion)

$$\therefore 40.25 : 28.75 :: 17.5 : x \quad \Leftrightarrow 40.25 \times x = 28.75 \times 17.5$$

$$\Leftrightarrow x = \frac{(28.75 \times 17.5)}{40.25} \quad \Leftrightarrow x = 12.5$$

9. A man completes $\frac{5}{8}$ of a job in 10 days. At this rate, how many days will ~~it~~ ~~can~~ take him to finish the job?

SOL: Work done = $\frac{5}{8}$. Balance work = $(1 - \frac{5}{8}) = \frac{3}{8}$

Less work, Less days (Direct proportion)

Let the required number of days be x .

$$\text{Then } \frac{5}{8} : \frac{3}{8} :: 10 : x \quad \Leftrightarrow \frac{5}{8} \times x = \frac{3}{8} \times 10$$

$$\Leftrightarrow x = \left(\frac{3}{8} \times 10 \times \frac{8}{5} \right) = 6.$$

10. 36 men can complete a piece of work in 18 days. In how many days will 27 men complete the same work?

SOL: Let the required number of days be x .
Then, less men, more days (Indirect proportion)

$$\therefore 27 : 36 :: 18 : x \Leftrightarrow 27 \times x = 36 \times 18$$

$$\Leftrightarrow x = \frac{36 \times 18}{27} \Leftrightarrow x = 24$$

11. A fort had provision of food for 150 men for 45 days. After 10 days 25 men left the fort, the number of days for which the remaining food will last, is:

SOL: After 10 days : 150 men had food for 35 days.

Suppose 125 men had food for x days. Now, Less men
More days (Indirect proportion)

$$\therefore 125 : 150 :: 35 : x \Leftrightarrow 125 \times x = 150 \times 35$$

$$\Leftrightarrow x = \frac{150 \times 35}{125} \Leftrightarrow x = 42$$

Hence, the remaining food will last for 42 days.

12. A wheel that has 6 cogs is meshed with a larger wheel of 14 cogs. When the smaller wheel has made 21 revolutions, then the number of revolutions made by the larger wheel is.

SOL: Let the required number of revolutions made by larger wheel be x . Then, more cogs,
less revolutions (Indirect proportion)

$$\therefore 14 : 6 :: 21 : x \Leftrightarrow 14 \times x = 6 \times 21 \Leftrightarrow x = \left(\frac{6 \times 21}{14} \right) = 9$$

13. In a camp, there is a meal for 120 men or 200 children. If 150 children have taken the meal, how many men will be catered to with the remaining meal?

Sol: There is a meal for 200 children. 150 children have taken the meal. Remaining meal is to be catered to 50 children.

Now, 200 children = 120 men.

$$50 \text{ children} = \left(\frac{120}{200} \times 50 \right) \text{ men} = 30 \text{ men.}$$

14. The cost of 16 packets of salt, each weighing 900 grams is Rs. 28. What will be the cost of 27 packets, if each packet weighs 1 kg?

Sol: Let the required cost be Rs. x . Then,
More packets, More cost (Direct proportion)
More weight, More cost (Direct proportion).

$$\left. \begin{array}{l} \text{Packets } 16:27 \\ \text{weight } 900:1000 \end{array} \right\} \therefore 28:x.$$

$$\therefore (16 \times 900 \times x) = (27 \times 1000 \times 28) \Leftrightarrow x = \left(\frac{27 \times 1000 \times 28}{16 \times 900} \right)$$
$$= \frac{105}{2} = 52.50.$$

15. The cost of 16 pack A mat-weavers can weave A mats in A days. At the same rate, how many mats would be weaved by 8 mat-weavers in 8 days?

Sol: Let the required number of mats be x .

More weavers, More mats (Direct proportion)

More days, More mats (Direct proportion)

$$\begin{array}{l} \text{weavers } 4 : 8 \\ \text{Days } 4 : 8 \end{array} \left. \vphantom{\begin{array}{l} \text{weavers } 4 : 8 \\ \text{Days } 4 : 8 \end{array}} \right\} :: 4 : x$$

$$\therefore 4 \times 4 \times x = 8 \times 8 \times 4 \Leftrightarrow x = \frac{(8 \times 8 \times 4)}{(4 \times 4)} = 16$$