

## 12. Direct and Inverse Proportions

### Exercise 12A

#### 1. Question

Observe the tables given below and in each one find whether x and y are proportional:

(i)

x	3	5	8	11	26
y	9	15	24	33	78

(ii)

x	2.5	4	7.5	10	14
y	10	16	30	40	42

(iii)

x	5	7	9	15	18	25
y	15	21	27	60	72	75

**Answer**

Checking the  $\frac{x}{y}$  ratio here

$$(i) \frac{3}{9} = \frac{1}{3}, \frac{5}{15} = \frac{1}{3}, \frac{8}{24} = \frac{1}{3}, \frac{11}{33} = \frac{1}{3}, \frac{26}{78} = \frac{1}{3}; \text{ all are equal}$$

$$(ii) \frac{2.5}{10} = \frac{1}{4}, \frac{4}{16} = \frac{1}{4}, \frac{7.5}{30} = \frac{1}{4}, \frac{10}{40} = \frac{1}{4}, \frac{14}{42} = \frac{1}{3}; \text{ unequal}$$

$$(iii) \frac{5}{15} = \frac{1}{3}, \frac{7}{21} = \frac{1}{3}, \frac{9}{27} = \frac{1}{3}, \frac{15}{60} = \frac{1}{4}, \frac{18}{72} = \frac{1}{4}, \frac{25}{75} = \frac{1}{3}; \text{ unequal}$$

## 2. Question

If x and y are directly proportional, find the value of  $x_1$ ,  $x_2$  and  $y_2$  in the table given below:

X	3	$x_1$	$x_2$	10
Y	72	120	192	$y_2$

### Answer

We use the relation  $\frac{x}{y} = \frac{X}{Y}$  Here  $x_1 = 5$ ,  $y_1 = 120$  and  $x_2 = 2$

$$\text{Here, } \frac{3}{72} = \frac{x_1}{120}$$

$$\Rightarrow x_1 \times 72 = 3 \times 120$$

$$\Rightarrow x_1 = \frac{3 \times 120}{72} = 5$$

$$\text{Now, } \frac{3}{72} = \frac{x_2}{192}$$

$$\Rightarrow x_2 \times 72 = 3 \times 192$$

$$\Rightarrow x_2 = \frac{3 \times 192}{72} = 8$$

$$\text{And } \frac{3}{72} = \frac{10}{y_2}$$

$$\Rightarrow y_2 \times 3 = 10 \times 72$$

$$\Rightarrow y_2 = \frac{10 \times 72}{3} = 240$$

### 3. Question

If truck covers a distance of 510 km in 34 litres of diesel. How much distance would it cover in 20 litres of diesel?

#### Answer

Distance covered by truck increases, diesel required also increases. So it is a direct proportion.

$$\text{Let required distance be } x \text{ km, } \frac{510}{34} = \frac{x}{20}$$

$$\Rightarrow 34 \times x = 510 \times 20$$

$$\Rightarrow x = \frac{510 \times 20}{34} = 300 \text{ km}$$

### 4. Question

A taxi charges a fare of Rs.2550 for journey of 150 km. How much would it charge for a journey of 124 km?

#### Answer

Fare increases as the distance of the journey increases. So it is a direct proportion.

$$\text{Let required fare be Rs } x, \frac{2550}{150} = \frac{x}{124}$$

$$\Rightarrow 150 \times x = 2550 \times 124$$

$$\Rightarrow x = \frac{2550 \times 124}{150} = \text{Rs. } 2108$$

### 5. Question

A loaded truck covers 16 km in 25 minutes. At the same speed, how far can it travel in 5 hours?

#### Answer

At the same speed, more the distance travelled more will be the time taken. So it is a direct proportion.

Let required distance be  $x$  km, but unit of time is different so we will write 25 min =  $\frac{25}{60}$  hr

$$\frac{16}{\frac{25}{60}} = \frac{x}{5}$$

$$\Rightarrow \frac{25}{60} \times x = 16 \times 5$$

$$\Rightarrow x = \frac{80 \times 60}{25} = 192 \text{ km}$$

### 6. Question

If 18 dolls cost Rs.630, how many dolls can be bought for Rs.455?

#### Answer

More the dolls, more will be the cost. So it is a direct proportion.

$$\text{Let no. of dolls be } x, \frac{18}{630} = \frac{x}{455}$$

$$\Rightarrow 630 \times x = 18 \times 455$$

$$\Rightarrow x = \frac{18 \times 455}{630} = 13$$

### 7. Question

If 9 kg of sugar costs Rs. 238.50, how much sugar can be bought for Rs.371?

#### Answer

More the amount of sugar, more will be the cost. So it is a direct proportion.

$$\text{Let the amount of sugar be } x \text{ kg, } \frac{9}{238.50} = \frac{x}{371}$$

$$\Rightarrow 238.50 \times x = 9 \times 371$$

$$\Rightarrow x = \frac{9 \times 371}{238.50} = 14 \text{ kg}$$

### 8. Question

The cost of 15 metres of cloth is Rs.981. What length of this cloth can be purchased for Rs.1308?

#### Answer

More the length of cloth, more will be the cost. So it is a direct proportion.

$$\text{Let the length of cloth be } x \text{ metres } \frac{15}{981} = \frac{x}{1308}$$

$$\Rightarrow 981 \times x = 15 \times 1308$$

$$\Rightarrow x = \frac{15 \times 1308}{981} = 20 \text{ meters}$$

### 9. Question

In a model of a ship, the mast is 9 cm high, while the mast of the actual ship is 15 m high. If

the length of the ship is 35 metres, how long is the model ship?

**Answer**

The length and the height of ship and model should be proportional.

Height of mast of actual ship = 15 m

Height of model ship = 9 m

Length of ship = 35 m

Length of model = x

So,

$$\frac{\text{Height of ship}}{\text{Length of ship}} = \frac{\text{Height of model}}{\text{Length of model}}$$

$$15/35 = 9/x$$

Cross multiplying, we get,

$$x = (9 \times 35)/15 = 21 \text{ m}$$

**Length of model of the ship is 21 m.**

**10. Question**

In 8 days, the earth picks up  $(6.4 \times 10^7)$  kg of dust from the atmosphere. How much dust will it pick up in 15 days?

**Answer**

More the no. of days, more will be the dust picked by the earth. So it is a direct proportion.

Let the amount of dust be x kg,  $\frac{6.4 \times 10^7}{8} = \frac{x}{15}$

$$\Rightarrow 8 \times x = 15 \times 6.4 \times 10^7$$

$$\Rightarrow x = \frac{15 \times 6.4 \times 10^7}{8} = 12 \times 10^7 \text{ kg} = 1.2 \times 10^8 \text{ kg}$$

**11. Question**

A car is travelling at the average speed of 50km/hr. How much distance would it travel in 1 hour 12 minutes?

**Answer**

$$\text{Average Speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

Let distance be x km, time =  $(1 + \frac{12}{60})$  hr =  $(1 + \frac{1}{5})$ hr =  $\frac{6}{5}$  hr

$$\Rightarrow 50\text{km/hr} = \frac{x}{\frac{6}{5}}$$

$$\Rightarrow x = 50 \times \frac{6}{5} = 60 \text{ km}$$

### 12. Question

Ravi walks at the uniform rate of 5 km/hr. What distance would he cover in 2 hours 24 minutes?

### Answer

$$\text{Uniform Speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

$$\text{Let distance be } x \text{ km, time} = \left(2 + \frac{24}{60}\right) \text{ hr} = \left(2 + \frac{2}{5}\right) \text{ hr} = \frac{12}{5} \text{ hr}$$

$$\Rightarrow 5\text{km/hr} = \frac{x}{\frac{12}{5}}$$

$$\Rightarrow x = 5 \times \frac{12}{5} = 12 \text{ km}$$

### 13. Question

If the thickness of a pile of 12 cardboard is 65 mm, find the thickness of a pile of 312 such cardboards.

### Answer

More the no. of cardboards, more will be the thickness. So it is a direct proportion.

$$\text{Let the thickness be } x \text{ mm, } \frac{65}{12} = \frac{x}{312}$$

$$\Rightarrow 12 \times x = 65 \times 312$$

$$\Rightarrow x = \frac{65 \times 312}{12} = 1690 \text{ mm} = 1\text{m } 690\text{mm} = 1\text{m } 69 \text{ cm}$$

### 14. Question

11 men can dig  $6\frac{3}{4}$ -metre-long trench in one day. How many men should be employed for digging 27-metre-long trench of the same type in one day?

### Answer

More the length of the trench, more will be the no. of men required to finish it in a day. So it is a direct proportion.

$$6\frac{3}{4} \text{ m} = \frac{27}{4} \text{ m}$$

Let the no. of men be  $x$ ,  $\frac{11}{27} = \frac{x}{27}$

$$\Rightarrow \frac{27}{4} \times x = 27 \times 11$$

$$\Rightarrow x = \frac{27 \times 11 \times 4}{27} = 44 \text{ men}$$

### 15. Question

Reenu type 540 words during half an hour. How many words would she type in 8 minutes?

### Answer

More the time, more will be the no. of words typed. So it is a direct proportion.

Half an hour = 30 minutes

Let the no. of words be  $x$ ,  $\frac{540}{30} = \frac{x}{8}$

$$\Rightarrow 30 \times x = 540 \times 8$$

$$\Rightarrow x = \frac{540 \times 8}{30} = 144 \text{ words}$$

### Exercise 12B

#### 1. Question

Observe the tables given below and in each case find whether  $x$  and  $y$  are inversely proportional:

(i)

X	6	10	14	16
Y	9	15	21	24

(ii)

X	5	9	15	3	45
Y	18	10	6	30	2

(iii)

X	9	3	6	36
Y	4	12	9	1

### Answer

Here we check the values of  $x \times y$

(i)  $6 \times 9 = 54$ ,  $10 \times 15 = 150$ ,  $14 \times 21 = 294$ ,  $16 \times 24 = 384$  ; unequal

(i)  $5 \times 18 = 90$ ,  $9 \times 10 = 90$ ,  $15 \times 6 = 90$ ,  $3 \times 30 = 90$ ,  $45 \times 2 = 90$ ; equal

(i)  $9 \times 4 = 36$ ,  $3 \times 12 = 36$ ,  $6 \times 6 = 36$ ,  $6 \times 9 = 54$ ,  $36 \times 1 = 36$  ;unequal

### 2. Question

If  $x$  and  $y$  are inversely proportional, find the values of  $x_1$ ,  $x_2$ ,  $y_1$  and  $y_2$  in the table given below:

X	8	$x_1$	16	$x_2$	80
Y	$y_1$	4	5	2	$y_2$

### Answer

$$8 \times y_1 = 16 \times 5$$



$$\Rightarrow y_1 = 10$$

$$x_1 \times 4 = 16 \times 5$$

$$\Rightarrow x_1 = 20$$

$$x_2 \times 2 = 16 \times 5$$

$$\Rightarrow x_2 = 40$$

$$80 y_2 = 16 \times 5$$

$$\Rightarrow y_2 = 1$$

### 3. Question

If 35 men can reap a field in 8 days, in how many days can 20 men reap the same field?

#### Answer

More the number of men, lesser the days required. So, it is an inverse proportion.

Let the required no. of days be  $x$ .

$$\Rightarrow 35 \times 8 = 20 \times x$$

$$\Rightarrow x = \frac{35 \times 8}{20} = 14 \text{ days}$$

### 4. Question

12 men can dig a pond in 8 days. How many men can dig it in 6 days?

#### Answer

More the number of men, lesser the days required. So, it is an inverse proportion.

Let the required no. of men be  $x$ .

$$\Rightarrow 12 \times 8 = 6 \times x$$

$$\Rightarrow x = \frac{12 \times 8}{6} = 16 \text{ men}$$

### 5. Question

6 cows can graze a field in 28 days. How long would 14 cows take to graze the same field?

#### Answer

More the number of cows, lesser the days required to graze a field. So, it is an inverse proportion.

Let the required no. of days be  $x$ .

$$\Rightarrow 6 \times 28 = 14 \times x$$

$$\Rightarrow x = \frac{6 \times 28}{14} = 12 \text{ days}$$

### 6. Question

A car takes 5 hours to reach a destination by travelling at the speed of 60 km/hr. How long will it take when the car travels at the speed of 75 km/hr?

**Answer**

More the speed of car, lesser the time required. So, it is an inverse proportion.

Let the required time be  $x$  hours.

$$\Rightarrow 5 \times 60 = 75 \times x$$

$$\Rightarrow x = \frac{5 \times 60}{75} = 4 \text{ hours}$$

**7. Question**

A factory required 42 machines to produce a given number of articles in 56 days. How many machines would be required to produce the same number of articles in 48 days?

**Answer**

More the number of machines, lesser the days required to produce a given number of articles. So, it is an inverse proportion.

Let the required no. of machines be  $x$ .

$$\Rightarrow 42 \times 56 = 48 \times x$$

$$\Rightarrow x = \frac{42 \times 56}{48} = 49 \text{ machines}$$

**8. Question**

7 taps of the same size fill a tank in 1 hour 36 minutes. How long will 8 taps of the same size take to fill the tank?

**Answer**

More the number of taps, lesser the time required to fill a tank. So, it is an inverse proportion.

Let the required time be  $x$  minutes.

$$\Rightarrow 7 \times (60 + 36) = 8 \times x$$

$$\Rightarrow x = \frac{7 \times 96}{8} = 84 \text{ minutes} = 1 \text{ hour } 24 \text{ minutes}$$

**9. Question**

8 taps of the same size fill a tank in 27 minutes. If two taps go out of order, how long would the remaining taps take to fill the tank?

**Answer**

More the number of taps, lesser the time required to fill a tank. So, it is an inverse proportion.

Let the required time be  $x$  minutes.

$$\Rightarrow 8 \times 27 = 6 \times x$$

$$\Rightarrow x = \frac{8 \times 27}{6} = 36 \text{ minutes}$$

### 10. Question

A farmer has enough food to feed 28 animals in his cattle for 9 days. How long would the food last, if there were 8 more animals in his cattle?

#### Answer

More the number of animals, lesser the days to feed them by given food. So, it is an inverse proportion.

Let the required days be  $x$ .

$$\Rightarrow 28 \times 9 = 36 \times x$$

$$\Rightarrow x = \frac{28 \times 9}{36} = 7 \text{ days}$$

### 11. Question

A garrison of 900 men had provisions for 42 days. However, a reinforcement of 500 men arrived. For how many days will the food last now?

#### Answer

More the number of men, lesser the days to feed them by given food. So, it is an inverse proportion.

Let the required days be  $x$ .

$$\Rightarrow 900 \times 42 = 1400 \times x$$

$$\Rightarrow x = \frac{900 \times 42}{1400} = 27 \text{ days}$$

### 12. Question

In a hostel, 75 students had food provision for 24 days. If 15 students leave the hostel, for how many days would the food provision last?

#### Answer

More the number of men, lesser the days to feed them by given food. So, it is an inverse proportion.

Let the required days be  $x$ .

$$\Rightarrow 75 \times 24 = 60 \times x$$

$$\Rightarrow x = \frac{75 \times 24}{60} = 30 \text{ days}$$

### 13. Question

A school has 9 periods a day each of 40 minutes duration. How long would each period be, if the school has 8 periods a day, assuming the number of school hours to be the same?

#### Answer

Lesser the number of periods in a day, more the duration of them. So, it is an inverse proportion.

Let the required duration be  $x$ .

$$\Rightarrow 9 \times 40 = 8 \times x$$

$$\Rightarrow x = \frac{9 \times 40}{8} = 45 \text{ days}$$

#### 14. Question

If  $x$  and  $y$  vary inversely and  $x = 15$  when  $y = 6$ , find  $y$  when  $x = 9$ .

**Answer**

$$\Rightarrow 15 \times 6 = 9 \times y$$

$$\Rightarrow y = \frac{15 \times 6}{9} = 10$$

#### 15. Question

If  $x$  and  $y$  vary inversely and  $x = 18$  when  $y = 8$ , find  $x$  when  $y = 16$ .

**Answer**

$$\Rightarrow 18 \times 8 = x \times 16$$

$$\Rightarrow x = \frac{18 \times 8}{16} = 9$$

### Exercise 12C

#### 1. Question

If 14 kg of pulses cost Rs.882, what is the cost of 22 kg of pulses?

- A. Rs.1254
- B. Rs.1298
- C. Rs.1342
- D. 1386

**Answer**

More the amount of pulses, more will be the cost. So it is a direct proportion.

Let the cost be  $x$ ,  $\frac{882}{14} = \frac{x}{22}$

$$\Rightarrow x = \frac{882 \times 22}{14} = \text{Rs } 1386$$

#### 2. Question

If 8 orange cost Rs.52, how many oranges can be bought for Rs.169?

- A. 13

B. 18

C. 26

D. 24

**Answer**

More the amount of oranges, more will be the cost. So it is a direct proportion.

Let the amount be x,  $\frac{8}{52} = \frac{x}{169}$

$$\Rightarrow x = \frac{8 \times 169}{52} = \text{Rs } 26$$

**3. Question**

A machine fills 420 bottles in 3 hours. How many bottles will it fill in 5 hours?

A. 252

B. 700

C. 504

D. 300

**Answer**

More the no of bottles, more will be the time. So it is a direct proportion.

Let the bottles be x,  $\frac{420}{3} = \frac{x}{5}$

$$\Rightarrow x = \frac{5 \times 420}{3} = 700$$

**4. Question**

A car is travelling at a uniform speed of 75 km/hr. How much distance will it cover in 20 minutes?

A. 25 km

B. 15 km

C. 30 km

D. 20 km

**Answer**

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

Let distance be x km, time =  $\frac{20}{60}$  hr =  $\frac{1}{3}$  hr

$$\Rightarrow 75 \text{ km/hr} = \frac{x}{\frac{1}{3}}$$

$$\Rightarrow x = 75 \times \frac{1}{3} = 25 \text{ km}$$

### 5. Question

The weight of 12 sheets of a thick paper is 40 grams. How many sheets would weight 1 kg?

- A. 480
- B. 360
- C. 300
- D. none of these

### Answer

More the no of sheets, more will be the weight. So it is a direct proportion.

Let the sheets be x,  $\frac{12}{0.04} = \frac{x}{1}$

$$\Rightarrow x = \frac{12 \times 1}{0.04} = 300$$

### 6. Question

A pole 14 m high casts a shadow of 10 m. At the same time, what will be the height of a tree, the length of whose shadow is 7 metres?

- A. 20 m
- B. 9.8 m
- C. 5 m
- D. none of these

### Answer

More the height, more will be the length of shadow. So it is a direct proportion.

Let the height of tree be x m,  $\frac{14}{10} = \frac{x}{7}$

$$\Rightarrow x = \frac{14 \times 7}{10} = 9.8 \text{ m}$$

### 7. Question

A photograph of a bacteria enlarged 50000 times attains a length of 5 cm. The actual length of bacteria is

- A. 1000 cm
- B.  $10^{-3}$  cm
- C.  $10^{-4}$  cm
- D.  $10^{-2}$  cm

**Answer**

Let the actual length be  $x$  cm. When the bacteria is enlarged this much its length becomes 5 cm.

Then,  $x \times 50000 = 5$ .

$$\therefore x = \frac{1}{1000} = \frac{1}{10^4} = 10^{-4}$$

**8. Question**

6 Pipes fill a tank in 120 minutes, then 5 pipes will fill it in

- A. 100 min
- B. 144 min
- C. 140 min
- D. 108 min

**Answer**

More the no. of pipes, lesser the time to fill the tank. So, it is an inverse proportion.

Let the required duration be  $x$  min.

$$\Rightarrow 6 \times 120 = 5 \times x$$

$$\Rightarrow x = \frac{6 \times 120}{5} = 144 \text{ minutes}$$

**9. Question**

3 persons can build a wall in 4 days, then 4 persons can build it in

- A.  $5\frac{1}{3}$  days
- B. 3 days
- C.  $4\frac{1}{3}$  days
- D. none of these

**Answer**

More the no. of persons, lesser the days to build. So, it is an inverse proportion.

Let the required duration be x days.

$$\Rightarrow 3 \times 4 = 4 \times x$$

$$\Rightarrow x = \frac{3 \times 4}{4} = 3 \text{ days}$$

### 10. Question

A car takes 2 hours to reach a destination by travelling at 60 km/hr. How long will it take while travelling at 80 km/hr?

- A. 1 hr 30 min
- B. 1hr 40 min
- C. 2hrs 40 min
- D. none of these

### Answer

More the speed, lesser the time to travel. So, it is an inverse proportion.

Let the required time be x hr.

$$\Rightarrow 2 \times 60 = 80 \times x$$

$$\Rightarrow x = \frac{2 \times 60}{80} = 1.5 \text{ hours} = 1 \text{ hour } 30 \text{ minutes}$$

### CCE Test Paper-12

#### 1. Question

350 boxes can be placed in 25 cartons. How many boxes can be placed in 16 cartons?

### Answer

More the no of boxes, more will be the cartons required. So it is a direct proportion.

Let the boxes be x,  $\frac{350}{25} = \frac{x}{16}$

$$\Rightarrow x = \frac{16 \times 350}{25} = 224$$

#### 2. Question

The cost of 140 tennis balls is Rs.4900. Find the cost of 2 dozen such balls.

### Answer

More the no of tennis balls, more will be the cost. So it is a direct proportion.

Let the cost be Rs x,  $\frac{4900}{140} = \frac{x}{2 \times 12}$



$$\Rightarrow x = \frac{24 \times 4900}{140} = \text{Rs } 840$$

### 3. Question

The railway fare for 61 km is Rs.183. Find the fare for 53 km.

#### Answer

More the distance, more will be the fare. So it is a direct proportion.

$$\text{Let the fare be Rs } x, \frac{183}{61} = \frac{x}{53}$$

$$\Rightarrow x = \frac{183 \times 53}{61} = \text{Rs } 159$$

### 4. Question

10 people can dig a trench in 6 days. How many people can dig it in 4 days?

#### Answer

More the no. of people, lesser the days. So, it is an inverse proportion.

Let the required time be  $x$  days.

$$\Rightarrow 10 \times 6 = 4 \times x$$

$$\Rightarrow x = \frac{10 \times 6}{4} = 15 \text{ days}$$

### 5. Question

30 men can finish a piece of work in 28 days. How many days will be taken by 21 men to finish.

#### Answer

More the no. of men, lesser the days. So, it is an inverse proportion.

Let the required time be  $x$  days.

$$\Rightarrow 30 \times 28 = 21 \times x$$

$$\Rightarrow x = \frac{30 \times 28}{21} = 40 \text{ days}$$

### 6. Question

A garrison of 200 men had provisions for 45 days. After 15 days, 40 more men join the garrison. Find the number of days for which the remaining food will last.

#### Answer

More the no. of men, lesser the days for which food last. So, it is an inverse proportion.

200 men had provisions for 45 days. After 15 days, 200 men had provisions for 30 days.

Now,

i) Number of men ( $x_1$ ) = 200 Provisions finished ( $y_1$ ) = 30 days

ii) after 15 days number of men joined are 40. Therefore,

Number of men after 15 days ( $x_2$ ) = 240

Let food last in number of days =  $y_2$

$$y_2 = \frac{200 \times 30}{240}$$

= 25 days

### 7. Question

6 pipes can fill a tank in 24 minutes. One pipe can fill it in

- A. 4 minutes
- B. 30 minutes
- C. 72 minutes
- D. 144 minutes

### Answer

It is an inverse proportion.

If 6 pipes can do it in 24 minutes

Then time taken by 1 pipe =  $24 \times 6 = 144$  minutes

### 8. Question

14 workers can build a wall in 42 days. One worker can build it in

- A. 3 days
- B. 147 days
- C. 294 days
- D. 588 days

### Answer

It is an inverse proportion.

If 14 workers can do it in 42 days.

Then time taken by 1 worker =  $14 \times 42 = 588$  days

### 9. Question

35 men can reap a field in 8 days. In how many days can 20 men reap it?

- A. 14 days

B. 28 days

C.  $87\frac{1}{2}$

D. none of these

**Answer**

More the no. of men, lesser the days required. So, it is an inverse proportion.

Let the required no. be x days.

$$\Rightarrow 35 \times 8 = 20 \times x$$

$$\Rightarrow x = \frac{35 \times 8}{20} = 14 \text{ days}$$

**10. Question**

A car is travelling at an average speed of 60 km per hour. How much distance will it cover in 1 hour 12 minutes?

A. 50 km

B. 72 km

C. 63 km

D. 67.2 km

**Answer**

$$\text{Average Speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

$$\text{Let distance be } x \text{ km, time} = \left(1 + \frac{12}{60}\right) \text{ hr} = \left(1 + \frac{1}{5}\right) \text{ hr} = \frac{6}{5} \text{ hr}$$

$$\Rightarrow 60 \text{ km/hr} = \frac{x}{\frac{6}{5}}$$

$$\Rightarrow x = 60 \times \frac{6}{5} = 72 \text{ km}$$

**11. Question**

Rashmi types 510 words in half an hour. How many words would she type in 10 minutes?

A. 85

B. 150

C. 170

D. 153

**Answer**

More the time, more will be the no. of words typed. So it is a direct proportion.

Half an hour = 30 minutes

Let the no. of words be  $x$ ,  $\frac{510}{30} = \frac{x}{10}$

$$\Rightarrow 30 \times x = 510 \times 10$$

$$\Rightarrow x = \frac{510 \times 10}{30} = 170 \text{ words}$$

## 12. Question

$x$  and  $y$  vary directly. When  $x = 3$ , then  $y = 36$ . What will be the value of  $x$  when  $y = 96$ ?

- A. 18
- B. 12
- C. 8
- D. 4

## Answer

We use the relation  $\frac{x}{y} = \frac{X}{Y}$  Here  $x_1 = 3$ ,  $y_1 = 36$  and  $y_2 = 96$

$$\text{Here, } \frac{3}{36} = \frac{x_1}{96}$$

$$\Rightarrow x_1 \times 36 = 3 \times 96$$

$$\Rightarrow x_1 = \frac{3 \times 96}{36} = 8$$

## 13. Question

$x$  and  $y$  vary inversely. When  $x = 15$ , then  $y = 6$ . What will be the value of  $y$  when  $x = 9$ ?

- A. 10
- B. 15
- C. 54
- D. 135

## Answer

$$\Rightarrow 15 \times 6 = 9 \times y$$

$$\Rightarrow y = \frac{15 \times 6}{9} = 10$$

## 14. Question

Fill in the blanks.

- (i) If 3 persons can do a piece of work in 4 days, then 4 persons can do it in.....days.
- (ii) If 5 pipes can fill a tank in 144 minutes, then 6 pipes can fill it in .....minutes.
- (iii) A car covers a certain distance in 1 hr 30 minutes at 60 km per hour. If it moves at 45 km per hour, it will take.....hours.
- (iv) If 8 oranges cost Rs. 20.80, the cost of 5 oranges is Rs.....
- (v) The weight of 12 sheets of paper is 50 grams. How many sheets will weigh 500 grams?

**Answer**

(i) By Inverse proportion

$$3 \times 4 = 4 \times (\text{no. of days required})$$

$$(\text{No. of days required}) = \frac{3 \times 4}{4} = 3 \text{ days}$$

(ii) By Inverse proportion

$$5 \times 144 = 6 \times (\text{time required})$$

$$(\text{Time required}) = \frac{5 \times 144}{6} = 120 \text{ minutes}$$

(iii) By Inverse proportion

$$90 \text{ minutes} \times 60 \text{ km/hr} = 45 \text{ km/hr} \times (\text{time taken in minutes})$$

$$(\text{No. of days required}) = \frac{90 \times 60}{45} = 120 \text{ minutes} = 2 \text{ hours}$$

(iv) More the oranges more will be the cost. So it is a direct proportion.

$$\text{Let the cost be Rs } x, \frac{20.80}{8} = \frac{x}{5}$$

$$\Rightarrow 8 \times x = 20.80 \times 5$$

$$x = \frac{20.80 \times 5}{8} = \text{Rs } 13$$

(v) More the no. of sheets more will be the weight of them. So it is a direct proportion.

$$\text{Let the no. of sheets be } x, \frac{12}{50} = \frac{x}{500}$$

$$50 \times x = 500 \times 12$$

$$x = \frac{500 \times 12}{50} = 120 \text{ sheets}$$