

# Direct and Inverse Proportions

## Ex 12A

Q1.

**Answer :**

(i)

Clearly,  $\frac{x}{y} = \frac{3}{9} = \frac{5}{15} = \frac{8}{24} = \frac{11}{33} = \frac{26}{78} = \frac{1}{3}$  (constant)

Therefore,  $x$  and  $y$  are proportional.

(ii)

Clearly,  $\frac{x}{y} = \frac{2.5}{10} = \frac{4}{16} = \frac{7.5}{30} = \frac{10}{40} = \frac{1}{4}$ , while  $\frac{14}{42} = \frac{1}{3}$

i.e.,  $\frac{2.5}{10} = \frac{4}{16} = \frac{7.5}{30} = \frac{10}{40}$  is not equal to  $\frac{14}{42}$ .

Therefore,  $x$  and  $y$  are not proportional.

(iii)

Clearly,  $\frac{x}{y} = \frac{5}{15} = \frac{7}{21} = \frac{9}{27} = \frac{25}{75} = \frac{1}{3}$ , while  $\frac{15}{60} = \frac{18}{72} = \frac{1}{4}$

i.e.,  $\frac{5}{15} = \frac{7}{21} = \frac{9}{27} = \frac{25}{75}$  is not equal to  $\frac{15}{60}$  and  $\frac{18}{72}$ .

Therefore,  $x$  and  $y$  are not proportional.

Q2.

**Answer :**

Since  $x$  and  $y$  are directly proportional, we have :

$$\frac{3}{72} = \frac{x_1}{120} = \frac{x_2}{192} = \frac{10}{y_1}$$

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

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

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

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

$$\text{And, } \frac{3}{72} = \frac{10}{y_1}$$

$$\Rightarrow y_1 = \frac{72 \times 10}{3} = 240$$

Therefore,  $x_1 = 5$ ,  $x_2 = 8$  and  $y_1 = 240$

Q3.

**Answer :**

Let the required distance be  $x$  km. Then, we have:

Quantity of diesel (in litres)	34	20
Distance (in km)	510	$x$

Clearly, the less the quantity of diesel consumed, the less is the distance covered.

So, this is a case of direct proportion.

$$\text{Now, } \frac{34}{510} = \frac{20}{x}$$

$$\Rightarrow \frac{1}{15} = \frac{20}{x}$$

$$\Rightarrow x \times 1 = 20 \times 15 = 300$$

Therefore, the required distance is 300 km.

Q4.

**Answer :**

Let the required charge be Rs  $x$ . Then, we have:

Distance (in km)	150	124
Taxi charges (in rupees)	1275	$x$

Clearly, the less the distance covered, the less will be the taxi charges.

So, this is a case of direct proportion.

$$\text{Now, } \frac{150}{1275} = \frac{124}{x}$$

$$\Rightarrow \frac{2}{17} = \frac{124}{x}$$

$$\Rightarrow (2 \times x) = (124 \times 17)$$

$$\Rightarrow x = \frac{124 \times 17}{2}$$

$$\Rightarrow x = 62 \times 17 = 1054$$

Therefore, the required charge is Rs 1,054.

Q5.

**Answer :**

Let the required distance be  $x$  km. Then, we have:

$$1 \text{ h} = 60 \text{ min}$$

$$\text{i.e., } 5 \text{ h} = 5 \times 60 = 300 \text{ min}$$

Distance (in km)	16	$x$
Time (in min)	25	300

Clearly, the more the time taken, the more will be the distance covered.

So, this is a case of direct proportion.

$$\text{Now, } \frac{16}{25} = \frac{x}{300}$$

$$\Rightarrow x = \left( \frac{16 \times 300}{25} \right)$$

$$\Rightarrow x = 192$$

Therefore, the required distance is 192 km.

Q6.

**Answer :**

Let the required number of dolls be  $x$ . Then, we have:

No of dolls	18	$x$
Cost of dolls (in rupees)	630	455

Clearly, the less the amount of money, the less will be the number of dolls bought.

So, this is a case of direct proportion.

$$\text{Now, } \frac{18}{630} = \frac{x}{455}$$

$$\Rightarrow \frac{1}{35} = \frac{x}{455}$$

$$\Rightarrow x = \frac{455}{35}$$

$$\Rightarrow x = 13$$

Therefore, 13 dolls can be bought for Rs 455.

Q7.

**Answer :**

Let the required weight of sugar be  $x$  kg. Then, we have:

Weight of sugar (in kg)	9	$x$
Cost of sugar (in rupees)	166.50	259

Clearly, more quantity of sugar can be bought for more amount of money.

So, this is a case of direct proportion.

$$\text{Now, } \frac{9}{166.50} = \frac{x}{259}$$

$$\Rightarrow x = \frac{9 \times 259}{166.50}$$

$$\Rightarrow x = \frac{9 \times 259 \times 100}{16650}$$

$$\Rightarrow x = 14$$

Therefore, 14 kg of sugar can be bought for Rs 259.

Q8.

**Answer :**

Let the length of cloth be  $x$  m. Then, we have:

Length of cloth (in metres)	15	$x$
Cost of cloth (in rupees)	981	1308

Clearly, more length of cloth can be bought by more amount of money.

So, this is a case of direct proportion.

$$\text{Now, } \frac{15}{981} = \frac{x}{1308}$$

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

$$\Rightarrow x = 20$$

Therefore, 20 m of cloth can be bought for Rs 1,308.

Q9.

**Answer :**

Let  $x$  m be the length of the model of the ship. Then, we have:

$$1 \text{ m} = 100 \text{ cm}$$

$$\text{Therefore, } 15 \text{ m} = 1500 \text{ cm}$$

$$35 \text{ m} = 3500 \text{ cm}$$

	Length of the mast (in cm)	Length of the ship (in cm)
Actual ship	1500	3500
Model of the ship	9	$x$

Clearly, if the length of the actual ship is more, then the length of the model ship will also be more.

So, this is a case of direct proportion.

$$\text{Now, } \frac{1500}{9} = \frac{3500}{x}$$

$$\Rightarrow x = \frac{3500 \times 9}{1500}$$

$$\Rightarrow x = 21 \text{ cm}$$

Therefore, the length of the model of the ship is 21 cm.

Q10.

**Answer :**

Let  $x$  kg be the required amount of dust. Then, we have:

No. of days	8	15
Dust (in kg)	$6.4 \times 10^7$	$x$

Clearly, more amount of dust will be collected in more number of days.

So, this is a case of direct proportion.

$$\text{Now, } \frac{8}{6.4 \times 10^7} = \frac{15}{x}$$

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

$$\Rightarrow x = 12 \times 10^7$$

Therefore, 12,00,00,000 kg of dust will be picked up in 15 days.

Q11.

**Answer :**

Let  $x$  km be the required distance. Then, we have:

$$1 \text{ h} = 60 \text{ min}$$

$$\text{i.e., } 1 \text{ h } 12 \text{ min} = (60 + 12) \text{ min} = 72 \text{ min}$$

Distance covered (in km)	50	$x$
Time (in min)	60	72

Clearly, more distance will be covered in more time.

So, this is a case of direct proportion.

$$\text{Now, } \frac{50}{60} = \frac{x}{72}$$

$$\Rightarrow x = \frac{50 \times 72}{60}$$

$$\Rightarrow x = 60$$

Therefore, the distance travelled by the car in 1 h 12 min is 60 km.

Q12.

**Answer :**

Let  $x$  km be the required distance covered by Ravi in 2 h 24 min.

Then, we have:

$$1 \text{ h} = 60 \text{ min}$$

$$\text{i.e., } 2 \text{ h } 24 \text{ min} = (120 + 24) \text{ min} = 144 \text{ min}$$

Distance covered (in km)	5	$x$
Time (in min)	60	144

Clearly, more distance will be covered in more time.

So, this is a case of direct proportion.

$$\text{Now, } \frac{5}{60} = \frac{x}{144}$$

$$\Rightarrow x = \frac{5 \times 144}{60}$$

$$\Rightarrow x = 12$$

Therefore, the distance covered by Ravi in 2 h 24 min is 12 km.

Q13.

**Answer :**

Let  $x$  mm be the required thickness. Then, we have:

Thickness of cardboard (in mm)	65	$x$
No. of cardboards	12	312

Clearly, when the number of cardboard is more, the thickness will also be more.

So, it is a case of direct proportion.

$$\text{Now, } \frac{65}{12} = \frac{x}{312}$$

$$\Rightarrow x = \frac{65 \times 312}{12}$$

$$\Rightarrow x = 1690$$

Therefore, the thickness of the pile of 312 cardboards is 1690 mm.

Q14.

**Answer :**

Let  $x$  be the required number of men.

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

Then, we have:

Number of men	11	$x$
Length of trench (in metres)	$\frac{27}{4}$	27

Clearly, the longer the trench, the greater will be the number of men required.

So, it is a case of direct proportion.

$$\text{Now, } \frac{11}{\frac{27}{4}} = \frac{x}{27}$$

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

$$\Rightarrow x = 44$$

Therefore, 44 men should be employed to dig a trench of length 27 m.

Q15.

**Answer :**

Let Reenu type  $x$  words in 8 minutes.

No. of words	540	$x$
Time taken (in min)	30	8

Clearly, less number of words will be typed in less time.

So, it is a case of direct proportion.

$$\text{Now, } \frac{540}{30} = \frac{x}{8}$$

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

$$\Rightarrow x = 144$$

Therefore, Reenu will type 144 words in 8 minutes.