



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.

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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.

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.

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 m = 100 cm

Therefore, 15 m = 1500 cm

35 m = 3500 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.

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

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

$\Rightarrow x = 21$ cm

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

Q10.

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

No. of days	8	15
Dust (in kg)	6.4×10^7	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.

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.

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.

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.

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.

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