



CLASS VIII: Maths  
Chapter 11: Direct and Inverse Proportions

Questions and Solutions | Exercise 11.1 - NCERT Books

Q 1. Following are the car parking charges near a railway station up to

4 hours Rs 60

8 hours Rs 100

12 hours Rs 140

24 hours Rs 180

Check if the parking charges are in direct proportion to the parking time.

Answer :

A table of the given information is formed as

Number of hours	4	8	12	24
Parking charges (in Rs)	60	100	140	180

The ratio of parking charges to the respective number of hours (Rs/ hour) can be calculated as

$$\frac{60}{4} = 15, \quad \frac{100}{8} = \frac{25}{2}, \quad \frac{140}{12} = \frac{35}{3}, \quad \frac{180}{24} = \frac{15}{2}$$

As each ratio is not same, therefore, the parking charges are not in a direct proportion to the parking time.

Q2 :

A mixture of paint is prepared by mixing 1 part of red pigments with 8 parts of base. In the following table, find the parts of base that need to be added.

Parts of red pigment	1	4	7	12	20
parts of base	8	...	...	...	...



Answer :

The given mixture of paint is prepared by mixing 1 part of red pigments with 8 parts of base. For more parts of red pigments, the parts of the base will also be more. Therefore, the parts of red pigments and the parts of base are in direct proportion. The given information in the form of a table is as follows.

Parts of red pigment	1	4	7	12	20
Parts of base	8	$x_1$	$x_2$	$x_3$	$x_4$

According to direct proportion,

$$\frac{x_1}{4} = \frac{8}{1} \Rightarrow x_1 = 4 \times 8 = 32$$

$$\frac{x_2}{7} = \frac{8}{1} \Rightarrow x_2 = 7 \times 8 = 56$$

$$\frac{x_3}{12} = \frac{8}{1} \Rightarrow x_3 = 8 \times 12 = 96$$

$$\frac{x_4}{20} = \frac{8}{1} \Rightarrow x_4 = 8 \times 20 = 160$$

The table can be drawn as follows.

Parts of red pigment	1	4	7	12	20
Parts of base	8	32	56	96	160

Q3 :

In Question 2 above, if 1 part of a red pigment requires 75 mL of base, how much red pigment should we mix with 1800 mL of base?

Answer :

Let the parts of red pigment required to mix with 1800 mL of base be  $x$ .



The given information in the form of a table is as follows.

Parts of red pigment	1	$x$
Parts of base (in mL)	75	1800

The parts of red pigment and the parts of base are in direct proportion.

Therefore, we obtain

$$\begin{aligned}\frac{1}{75} &= \frac{x}{1800} \\ \Rightarrow x &= \frac{1 \times 1800}{75} \\ \Rightarrow x &= 24\end{aligned}$$

Thus, 24 parts of red pigments should be mixed with 1800 mL of base.

Q4 :

A machine in a soft drink factory fills 840 bottles in six hours. How many bottles will it fill in five hours?

Answer :

Let the number of bottles filled by the machine in five hours be  $x$ .

The given information in the form of a table is as follows.

Number of bottles	840	$x$
Time taken (in hours)	6	5

The number of bottles and the time taken to fill these bottles are in direct proportion. Therefore, we obtain



$$\frac{840}{6} = \frac{x}{5}$$
$$x = \frac{840 \times 5}{6} = 700$$

Thus, 700 bottles will be filled in 5 hours.

Q5 :

A photograph of a bacteria enlarged 50,000 times attains a length of 5 cm. What is the actual length of the bacteria? If the photograph is enlarged 20,000 times only, what would be its enlarged length?

Answer :

Let the actual length of bacteria be  $x$  cm and the enlarged length of bacteria be  $y$  cm, if the photograph is enlarged for 20,000 times.

The given information in the form of a table is as follows.

Length of bacteria (in cm)	5	$x$	$y$
Number of times photograph of Bacteria was enlarged	50000	1	20000

The number of times the photograph of bacteria was enlarged and the length of bacteria are in direct proportion.

Therefore, we obtain

$$\frac{5}{50,000} = \frac{x}{1}$$
$$\Rightarrow x = \frac{1}{10000} = 10^{-4}$$

Hence, the actual length of bacteria is  $10^{-4}$  cm.

Let the length of bacteria when the photograph of bacteria is enlarged 20, 000 times be  $y$ .



$$\frac{5}{50,000} = \frac{y}{20,000}$$
$$y = \frac{20,000 \times 5}{50,000} = 2$$

Hence, the enlarged length of bacteria is 2 cm.

Q6 :

In a model of a ship, the mast is 9 cm high, while the mast of the actual ship is 12 m high. If the length of the ship is 28 m, how long is the model ship?

Answer :

Let the length of the mast of the model ship be  $x$  cm.

The given information in the form of a table is as follows:

-	Height of mast	Length of ship
Model ship	9 cm	$x$
Actual ship	12 m	28 m

We know that the dimensions of the actual ship and the model ship are directly proportional to each other.

Therefore, we obtain:

$$\frac{12}{9} = \frac{28}{x}$$
$$x = \frac{28 \times 9}{12} = 21$$

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



Q 7. Suppose 2 kg of sugar contains  $9 \times 10^6$  crystals.

How many sugar crystals are there in (i) 5 kg of sugar? (ii) 1.2 kg of sugar?

Answer :

(i) Let the number of sugar crystals in 5 kg of sugar be  $x$ .

The given information in the form of a table is as follows.

Amount of sugar (in kg)	2	5
Number of crystals	$9 \times 10^6$	$x$

The amount of sugar and the number of crystals it contains are directly proportional to each other. Therefore, we obtain

$$\frac{2}{9 \times 10^6} = \frac{5}{x}$$
$$x = \frac{5 \times 9 \times 10^6}{2} = 2.25 \times 10^7$$

Hence, the number of sugar crystals is  $2.25 \times 10^7$ .

(ii) Let the number of sugar crystals in 1.2 kg of sugar be  $y$ . The given information in the form of a table is as follows.

Amount of sugar (in kg)	2	1.2
Number of crystals	$9 \times 10^6$	$y$

$$\frac{2}{9 \times 10^6} = \frac{1.2}{y}$$
$$y = \frac{1.2 \times 9 \times 10^6}{2} = 5.4 \times 10^6$$

Hence, the number of sugar crystals is  $5.4 \times 10^6$ .



Q 8. Rashmi has a road map with a scale of 1 cm representing 18 km. She drives on a road for 72 km. What would be her distance covered in the map?

Answer :

Let the distance represented on the map be  $x$  cm.

The given information in the form of a table is as follows.

Distance covered on road in (in km)	18	72
Distance represented on map (in cm)	1	$x$

The distances covered on road and represented on map are directly proportional to each other. Therefore, we obtain

$$\frac{18}{1} = \frac{72}{x}$$
$$\Rightarrow x = \frac{72}{18} = 4$$

Hence, the distance represented on the map is 4 cm.

Q9 :

A 5 m 60 cm high vertical pole casts a shadow 3 m 20 cm long. Find at the same time -

(i) the length of the shadow cast by another pole 10 m 50 cm high

(ii) the height of a pole which casts a shadow 5 m long.

Answer :

(i) Let the length of the shadow of the other pole be  $x$  m.

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

The given information in the form of a table is as follows.

Height of pole (in m)	5.60	10.50
Length of shadow (in m)	3.20	$x$

More the height of an object, more will be the length of its shadow.

Thus, the height of an object and length of its shadow are directly proportional to each other. Therefore, we obtain

$$\frac{5.60}{3.20} = \frac{10.50}{x}$$

$$\Rightarrow x = \frac{10.50 \times 3.20}{5.60} = 6$$

Hence, the length of the shadow will be 6 m.

(ii) Let the height of the pole be  $y$  m.

The given information in the form of a table is as follows.

Height of pole (in m)	5.60	$y$
Length of shadow (in m)	3.20	5

The height of the pole and the length of the shadow are directly proportional to each other. Therefore,

$$\frac{5.60}{3.20} = \frac{y}{5}$$

$$y = \frac{5 \times 5.60}{3.20} = 8.75$$

Thus, the height of the pole is 8.75 m or 8 m 75 cm.

Q10 :

A loaded truck travels 14 km in 25 minutes. If the speed remains the same, how far can it travel in 5 hours?



**Answer :**

Let the distance travelled by the truck in 5 hours be  $x$  km.

We know, 1 hour = 60 minutes

$\therefore$  5 hours =  $(5 \times 60)$  minutes = 300 minutes

The given information in the form of a table is as follows.

Distance travelled (in km)	14	$x$
Time (in min)	25	300

The distance travelled by the truck and the time taken by the truck are directly proportional to each other. Therefore,

$$\frac{14}{25} = \frac{x}{300}$$
$$x = \frac{14 \times 300}{25} = 168$$

Hence, the distance travelled by the truck is 168 km.