

NCERT Solutions for Class 8 Maths Chapter 11 Direct and Inverse Proportions Ex 11.2

Ex 11.2 Class 8 Maths Question 1.

Which of the following are in inverse proportion?

- (i) The number of workers on a job and the time to complete the job.
- (ii) The time taken for a journey and the distance travelled in a uniform speed.
- (iii) Area of cultivated land and the crop harvested.
- (iv) The time taken for a fixed journey and the speed of the vehicle.
- (v) The population of a country and the area of land per person.

Solution:

(i) As the number of workers increase, the job will take less time to complete. Hence, they are inversely proportional.

(ii) For more time, more distance to travel. Hence, they are not inversely proportional. (iii) More area of land cultivated, more crop to harvest. Hence, they are not inversely proportional. (iv) If speed is increased, it will take less time to complete the fixed journey. Hence, they are inversely proportional.

(v) If the population of a country increases, then the area of land per person will be decreased. Hence, they are inversely proportional.

Ex 11.2 Class 8 Maths Question 2.

In a Television game show, the prize money of ₹ 1,00,000 is to be divided equally amongst the winners. Complete the following table and find whether the prize money given to an individual winner is directly or inversely proportional to the number of winners?

Number of winners	1	2	4	5	8	10	20
The prize for each winner (in ₹)	1,00,000	50,000	–	–	–	–	–

Solution:

Let, the blank spaces be denoted by a, b, c, d and e.

So, we observe that $1 \times 100,000 = 2 \times 50,000$

$$\Rightarrow 1,00,000 = 1,00,000$$

Hence they are inversely proportional.

$$2 \times 50,000 = 4 \times a$$

$$\therefore a = \frac{2 \times 50,000}{4} = 25,000$$

$$2 \times 50,000 = 5 \times b$$

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

$$2 \times 50,000 = 8 \times c$$

$$\therefore c = \frac{2 \times 50,000}{8} = 12,500$$

$$2 \times 50,000 = 10 \times d$$

$$\therefore d = \frac{2 \times 50,000}{10} = 10,000$$

$$2 \times 50,000 = 20 \times e$$

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

Hence the required table is

Number of winners	1	2	4	5	8	10	20
The prize for each winner (in ₹)	1,00,000	50,000	25,000	20,000	12,500	10,000	5,000

Ex 11.2 Class 8 Maths Question 3.

Rehman is making a wheel using spokes. He wants to x equal spokes in such a way that the angles between any pair of consecutive spokes are equal. Help him by completing the following table.



Number of spokes	4	6	8	10	12
The angle between a pair of consecutive spokes	90°	60°	–	–	–

(i) Are the number of spokes and the angle formed between the pairs of consecutive spokes in inverse proportion.

(ii) Calculate the angle between a pair of consecutive spokes on a wheel with 15 spokes. (iii)

How many spokes would be needed, if the angle between a pair of consecutive spokes is 40°?

Solution:

From the above table, we observe that

$$4 \times 90^\circ = 6 \times 60^\circ$$

$$360^\circ = 360^\circ$$

Thus the two quantities are inversely proportional.

Let the blank spaces be denoted by a, b, and c.

$$4 \times 90^\circ = 8 \times a$$

$$a = \frac{4 \times 90^\circ}{8} = 45^\circ$$

$$4 \times 90^\circ = 10 \times b$$

$$b = \frac{4 \times 90^\circ}{10} = 36^\circ$$

$$4 \times 90^\circ = 12 \times c$$

$$c = \frac{4 \times 90^\circ}{12} = 30^\circ$$

Hence, the required table is

Number of spokes	4	6	8	10	12
The angle between a pair of consecutive spokes	90°	60°	45°	36°	30°

(i) Yes, they are in inverse proportion

(ii) If the number of spokes is 15, then

$$4 \times 90^\circ = 15 \times x$$

$$x = \frac{4 \times 90}{15} = 24^\circ$$

(iii) If the angle between two consecutive spokes is 40°, then

$$4 \times 90^\circ = y \times 40^\circ$$

$$\frac{4 \times 90}{40}$$

$$y = 9 \text{ spokes.}$$

$$40$$

Thus the required number of spokes = 9.

Ex 11.2 Class 8 Maths Question 4.

If a box of sweets is divided among 24 children, they will get 5 sweets each. How many would each get, if the number of the children is decreased by 4?

Solution:

Number of children	Number of Sweets
24	5
(24 - 4) or 20	a

We observe that on increasing the number of children, number of sweets got by each will be less. So, they are in inverse proportion.

$$x_1 y_1 = x_2 y_2$$

$$\text{where } x_1 = 24, y_1 = 5, x_2 = 20$$

$$\text{and } y_2 = a(\text{let})$$

$$24 \times 5 = 20 \times a$$

$$a = 6$$

Hence, the required number of sweets = 6.

Ex 11.2 Class 8 Maths Question 5.

A farmer has enough food to feed 20 animals in his cattle for 6 days. How long would the food last if there were 10 more animals in his cattle?

Solution:

If the number of animals increases, then it will take fewer days to last.

Then the two quantities are in inverse proportions.

Number of animals	Number of days
20	6

(20 + 10) or 30	P
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Let the required number of days be p.

$$x_1 y_1 = x_2 y_2$$

$$\text{where } x_1 = 20, y_1 = 6, x_2 = 3$$

$$\text{and } y_2 = p \text{ (let)}$$

$$20 \times 6 = 30 \times p$$

$$p = 4$$

Hence the required number of days = 4.

Ex 11.2 Class 8 Maths Question 6.

A contractor estimates that 3 persons could rewire Jasminder's house in 4 days. If, he uses 4 persons instead of three, how long should they take to complete the job?

Solution:

If the number of persons is increased, it will take less number of days to complete the job. Thus, the two quantities are in inverse proportion.

Number of persons	Number of days
3	4
4	k

Let the required number of days be k.

$$x_1 y_1 = x_2 y_2$$

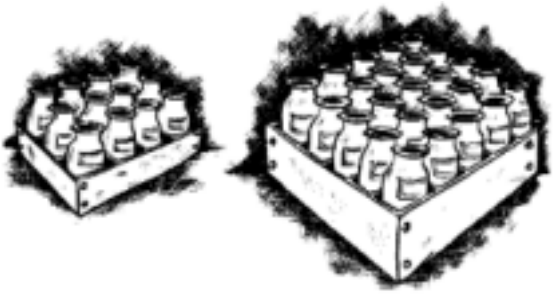
$$3 \times 4 = 4 \times k$$

$$k = 3 \text{ days.}$$

Hence, the required number of days = 3.

Ex 11.2 Class 8 Maths Question 7.

A batch of bottles was packed in 25 boxes with 12 bottles in each box. If the same batch is packed using 20 bottles in each box, how many boxes would be filled?



Solution:

If the number of bottles is increased then the required number of boxes will be decreased. Thus the two quantities are in inverse proportion.

Number of boxes	Number of bottles per box
25	12
x	20

Let the required number of boxes be x.

$$x_1 y_1 = x_2 y_2$$

$$25 \times 12 = x \times 20$$

$$x = 15$$

Hence, the required number of boxes = 15.

Ex 11.2 Class 8 Maths Question 8.

A factory requires 42 machines to produce a given number of articles in 63 days. How many machines would be required to produce the same number of articles in 54 days?

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Solution:

If the number of machines is increased then less number of days would be required to produced the same number of articles.

Thus, the two quantities are in inverse proportion.

Number of machines	Number of days
42	63
x	54

Let the required number of machines be x .

$$xy = xy$$

$$42 \times 63 = x \times 54$$

$$x = 49$$

Hence, the required number of machines is 49.

Ex 11.2 Class 8 Maths Question 9.

A car takes 2 hours to reach a destination by traveling at a speed of 60 km/h. How long will it take when the car travels at the speed of 80 km/h?

Solution:

On increasing the speed, it will take less time to travel a distance.

Thus the two quantities are in inverse proportions.

Speed in km/h	Time in hour
60	2
80	x

Let the required times be x hours.

$$xy = xy$$

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

$$\underline{3} \quad 1$$

$$x = \frac{60 \times 2}{80} = 1 \text{ hrs.}$$

$$\frac{2}{2} \times \frac{1}{1}$$

Hence, the required time = 1 hours.

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Ex 11.2 Class 8 Maths Question 10.

Two persons could fit new windows in a house in 3 days.

(i) One of the people fell ill before the work started. How long would the job take now? (ii) How many persons would be needed to fit the windows in one day?

Solution:

On increasing the number of persons, less time will be required to complete a job.

Thus, the quantities are in inverse proportion.

Number of persons	Number of days
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2	3
(i) $1(2 - 1)$	x
(ii) y	1

(i) Let the required number of days be x.

$$x \times 2 = 3 \times 1$$

$$2 \times x = 3 \times 1$$

$$x = 6$$

Hence, the required number of days = 6

(ii) Let the required number of persons be y.

$$x \times y = 3 \times 1$$

$$2 \times 3 = y \times 1$$

$$y = 6$$

Hence, the required number of persons = 6.

Ex 11.2 Class 8 Maths Question 11.

A school has 8 periods a day each of 45 minutes duration. How long would each period be, if the school has 9 periods a day, assuming the number of school hours to be the same?

Solution:

On increasing the duration of periods, the number of periods will be reduced.

Thus, the two quantities are in inverse proportion.

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Number of periods	Duration of periods in minutes
8	45
9	x

Let the required duration of each period be x.

$$x \times y = 3 \times 1$$

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$$8 \times 45 = 9 \times x$$

$$x = 40 \text{ minutes}$$

Hence, the required duration of period = 40 minutes.