



# MATHS

## BOOKS - NAND LAL PUBLICATION

### DIRECT AND INVERSE PROPORTIONS

Try These

1. Observe the tables and find if  $x$  and  $y$  are directly proportional

$x$	20	17	14	11	8	5	2
$y$	40	34	28	22	16	10	4



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2. Observe the tables and find if  $x$  and  $y$  are directly proportional

$x$	6	10	14	18	22	26	30
$y$	4	8	12	16	40	24	28



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3. Observe the tables and find if  $x$  and  $y$  are directly proportional

$x$	5	8	12	15	18	20
$y$	15	24	36	60	72	100



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4. Principal=Rs.1000,Rate =8% per annum.Fill in the following table and find which type of interest (simple or compound) changes in direct proportion with time period

Time period	1 year	2 years	3 years
Simple Interest (in ₹)			
Compound Interest (in ₹)			



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5. Observe the tables and find which pairs of variables ( here  $x$  and  $y$  ) are inverse proportion .

$x$	50	40	30	20
$y$	5	6	7	8



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6. Observe the tables and find which pairs of variables ( here  $x$  and  $y$  ) are inverse proportion .

$x$	100	200	300	400
$y$	60	30	20	15



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7. Observe the tables and find which pairs of variables ( here  $x$  and  $y$ ) are inverse proportion .

$x$	90	60	45	30	20	5
$y$	10	15	20	25	30	35



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**Do This**

1. Ask your friend to fill the following table and find the ratio of his age to the corresponding age of his mother .

	Age five years ago	Present Age	Age after five year
Friend age (F)			
Mother's age (M)			
$\frac{F}{M}$			

What do you observe?



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2. On a squared paper draw five squares of different sides. Write the following

information in a tabular form .

	Square-1	Square-2	Square-3	Square-4	Square-5
Length of a side (L)					
Perimetr (P)					
$\frac{L}{P}$					
Area (A)					
$\frac{L}{A}$					

Find whether the length of a side is in direct proportion to :

(a) the perimeter of the square.

(b ) the area of the square.



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3. The following ingredients required to make halwa for 5 persons.

Suji / Rawa = 250 g sugar = 300 g

Ghee = 200 g , water = 500 ml.

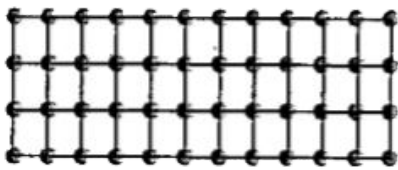
Using the concept of proportion estimate the changes in the quantity ingredients to prepare halwa for your class.



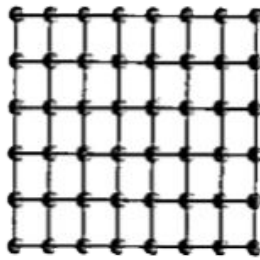
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4. Take a squared paper and arrange 48 counters on it in different number of rows as shown below .





4 Rows, 12 column



6 Rows, 8 columns

Number of Rows (R)	(R <sub>1</sub> ) 2	(R <sub>2</sub> ) 3	(R <sub>3</sub> ) 4	(R <sub>4</sub> ) 6	(R <sub>5</sub> ) 8
Number of Columns (C)	(C <sub>1</sub> ) .....	(C <sub>2</sub> ) .....	(C <sub>3</sub> ) 12	(C <sub>4</sub> ) 8	(C <sub>5</sub> ) .....

What do you observe ? As R increases C decreases .

(i) Is  $R_1 : R_2 : C_2 : C_1$  ?

(ii) Is  $R_3 : R_4 = C_4 : C_3$  ?

(iii) Are R and C inversely proportional to each other ?



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5. Take a sheet of paper . Fold it as shown in the figure Count the number of part and the area of a part in each case.



Tabulate your observations and discuss with your friends . Is it a case of invers proportion ?

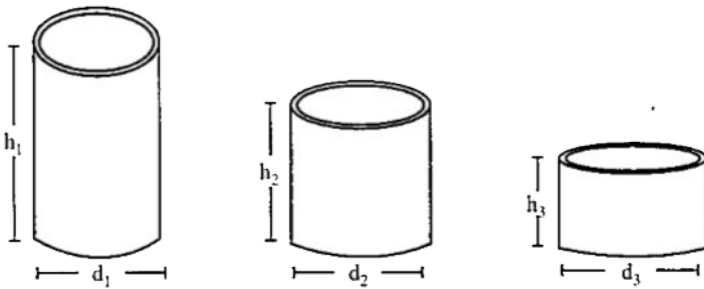
Why ?

Number of parts	1	2	4	8	16
Area of the each part	Area of the paper	$\frac{1}{2}$ the area of paper	.....	.....	.....



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6. Take a few containers of different sizes with circular bases. Fill the same amount of water in each container . Note the diameter of each container and the respective height at which the water level stands . Tabulate your observations. Is it a case of inverse proportion?



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## Exercise 13 1

1. Following are the car parking charges near a railway station upto

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.



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2. 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	...	...	...	...



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



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



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



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6. Suppose 2 kg of sugar contains  $9 \times 10^6$  crystals. How many sugar crystals are there in :  
5 kg of sugar?



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7. 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?



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8. A 5 m 60 cm high vertical pole casts a shadow 3 m 20 cm long. Find at the same time : the height of a pole which casts a shadow 5m long.





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



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**Exercise 13 2**

1. Which of the following are in inverse proportion : The number of workers on a job and the time to complete the job.



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2. Which of the following are in inverse proportion : The time taken for a journey and the distance travelled in a uniform speed.



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3. Which of the following are in inverse proportion : Area of cultivated land and the crop harvested.



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4. Which of the following are in inverse proportion : The time taken for a fixed journey and the speed of the vehicle.



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5. Which of the following are in inverse proportion : The population of a country and the area of land per person.



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6. In a Television game show, the prize money of Rs.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?



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



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8. 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 reduced by 4?



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9. 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?



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



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**11.** A batch of bottles were 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 needed?



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



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**14.** Two persons could fit new windows in a house in 3 days : One of the persons fell ill before the work started. How long would the job take now?





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**15.** Two persons could fit new windows in a house in 3 days : How many persons would be needed to fit the windows in one day?



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**16.** 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?



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## Additional Questions For Practice Objective Type Questions Fill In The Blank Spaces

1. If  $x_1, x_2$  are two variables of  $x$  and  $y_1, y_2$  that of  $y$  corresponding to the values vary inversely then

a.  $x_1y_1 = x_2y_2$

b.  $\frac{x_1}{y_1} = \frac{x_2}{y_2}$

c.  $x_1x_2 = y_1y_2$

c. none

A.  $x_1y_1 = x_2y_2$

B.  $\frac{x_1}{y_1} = \frac{x_2}{y_2}$

C.  $x_1x_2 = y_1y_2$

D. none

**Answer: A::B**



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2. Assuming land to be uniformly fertile the area of land and yield on it vary .

a. inversely

b. directly

c. none

A. Inversely

B. directly

C. none

D. none

**Answer: C::D**



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3. If both  $x$  and  $y$  are in direct proportion then

$\frac{1}{x}$  and  $\frac{1}{y}$  are in

a. direct proportion

b. inverse proportion

c. can be both

d. none

A. direct proportion

B. inverse proportion

C. can be both

D. none

**Answer:**



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4. If  $x=10$  ,  $y=14$  and both vary in direct proportion then which of the following pair is not possible .

a. 15,21

b. 25,35

c. 25,49

d. none

A. 15,21

B. 25,35

C. 25,49

D. none

**Answer: B::D**



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5. In which case two quantities vary directly.

a. 

x	0.5	2	8	32
y	2	8	32	128

b. 

x	2	5	10
y	25	10	5

c. 

x	2	4	6
y	18	9	6

d. none

A. 

x	0.5	2	8	32
y	2	8	32	128

B. 

x	2	5	10
y	25	10	5

C. 

x	2	4	6
y	18	9	6

D. none

**Answer:**



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6. If  $150 : x = 2.9 : 17.4$  then  $x$  is a square of

A. 30

B. 35

C. 40

D. none

**Answer: C**



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7. If  $x - 4y = 0$  then  $x$  and  $y$  vary

a. Inversely

b. directly

c. none

A. Inversely

B. directly

C. none

D. none

**Answer: C::D**



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## **Additional Questions For Practice Fill In The Blank**

1. Remuneration is \_\_\_\_\_ of work done .



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2. Perimeter of a circle and its diameter very \_\_\_\_\_ with each other .



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3. If 24 balls cost Rs. 144 then 6 balls cost \_\_\_\_\_

.



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4. If 5 items cost Rs a then \_\_\_\_\_ items can be bought for Rs b.



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5. A photograph of bacteria is enlarged 1,00,000 times attains a length of 5 cm then actual length of bacteria is \_\_\_\_\_ .



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6. If  $x$  and  $y$  are in direct proportion then they can be written as \_\_\_\_\_ .



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7. A road map has a scale showing 1 cm representing 25 km . Then distance of 5 cm represents \_\_\_\_\_ .



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8. If A can compute a work in  $n$  days then A one day work is  $\frac{1}{n}$ .



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9. If  $d$  varies directly as  $t^2$  then  $dt^2 = k$  where  $k$  is some constant ?



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**10.** Length of a side of a square and its area vary directly with each other?



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**11.** If  $P$  and  $q$  are in inverse variation then  $(p+2)$ ,  $(q-2)$  are also in inverse variation



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12. If  $x$  and  $y$  vary inversely and  $x = 5$  when  $y = \frac{2}{3}$  then for  $x = 10$ ,  $y = \underline{\hspace{2cm}}$



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## Additional Questions For Practice Short Answer Type Questions

1. In each of the following  $x$  and  $y$  vary directly with each other. Find the constant of variable.

.

(i)  $y = 3x$  (ii)  $2x=3y$

(iii)  $9x=y$  (iv)  $y = 2x$



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**2. Area of land and its cost**

a. directly proportional

b. inversely proportional

c. none



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**3.** Time taken to finish the work and number of men at work is direct or inverse proportion?



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**4.** Is the following Direct variation or Inverse variation?

Distance covered and taxi fare.



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5. the following is Direct variation or Inverse variation?

Cost of articles and number of articles .



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6. Speed of vehicle to the time taken for covering a certain distance is in direct or inverse proportion?



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7. Population of a place and area of land per person is in direct or inverse proportion?



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8. Observe the following tables and find if  $x$  and  $y$  vary directly or indirectly .

(a) 

$x$	18	14	10	3
$y$	36	28	20	6

(b) 

$x$	30	50	75	20
$y$	25	15	10	35



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9. If  $x$  and  $y$  are in direct proportion then find the value of  $a$  and  $b$  in

$x$	5	3	$a$
$y$	60	$b$	120



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**Additional Questions For Practice Long Answer  
Type Questions**

1. 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?



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2. Two person can finish the work in 7 days.

(i) One of the persons fell ill before the work started . How much time will the other person take to finish the same work.



(ii) How many persons will be needed to finish the work in one day.



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**3.** A train is moving at speed of 78 km/hr.

(i) How far will it travel in 20 minutes

(ii) Find the time required to cover a distance of 240 km.



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4. A person is standing on a railway station which is 120 m long . He observes that the trains crosses the station in 30 sec. but himself in 6 seconds. Find the length of the train.



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5. A car is moving at a uniform speed of 80 km/hr .

(i) How far will it travel in 12 minutes ?

(ii) How much time will it take to cover a distance of 240 km



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## Additional Questions For Practice Hots High Order Thinking Skill

1. The principal sanctioned a certain amount of money to the librarian to purchase some mathematics books costing Rs90 each . She could buy 80 books . Then she approached to

a publisher who offered her a 20% discount .  
Find the number of copies of mathematics books which she could buy from the publisher for the sanctioned money.



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## Sample Paper For Practice Answer The Multiple Choice Questions

1. If  $x_1, x_2$  are two variables of  $x$  and  $y_1, y_2$  that of  $y$  corresponding to the value vary

directly then.

a.  $x_1, x_2 = y_1 y_2$

b.  $\frac{x_1}{y_1} = \frac{x_2}{y_2}$

c.  $x_1 y_1 = x_2 y_2$

d. none

A.  $x_1, x_2 = y_1 y_2$

B.  $\frac{x_1}{y_1} = \frac{x_2}{y_2}$

C.  $x_1 y_1 = x_2 y_2$

D. none

**Answer: A::B**



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2. If 51 of milk costs Rs . 115 then cost of 91 of milk is

A. 108

B. 207

C. 117

D. none

**Answer: B**



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3. If  $x$  women can do the job in  $m$  days then  
 $(x+y)$  women can do the same job in

A.  $(x+y)$  days

B.  $(x+m)$  days

C.  $\left(\frac{xm}{(x+y)}\right) \text{days}$

D. none

**Answer: A::D**



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4. A pipe that fills 25% tank in 1 hour will fill it  
in

A. 2 hours

B. 4 hours

C. 6 hours

D. none

**Answer: D**



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## Sample Paper For Practice Fill In The Blanks

1. Speed of moving objects varies inversely to the \_\_\_\_\_ to cover a certain distance.



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2. Two quantities  $x$  and  $y$  are said to be in direct proportion if  $\frac{x}{y} = k$  then  $k$  is called the \_\_\_\_\_ .



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3. 25 men can repair the road in 10 days 50 men will take \_\_\_\_\_ days to repair the same road .



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4. If  $x$  and  $y$  are inverse proportion then they can be written as \_\_\_\_\_ .



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5. The distance covered varies inversely to the consumption of petrol?



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6. For a fixed time period and rate of interest simple interest is directly proportional to the principal.



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7. If  $x$  varies inversely with  $y$  when  $x=6$  ,  $y =8$

then  $x =8$  ,  $y=$ \_\_\_\_\_



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8. If one angle of a triangle is kept fixed then the measure of remaining two angles vary inversely?



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9. If  $x$  and  $y$  vary inversely then if  $x = 45$ . Find  $y$  if constant of variation is 360 .



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10. If  $x$  and  $y$  vary directly . If  $x = 5$  and  $y = 15$  .

Find  $y_1$  when  $x_1$  is 3.



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**11.** If  $x$  and  $y$  vary directly with each other. Find the constant of variation in  $y+2x=0$



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**12.** 25 kg rice lasts for 28 days in a family for 10 members . If 4 guests come to stay with them . How many days will 25 kg rice lasts.



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**13.** What is variation ? Name two types of variations . What is the condition for two quantities to be in inverse variation .



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**14.** Number of student and fees collected by the school .



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**15.** Number of workers and number fo working hours .



**View Text Solution**

**16.** Number of winners and the prize money are in direct or inverse proportionality?



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17. Are the number of spokes and the angles formed between the pairs of consecutive spokes in inverse proportion?



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