MATHS

BOOKS - SWAN PUBLICATION

DIRECT AND INVERSE PROPORTIONS

Do This

1. Take a clock and fix its minute hand at 12.

Record the angle turned through by the

minute hand from its original position and the

time that has passed, in the following table :

Time Passed (T) (in minutes)	(T_1) 15	(T_2) 30	(T_3) 45	(T_4) 60
Angle turned (A) (in degree)	(A_1) 90	(A_2) 180	(A_3) 270	(A_4) 360
$\dfrac{T}{A}$	$\dfrac{15}{90}=\dfrac{1}{6}$	$\dfrac{30}{180}=\dfrac{1}{6}$	$\dfrac{45}{270}=\dfrac{1}{6}$	$\dfrac{60}{360}=\dfrac{1}{6}$

What do you observe about T and A ? Do they increase together ?

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2. The number of functions from

$f: \{a_1, a_2, \ldots, a_{10}\} \to \{b_1, b_2, \ldots, b_5\}$ is

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3. 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)			
$\dfrac{F}{M}$			

What do you observe?

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4. On a squared paper, draw five squares of diferent sides. Write the following information in a tabular form.

	Square-1	Square-2	Square-3	Square-4	Square-5
Length of a side (L)	2	4	5	6·	7
Perimeter (P)	8	16	20	· 24	28
$\dfrac{L}{P}$	$\dfrac{2}{8}=\dfrac{1}{4}$	$\dfrac{4}{16}=\dfrac{1}{4}$	$\dfrac{5}{20}=\dfrac{1}{4}$	$\dfrac{6}{24}=\dfrac{1}{4}$	$\dfrac{7}{28}=\dfrac{1}{4}$
Area (A)	4	16	25	·· 36	49
$\dfrac{L}{A}$	$\dfrac{2}{4}=\dfrac{1}{2}$	$\dfrac{4}{16}=\dfrac{1}{4}$	$\dfrac{5}{25}=\dfrac{1}{5}$	$\dfrac{6}{36}=\dfrac{1}{6}$	$\dfrac{7}{49}=\dfrac{1}{7}$

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

(a) the perimeter of the square,
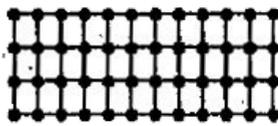
(b) the area of the square.

5. Draw a map of your class room using proper scale and symbol for different objects.
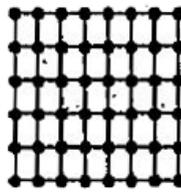
6. Take a squared paper and arrange 48 counters on it in different number of rows as shown below :

4 Rows, 12 columns 6 Rows, 8 columns

Number of Rows (R)	(R₁)	(R₂)	(R₃)	(R₄)	(R₅)
	2	3	4	6	8
Number of Columns (C)	(C₁)	(C₂)	(C₃)	(C₄)	(C₅)
	24	16	12	8	6

What do you observe ? As R increase, C derecases.

(i)   Is $R_1 : R_2 = C_2 : C_1$?   (ii)   Is $R_3 : R_4 = C_4 : C_3$?

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

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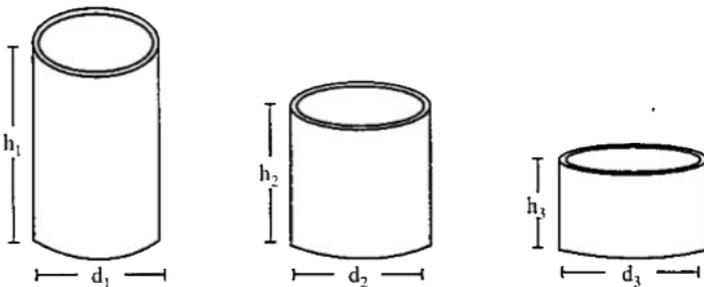

Tabulate your observations and discuss with your friends. It it a case of invers proportion ? Why ?

8. 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?

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

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2. check x, y are proportional?

x	y	$\dfrac{x}{y}$
6	4	$\dfrac{6}{4}=\dfrac{3}{2}$
10	8	$\dfrac{10}{8}=\dfrac{5}{.4}$
14	12.	$\dfrac{14}{12}=\dfrac{7}{6}$

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3. check x/y are proportional?

x	y	$\dfrac{x}{y}$
5	15	$\dfrac{5}{15} = \dfrac{1}{3}$
8	24	$\dfrac{8}{24} = \dfrac{1}{3}$
12	36	$-\dfrac{12}{36} = \dfrac{1}{3}$
15	60	$\dfrac{15}{60} = \dfrac{1}{4}$
18	72	$\dfrac{18}{72} = \dfrac{1}{4}$
20	100	$\dfrac{20}{100} = \dfrac{1}{5}$

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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 tabels and find which pairs of varibles (here x and y) are inverse proportion .

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

Think Discuss And Write

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

2. Following are the some of the characterstics of animals : for each characterstic indicate whether it is adaptation for tropical rain forest or polar regions. Do you think that some of thesecharacteristic can be adapted for both regions?Need of migrate

Question

1. Mohan prepares tea for himself and his sister. He uses 300 ml of water, 2 spoons of sugar, 1 spoon of tea leaves and 50 ml of milk. How much quantily of each item will he need, if he has to make tea for five persons?

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2. If two students take 20 minutes to arrange chairs for an assembly, then how much time would five students take to do the same job ?

3. Think of five more situations where you can compare three or more quantities.

Exercise 13 1

1. Following are the can 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	...	...	...	...

3. 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	...	...	...	...

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

5. 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 ?

6. 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 ?

7. Suppose 2 kg of sugar contains 9×10^6 crystals. How many sugar crystals are there in :

5 kg of sugar?

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?

9. A 5 m 60 cm high vertical pole casts a shadow 3 m 20 cm long. Find at the same time : the length of the shadow cast by another pole 10 m 50 cm high

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10. 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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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.

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

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

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

6. In a Television game show,the price money of Rs.1,00,000 is to be divided equally amongst the winners.Complete the following table and find whether the prize money gives to an

individual winner is directly or inversely proportional to the number of winners?

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?

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 Jasminder'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?

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?

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?

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?

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?

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?