Chapter 13: Direct and Inverse Proportions

1) **Find whether the relation is Direct or Indirect**

   (i) The time taken by a train to cover a fixed distance and the speed of the train.

   (ii) The distance travelled by CNG bus and the amount of CNG used.

   (iii) The number of people working and the time to complete a given work.

   (iv) Income tax and the income.

   (v) Distance travelled by an auto-rickshaw and time taken.

2) (i) Number of students in a hostel and consumption of food.

   (ii) Area of the walls of a room and the cost of white washing the walls.

   (iii) The number of people working and the quantity of work.

   (iv) Simple interest on a given sum and the rate of interest.

   (v) Compound interest on a given sum and the sum invested.

3) (i) The quantity of rice and its cost.

   (ii) The height of a tree and the number of years.

   (iii) Increase in cost and number of shirts that can be purchased if the budget remains the same.

   (iv) Area of land and its cost.

   (v) Sales Tax and the amount of the bill.

4) If x varies inversely as y and $x = 20$ when $y = 600$, find y when $x = 400$.

5) The variable x varies directly as y and $x = 80$ when y is 160. What is y when x is 64?

6) l varies directly as m and l is equal to 5, when $m = \dfrac{2}{3}$. Find l when $m = \dfrac{16}{3}$.

7) If x varies inversely as y and $y = 60$ when $x = 1.5$. Find x when $y = 4.5$.

8) In a camp, there is enough flour for 300 persons for 42 days. How long will the flour last if 20 more persons join the camp?

9) A contractor undertook a contract to complete a part of a stadium in 9 months with a team of 560 persons. Later on, it was required to complete the job in 5 months. How many extra persons should he employ to complete the work?

10) Sobi types 108 words in 6 minutes. How many words would she type in half an hour?

11) A car covers a distance in 40 minutes with an average speed of 60 km/h. What should be the average speed to cover the same distance in 25 minutes?

12) It is given that l varies directly as m.

   (i) Write an equation which relates l and m.

   (ii) Find the constant of proportion (k), when l is 6 then m is 18.

   (iii) Find l, when m is 33.

   (iv) Find m when l is 8.

13) If a deposit of Rs 2,000 earns an interest of Rs 500 in 3 years, how much interest would a deposit of Rs 36,000 earn in 3 years with the same rate of simple interest?

14) The mass of an aluminium rod varies directly with its length. If a 16 cm long rod has a mass of 192 g, find the length of the rod whose mass is 105 g.

15) Find the values of x and y if a and b are in inverse proportion:

   a.   12 x 8

   b.   30 5 y

16) If Naresh walks 250 steps to cover a distance of 200 metres, find the

distance travelled in 350 steps.

17) A car travels a distance of 225 km in 25 litres of petrol. How many litres of petrol will be required to cover a distance of 540 kilometres by this car?

18) From the following table, determine if x and y are in direct proportion or not.

(i)

x	3	6	15	20	30
y	12	24	45	60	120

(ii)

x	4	7	10	16
y	24	42	60	96

(iii)

x	1	4	9	20
y	1.5	6	13.5	30

19) If a and b vary inversely to each other, then find the values of p, q, r; x, y, z and l, m, n.

(i)

a	6	8	q	25
b	18	p	39	r

(ii)

a	2	y	6	10
b	x	12.5	15	z

(iii)

a	l	9	n	6
b	5	m	25	10

20) If 25 metres of cloth costs Rs 337.50, then

   (i) What will be the cost of 40 metres of the same type of cloth?

   (ii) What will be the length of the cloth bought for Rs 810?

21) A swimming pool can be filled in 4 hours by 8 pumps of the same type. How many such pumps are required if the pool is to be filled in

$2\frac{2}{3}$ hours?

22) The cost of 27 kg of iron is Rs 1,080, what will be the cost of 120 kg of iron of the same quality?

23) At a particular time, the length of the shadow of Qutub Minar whose height is 72 m is 80 m. What will be the height of an electric pole, the length of whose shadow at the same time is 1000 cm?

24) In a hostel of 50 girls, there are food provisions for 40 days. If 30 more girls join the hostel, how long will these provisions last?

25) Campus and Welfare Committee of school is planning to develop a blue shade for painting the entire school building. For this purpose various shades are tried by mixing containers of blue paint and white paint. In each of the following mixtures, decide which is a lighter shade of blue and also find the lightest blue shade among all of them.

Mixture A   Mixture B

(i)

Mixture C   Mixture D

(ii)

Mixture E   Mixture F

(iii)

Mixture G   Mixture H

(iv)

If one container has one litre paint and the building requires 105

litres for painting, how many container of each type is required to paint the building by darkest blue shade?

Posing a question

26) Work with a partner to write at least five ratio statements about this quilt, which has white, blue, and purple squares.
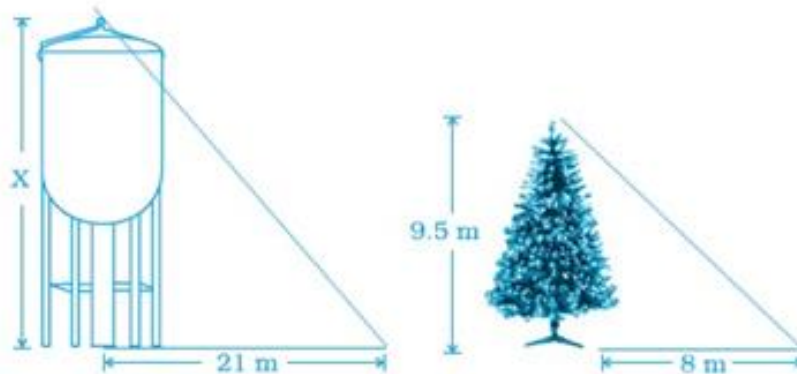

How many squares of each colour will be there in 12 such quilts?

27) A packet of sweets was distributed among 10 children and each of them received 4 sweets. If it is distributed among 8 children, how many sweets will each child get?

28) 44 cows can graze a field in 9 days. How many less/more cows will graze the same field in 12 days?

29) 30 persons can reap a field in 17 days. How many more persons should be engaged to reap the same field in 10 days?

30) Shabnam takes 20 minutes to reach her school if she goes at a speed of 6 km/h. If she wants to reach school in 24 minutes, what should be her speed?

31) Ravi starts for his school at 8:20 a.m. on his bicycle. If he travels at a speed of 10km/h, then he reaches his school late by 8 minutes but on travelling at 16 km/h he reaches the school 10 minutes early. At what time does the school start?

| Column I | Column II |

1.	x and y vary inversely to each other	A.	$\dfrac{x}{y}$ = Constant
2.	Mathematical representation of inverse variation of quantities p and q	B.	y will increase in proportion
3.	Mathematical representation of direct variation of quantities m and n	C.	xy = Constant
4.	When $x = 5$, $y = 2.5$ and when $y = 5$, $x = 10$	D.	$p \propto \dfrac{1}{q}$
5.	When $x = 10$, $y = 5$ and when $x = 20$, $y = 2.5$	E.	y will decrease in proportion
6.	x and y vary directly with each other	F.	x and y are directly proportional
7.	If x and y vary inversely then on decreasing x	G.	$m \alpha n$
8.	If x and y vary directly then on decreasing x	H.	x and y vary inversely
		I.	$p \alpha q$
		J.	$m \alpha \dfrac{1}{n}$

32) There are 20 grams of protein in 75 grams of sauted fish. How many grams of protein is in 225 gm of that fish?

33) Ms. Anita has to drive from Jhareda to Ganwari. She measures a distance of 3.5 cm between these villages on the map. What is the actual distance between the villages if the map scale is 1 cm = 10 km?

34) A water tank casts a shadow 21 m long. A tree of height 9.5 m casts a shadow 8 m long at the same time. The lengths of the shadows are directly proprotional to their heights. Find the height of the tank.
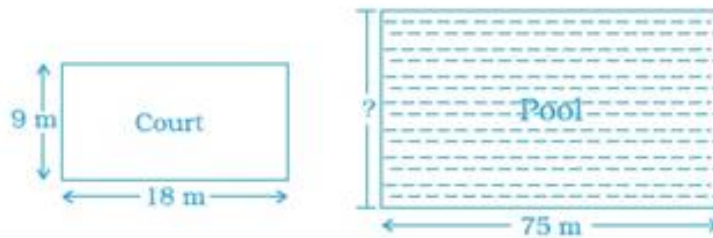
35) The table shows the time four elevators take to travel various distances. Find which elevator is fastest and which is slowest.

	Distance (m)	Time (sec.)
Elevator- A	435	29
Elevator- B	448	28
Elevator- C	130	10
Elevator- D	85	5

How much distance will be travelled by elevators B and C seperately in 140 sec? Who travelled more and by how much?
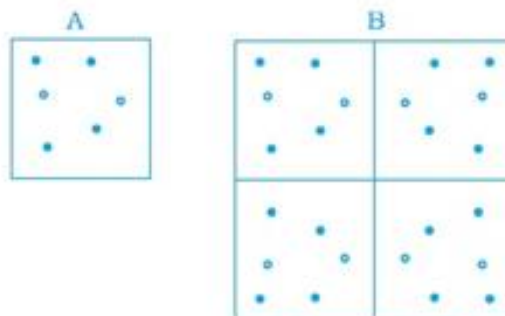
36) A volleyball court is in a rectangular shape and its dimensions are directly proportional to the dimensions of the swimming pool given below. Find the width of the pool.

37) A recipe for a particular type of muffins requires 1 cup of milk and 1.5 cups of chocolates. Riya has 7.5 cups of chocolates. If she is using the recipe as a guide, how many cups of milk will she need to prepare muffins?

38) Pattern B consists of four tiles like pattern A. Write a proportion involving red dots and blue dots in pattern A and B. Are they in direct proportion? If yes, write the constant of proportion.

39) A bowler throws a cricket ball at a speed of 120 km/h. How long does this ball take to travel a distance of 20 metres to reach the batsman?

40) The variable x is inversely proportional to y. If x increases by $p\%$, then by what per cent will y decrease?

41) Here is a key board of a harmonium:

(a) Find the ratio of white keys to black keys on the keyboard.

(b) What is the ratio of black keys to all keys on the given keyboard.

(c) This pattern of keys is repeated on larger keyboard. How many black keys would you expect to find on a keyboard with 14 such patterns.

42) The following table shows the distance travelled by one of the new eco-friendly energy-efficient cars travelled on gas.

Litres of gas	1	0.5	2	2.5	3	5
Distance (km)	15	7.5	30	37.5	45	75

Which type of properties are indicated by the table? How much distance will be covered by the car in 8 litres of gas?

43) Kritika is following this recipe for bread. She realises her sister used most of sugar syrup for her breakfast. Kritika has only $\frac{1}{6}$ cup of syrup, so she decides to make a small size of bread. How much of each ingredient shall she use?

Bread recipe

1 cup quick cooking oats

2 cups bread flour

$\frac{1}{3}$ cup sugar syrup

1 tablespoon cooking oil

$1\frac{1}{3}$ cups water

3 tablespoons yeast

1 teaspoon salt.

44) Many schools have a recommended students-teacher ratio as 35:1. Next year, school expects an increase in enrolment by 280 students. How many new teachers will they have to appoint to maintain the students-teacher ratio?

45) Kusum always forgets how to convert miles to kilometres and back again. However she remembers that her car's speedometer shows both miles and kilometres. She knows that travelling 50 miles per hour is same as travelling 80 kilometres per hour. To cover a distance of 200 km, how many miles Kusum would have to go?

46) The students of Anju's class sold posters to raise money. Anju wanted to create a ratio for finding the amount of money her class would make for different numbers of posters sold. She knew they could raise Rs 250 for every 60 posters sold.

   (a) How much money would Anju's class make for selling 102 posters?

   (b) Could Anju's class raise exactly Rs 2,000? If so, how many posters would they need to sell? If not, why?