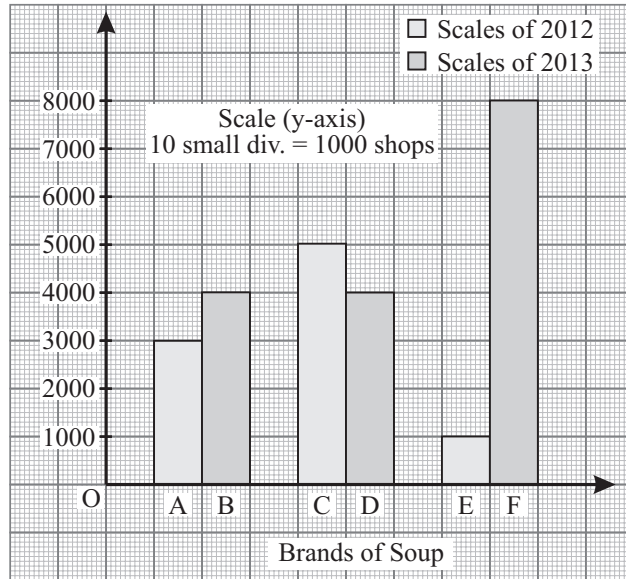


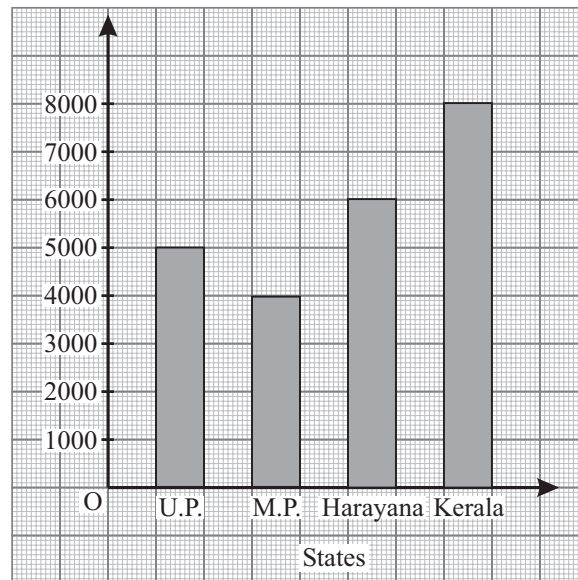
## 13. Data Handling

### Exercise 13.1

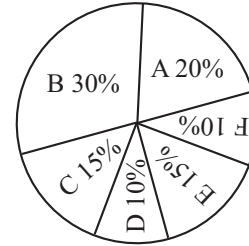
1. (a) For the sale of different brands of Soap in two shops, Double Bar graph would be the best graphical representation.



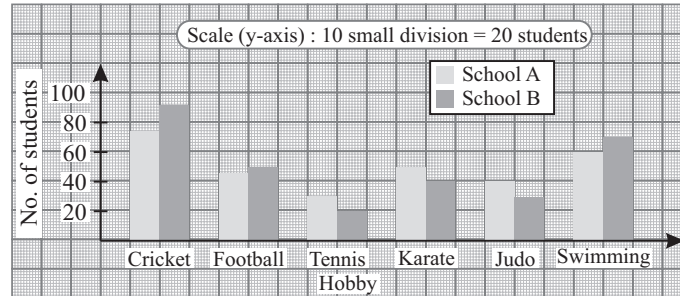
- (b) For the population of different states of our country, Bar graph would be the best graphical representation as we can take suitable values. For example : See the graph.



- (c) For the expenditure under different heads of a company pie chart would be the best graphical representation as we can divide the total expenditure into parts under different heads. For example : See the pie graph.
- (d) For the age in years of the employees of a factory, a Histogram would be the best graphical representation because ages can be grouped in different class intervals.

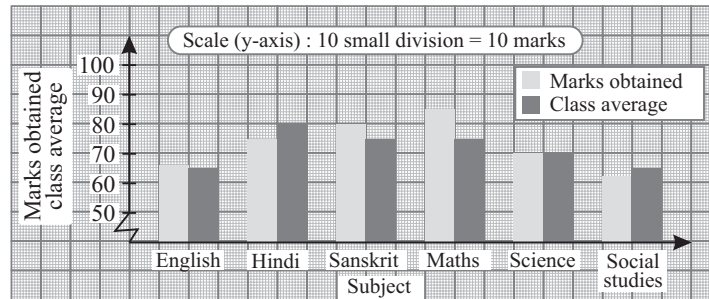


2.



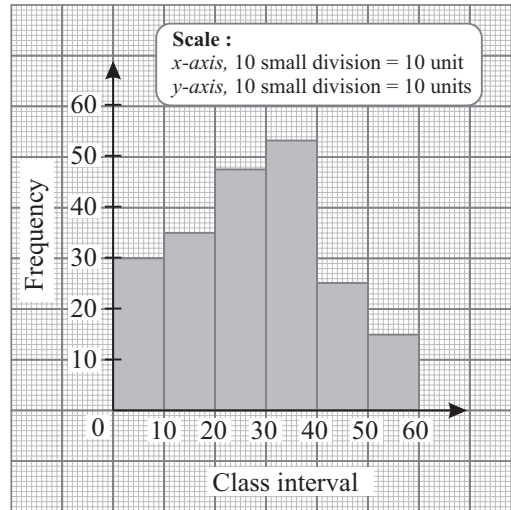
- (a) From the bar graph. It is clear that school B is more popular in cricket. (90 students play cricket)
- (b) From the bar graph, we see that school A is more popular in Karate i.e., 50 students like Karate.
- (c) From the bar graph, we see that in school B, Tennis is least popular, i.e., only 20 students like Tennis.
- (d) From the bar graph, we can say that 60% students from school A prefer swimming and 70% students from school B prefer swimming.

3.

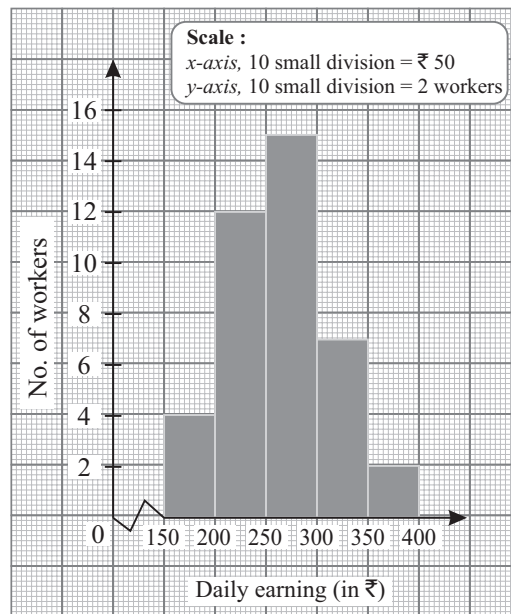


- (a) From the double bar graph we can say that in English, Sanskrit and Maths the performance of the student is better than the class average.
- (b) From the double bar graph we can say that in Hindi and Social Studies the performance of the student is worse than the class average.
- (c) It is clear from the double bar graph that in science the performance of the student is equal to the class average.

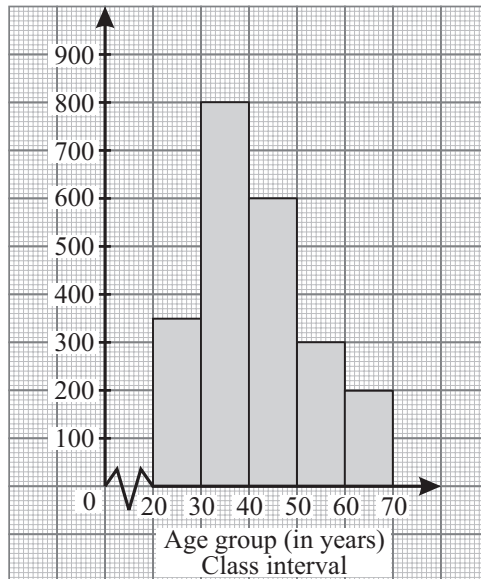
4.



5.



6. (a) From the histogram we can say that the age group (30–40) has the maximum number of self-employed persons.  
(b) Class size = 10.  
(c) From the histogram we can see that the age group (60–70) has the least number of self-employed persons by 200.



- (d) Class marks = ?  
 (e) Total number of self-employed persons in the town  
 $= 350 + 800 + 600 + 300 + 200 = 2250$
7. (a) Since percentage of  $P$  is more than any other brands. So, the most popular brand is  $P$ .

- (b) The least number brand is  $R$ .  
 (c) The central angle of the sector of shampoo

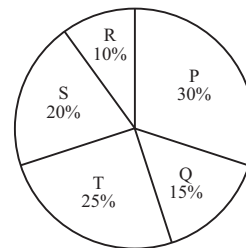
$$S = 20\% \text{ of } 360^\circ = \frac{20}{100} \times 360^\circ = 72^\circ.$$

- (d) The number of persons purchasing shampoo  $T$  is 270.  
 This means 25% purchasing of shampoo  $T$  is 270.  
 Purchasing of shampoo  $P$  is 30%  
 If 25% purchasing represents 270

$$1\% \text{ purchasing would represent} = \frac{270}{25}$$

$$30\% \text{ purchasing would represent} = \frac{270}{25} \times 30 = 324$$

$\therefore$  The number of persons purchasing shampoo  $P$  is 324.



8. (a) Maximum number of students has grade  $B$ .  
 (b) Percentage of students who have got  $B$  grade

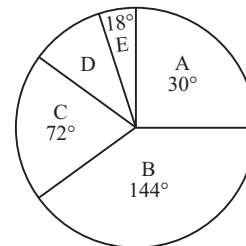
$$= \left( \frac{144^\circ}{360^\circ} \times 100 \right) \% = 40\%$$

- (c) Number of student in  $30^\circ = 9$

$$\text{Number of student in } 1^\circ = \frac{9}{30}$$

$$\text{Number of student in } 360^\circ = \frac{9}{30} \times 360$$

$$= 108 \text{ students.}$$

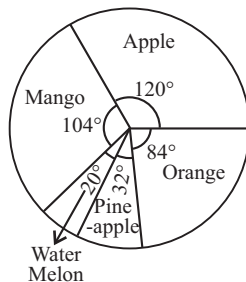


(d) Angle of the sector representing the student who have got *D* grade  
 $= 360^\circ - (\text{sum of all the other angles})$   
 $= 360^\circ - (18 + 30 + 72 + 144)$   
 $= 360 - 264 = 90^\circ$

9. We make a table and find the central angle for each item (Fruits).

Type of Fruits	No. of Fruits	Angle of the sector i.e. item
Mango	26	$\frac{26}{90} \times 360^\circ = 104^\circ$
Apple	30	$\frac{30}{90} \times 360^\circ = 120^\circ$
Watermelon	5	$\frac{5}{90} \times 360^\circ = 20^\circ$
Pine-apple	8	$\frac{8}{90} \times 360^\circ = 32^\circ$
Orange	21	$\frac{21}{90} \times 360^\circ = 84^\circ$
Total	90	$360^\circ$

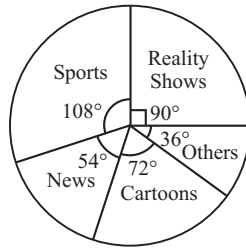
Now, we make the pie chart for the given data.



10. We make a table and find the central angle for each sector.

Favourite Programme	No. of persons	Angle of the sector
Sports	54	$\frac{54}{180} \times 360^\circ = 108^\circ$
Cartoons	36	$\frac{36}{180} \times 360^\circ = 72^\circ$
News	27	$\frac{27}{180} \times 360^\circ = 54^\circ$
Reality shows	45	$\frac{45}{180} \times 360^\circ = 90^\circ$
Others	18	$\frac{18}{180} \times 360^\circ = 36^\circ$
Total	180	$360^\circ$

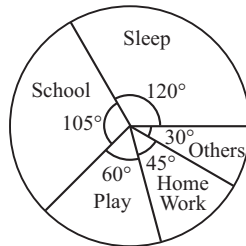
Now, we make the pie chart for the given data as given below.



11. First we make a table and find the central angle for each sector.

Activity	No. of Hours	Angle of the sector
School	7	$\frac{7}{24} \times 360^\circ = 105^\circ$
Play	4	$\frac{4}{24} \times 360^\circ = 60^\circ$
Homework	3	$\frac{3}{24} \times 360^\circ = 45^\circ$
Sleep	8	$\frac{8}{24} \times 360^\circ = 120^\circ$
Others	2	$\frac{2}{24} \times 360^\circ = 30^\circ$
Total	24	$360^\circ$

Now, we make the pie chart for the given data as given below.

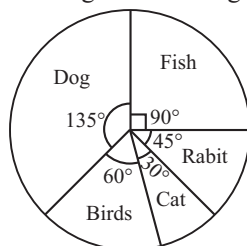


12. We make a table and find the central angle for each item (Survey).

Survey on Pet animals	No. of Persons	Angle of the Sector
Dog	27	$\frac{27}{72} \times 360^\circ = 135^\circ$
Cat	6	$\frac{6}{72} \times 360^\circ = 30^\circ$
Rabit	9	$\frac{9}{72} \times 360^\circ = 45^\circ$

Fish	18	$\frac{18}{72} \times 360^\circ = 90^\circ$
Birds	12	$\frac{12}{72} \times 360^\circ = 60^\circ$
Total	72	360°

Now, we make the pie-chart for the given data as given below.



### Exercise 13.2

1. When a die is thrown, the possible outcome = {1, 2, 3, 4, 5, 6}

(a) Number less than 4 are 1, 2, 3

$\therefore$  Favourable outcomes = 3 Total possible outcomes = 6

$\therefore$   $P$  (getting a number less than 4)

$$= \frac{\text{Favourable outcomes}}{\text{Total possible outcomes}} = \frac{3}{6} = \frac{1}{2}$$

(b) Prime number are 2, 3, 5

$\therefore$  Favourable outcomes = 3

$\therefore$   $P$  (getting a prime number) =  $\frac{3}{6} = \frac{1}{2}$ .

(c) Numbers greater than 2 are 3, 4, 5, 6.

$\therefore$  Favourable outcomes = 4

$\therefore$   $P$  (getting a number > 2) =  $\frac{4}{6} = \frac{2}{3}$ .

(d) Numbers less than 5 are 1, 2, 3, 4.

$\therefore$  Favourable outcomes = 4

$\therefore$   $P$  (getting a number < 5) =  $\frac{\text{Favourable outcomes}}{\text{Total possible outcomes}} = \frac{4}{6} = \frac{2}{3}$ .

2. Here outcomes will be the sectors in which the pointer stops.

(a) Possible outcomes

= {pointing stopping in Green, blue or Red sectors}

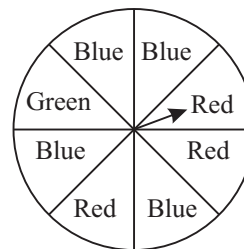
(b) No. of blue sectors = 4

Total no. of all the sectors = 8

$\therefore$   $P$  (the pointer stopping in the blue sector)

$$= \frac{\text{no. of blue sectors}}{\text{total no. of all the sectors}}$$

$$= \frac{4}{8} = \frac{1}{2}$$



(c) No. of red sectors = 3

$$\therefore P(\text{the pointer stopping in the red sector}) = \frac{\text{no. of red sectors}}{\text{Total no. of all the sectors}} = \frac{3}{8}$$

(d) No. of green sector = 1

$$P(\text{the pointer stopping in the green sector}) = \frac{\text{no. of green sector}}{\text{Total no. of all the sector}} = \frac{1}{8}$$

$$\therefore P(\text{not stopping in the green sector}) = 1 - \frac{1}{8} = \frac{7}{8}$$

3. Red balls = 5, Yellow balls = 7, White balls = 9

Total no. of balls = 21

$$(a) P(\text{being a red ball}) = \frac{\text{Red balls}}{\text{Total no. of balls}} = \frac{5}{21}$$

$$(b) P(\text{being a yellow ball}) = \frac{\text{Yellow balls}}{\text{Total no. of balls}} = \frac{7}{21} = \frac{1}{3}$$

$$(c) P(\text{being a white ball}) = \frac{\text{White balls}}{\text{Total no. of balls}} = \frac{9}{21} = \frac{3}{7}$$

4. tossing 3 identical coins, total possible outcomes

$$= \{HHH, TTT, HTT, HTH, HHT, THH, TTH, THT\} = 8$$

(a) Possible outcome of getting all three heads = 1 (i.e., HHH)

$$\therefore P(\text{getting all three heads}) = \frac{1}{8}$$

(b) Possible outcome of getting 1 head and 2 tails = {HTT, TTH, THT} = 3

$$\therefore P(\text{getting 1H and 2}) = \frac{3}{8}$$

5. Total no. of coins = 10

Possible outcomes of coins = {1, 2, 3, ..., 10}

$$(a) P(\text{the number of the coin being 7}) = \frac{\text{no. of coins having numbers}}{\text{Total no. of coins}} = \frac{1}{10}$$

(b) The number of the coins being < 6 are 1, 2, 3, 4, 5 i.e., 5.

$$\therefore P(\text{the number of coin being } < 6) = \frac{5}{10} = \frac{1}{2}$$

(c) The number of coin being even are 2, 4, 6, 8, 10.

$\therefore$  No. of even coins = 5

$$P(\text{the number of the coin being even}) = \frac{\text{no. of even coins}}{\text{Total no. of coins}} = \frac{5}{10} = \frac{1}{2}$$

(d) Coins being multiple of 3 are 3, 6, 9

$\therefore$  Possible outcomes for coins to be multiple of 3 = 3

$$\therefore P(\text{the number of coin being a multiple of three}) = \frac{3}{10}$$

(e) the number of coins being single-digit number = 9

i.e., (1, 2, 3, ..., 9)

$$\therefore P(\text{the number of the coin being a single-digit number}) = \frac{9}{10}$$

6. There are two coins ₹ 5 and ₹ 1.
- (a) Possible outcomes =  $\{HH, HT, TH, TT\}$
- (b) No. of getting 2 heads = 1 i.e.,  $\{H, H\}$   
 No. of getting 2 tails = 1 i.e.,  $\{T, T\}$  and total possible outcomes = 4
- (i)  $\therefore P(\text{getting 2 heads}) = \frac{1}{4}$ .
- (ii)  $\therefore P(\text{getting 2 tails}) = \frac{1}{4}$ .
7. When two dice are rolled together, the possible outcomes are :
- (1, 1) (2, 1) (3, 1) (4, 1) (5, 1) (6, 1)  
 (1, 2) (2, 2) (3, 2) (4, 2) (5, 2) (6, 2)  
 (1, 3) (2, 3) (3, 3) (4, 3) (5, 3) (6, 3)  
 (1, 4) (2, 4) (3, 4) (4, 4) (5, 4) (6, 4)  
 (1, 5) (2, 5) (3, 5) (4, 5) (5, 5) (6, 5)  
 (1, 6) (2, 6) (3, 6) (4, 6) (5, 6) (6, 6)
- Total no. of outcomes when two dice are rolled together = 36 (i.e.,  $6 \times 6$ )
- (a) Let  $A$  be the event of getting the sum as an even number i.e., 2, 4, 6, 8, 10, 12  
 $\therefore$  Favourable outcomes = 18  
 Hence, 
$$P(A) = \frac{\text{Favourable outcomes}}{\text{Total outcomes}} = \frac{18}{36} = \frac{1}{2}$$
- (b) Let  $B$  be the event of getting the sum as an odd number, i.e., 3, 5, 7, 9 and 11.  
 $\therefore$  Favourable outcomes (whose sum is odd) = 18  
 $\therefore$  
$$P(B) = \frac{18}{36} = \frac{1}{2}$$
- (c) Let  $C$  be the event of getting the sum as equal to 10 i.e., (4, 6) (5, 5), (6, 4)  
 $\therefore$  Favourable outcomes = 3  
 $\therefore$  
$$P(C) = \frac{3}{36} = \frac{1}{12}$$
- (d) Let  $D$  be the event of getting a doublet  
 $\therefore$  Favourable outcomes to  $D$  are (1, 1) (2, 2) (3, 3) (4, 4) (5, 5) and (6, 6) = 6  
 $\therefore$  
$$P(D) = \frac{6}{36} = \frac{1}{6}$$
- (e) Events of getting sum of single-digit number are = 30  
 $\therefore P(\text{a single-digit number}) = \frac{30}{36} = \frac{5}{6}$
8. Total no. of apples = 50  
 Rotten apples = 12  
 Eatable apples =  $50 - 12 = 38$
- (a)  $P(\text{the apple being rotten}) = \frac{\text{no. of rotten apples}}{\text{Total no. of apple}} = \frac{12}{50} = \frac{6}{25}$ .
- (b)  $P(\text{not rotten}) = 1 - P(\text{rotten}) = 1 - \frac{6}{25} = \frac{19}{25}$ .
9. Total no. of playing cards = 52 no. of heart cards = 13  
 No. of cards whose number is 8 = 4  
 No. of space cards = 13  
 No. of spade ace = 1

No. of cards whose number is odd = 3, 5, 7, 9 in each type of cards  
 $= 4 \times 4 = 16$

$$(a) \therefore P(\text{a heart}) = \frac{\text{no. of heart cards}}{\text{Total no. of playing cards}} = \frac{13}{52} = \frac{1}{4}.$$

$$(b) P(\text{a card whose number is 8}) = \frac{\text{no. of cards having number 4}}{\text{Total no. of playing cards}} = \frac{4}{52} = \frac{1}{13}.$$

$$(c) P(\text{a spade}) = \frac{\text{no. of spade cards}}{\text{Total no. of playing cards}} = \frac{13}{52} = \frac{1}{4}.$$

$$(d) P(\text{the spade ace}) = \frac{\text{no. of spade ace}}{\text{Total no. of cards}} = \frac{1}{52}.$$

$$(e) P(\text{a card having odd number}) = \frac{\text{no. of cards whose number is odd}}{\text{Total no. of cards}} = \frac{16}{52} = \frac{4}{13}.$$

10. No. of slips of paper = 50

Possible outcomes on the slips of paper = {1, 2, 3, ..., 50}

(a) Perfect square numbers are 1, 4, 9, 16, 25, 36, 49  
 no. of perfect square numbers = 7

$$\therefore P(\text{being a perfect square}) = \frac{7}{50}.$$

(b) Single-digit numbers are 1, 2, 3, 4, 5, 6, 7, 8, 9  
 no. of single-digit numbers = 9

$$\therefore P(\text{being a single-digit number}) = \frac{9}{50}.$$

(c) Multiples of 5 are 5, 10, 15, 20, 25, 30, 35, 40, 45, 50.

$\therefore$  Total no. of multiples of 5 = 10

$$\therefore P(\text{being a multiple of 5}) = \frac{10}{50} = \frac{1}{5}.$$

(d) Prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47

$\therefore$  Total no. of prime numbers between (1–50) are = 15

$$\therefore P(\text{a prime number}) = \frac{15}{50} = \frac{3}{10}.$$

11. Total no. of english alphabets = 26

(a) Vowels are a, e, i, o, u.

no. of vowels = 5

$$\therefore P(\text{being a vowel}) = \frac{5}{26}.$$

(b) Consonant =  $26 - 5 = 21$

$$\therefore P(\text{being a consonant}) = \frac{21}{26}.$$

(c) no. of letter 'm' = 1

$$\therefore P(\text{being the letter 'm'}) = \frac{1}{26}.$$

12. no. of toys = 22

no. of girls = 14

Total students =  $22 + 14 = 36$

$$(a) P(\text{note book belong to a girl}) = \frac{\text{no. of girls}}{\text{Total students}} = \frac{14}{36} = \frac{7}{18}$$

$$(b) P(\text{note book belong to a boy}) = \frac{22}{36} = \frac{11}{18}$$

13. No. of brown socks = 4  
 No. of white socks = 6  
 Total no. of socks = 10

$$(a) P(\text{being a white socks}) = \frac{6}{10} = \frac{3}{5}$$

$$(b) P(\text{being a brown socks}) = \frac{4}{10} = \frac{2}{5}$$

14. Total no. of students in the clas = 48  
 75% of the students are good in maths

$$\therefore \text{Good students in maths} = 75\% \text{ of } 48 = \frac{75}{100} \times 48 = 36$$

$$\therefore \text{Weak students in maths} = 48 - 36 = 12$$

$$(a) P(\text{being weak in Maths}) = \frac{\text{no. of weak students in maths}}{\text{Total no. of students in the class}} = \frac{12}{48} = \frac{1}{4}$$

$$(b) P(\text{being good in maths}) = \frac{\text{no. of weak students in maths}}{\text{Total no. of students in the class}} = \frac{36}{48} = \frac{3}{4}$$

### MCQ's

1. (b) 2. (c) 3. (a) 4. (c).

## 14. Introduction to Graphs

### Exercise 14.1

1. (a)  $A(4, 8)$

To plot  $A(4, 8)$  move 4 units on  $x$ -axis i.e., (right side of origin) and then 8 units on  $y$ -axis i.e., upwards as 8 is positive)

Clearly,  $A$  is in 1st quadrant.

- (b)  $B(-4, 4)$

To plot  $B(-4, 4)$  move 4 units on  $x$ -axis (i.e., left-side of the origin) and then 4 units on  $y$ -axis (i.e., upward as 4 is positive)

Clearly,  $B$  is in 2nd quadrant.

- (c)  $(4, 4)$

To plot  $C(4, 4)$  move 4 units on  $x$ -axis (i.e., right side of origin) and then 4 units on  $y$ -axis (i.e., upwards) as 4 is positive.

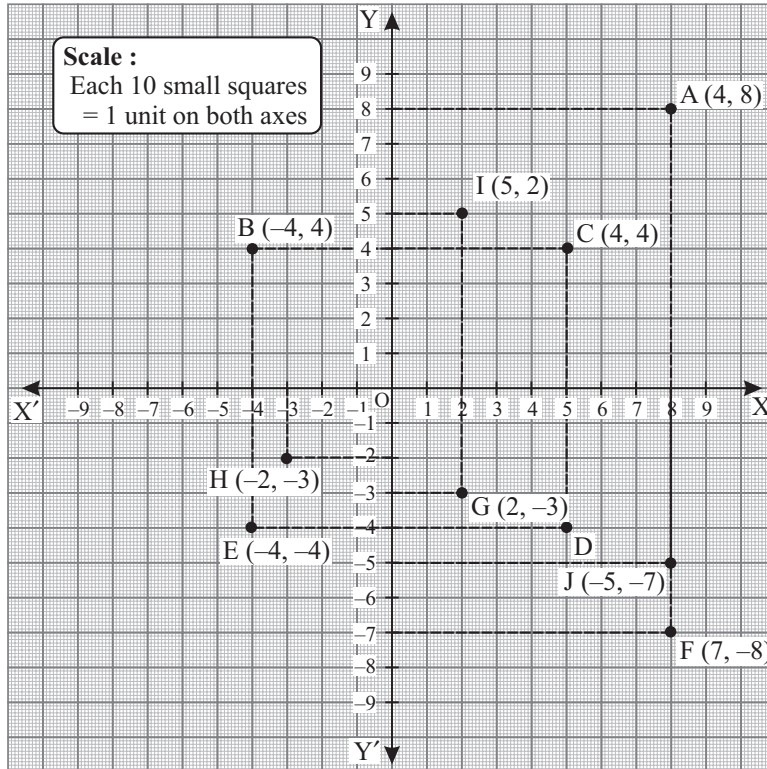
Clearly  $C$  is in 1st quadrant.

- (d) To plot  $D(4, -4)$  move 4 unit on  $x$ -axis (i.e., right side of origin) and then 4 unit on  $y$ -axis (i.e. downwards) as 4 is negative.

Clearly,  $D$  is in the 4th quadrant.

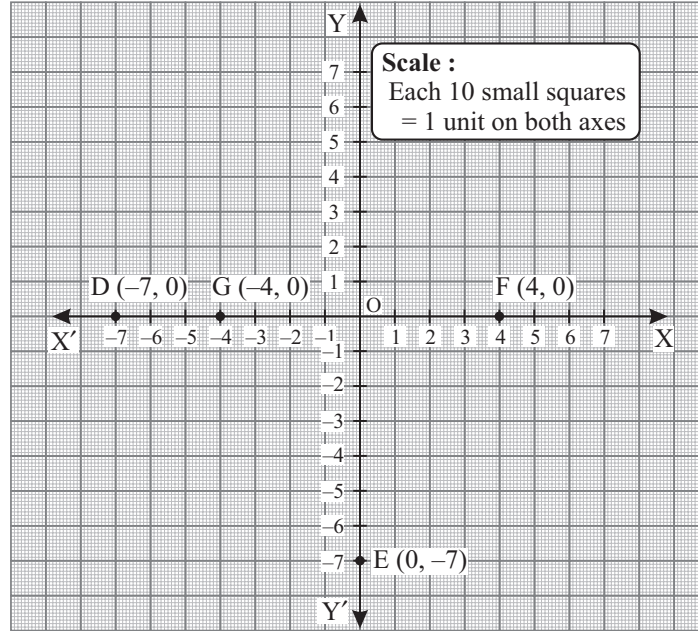
- (e) To plot  $E(-4, -4)$  move 4 unit on  $x$ -axis (i.e., left side of origin) and then 4 unit on  $y$ -axis (i.e., downward) as 4 is negative.

Clearly,  $E$  is in 3rd quadrant.



- (f) To plot  $F(7, -8)$ , move 7 unit on  $x$ -axis (i.e., right side of the origin) and then 8 unit on  $y$ -axis (i.e., downward) as 8 is negative.  
Clearly,  $F$  is in 4th quadrant.
- (g) To plot  $G(2, -3)$  move 2 units on  $x$ -axis (i.e. right side of the origin) and then 3 unit on  $y$ -axis (i.e., downward) as 3 is negative.  
Clearly,  $G$  is in 4th quadrant.
- (h)  $H(-2, -3)$   
To plot  $H(-2, 3)$ , move 2 unit on  $x$ -axis (i.e., left side of the origin) and then 3 unit on  $y$ -axis (i.e., downward) as 3 is negative.  
Clearly,  $H$  is in the 3rd quadrant.
- (i)  $(5, 2)$   
To plot  $I(5, 2)$  move 5 unit on  $x$ -axis i.e., right side of the origin and then 2 unit on  $y$ -axis i.e., upward as 2 is positive.  
Clearly,  $I$  is in the 1st quadrant.
- (j)  $J(-5, -7)$   
To plot  $J(-5, -7)$ , move 5 unit on  $x$ -axis i.e., left-side of the origin and then 7 unit on  $y$ -axis, i.e., downward as 7 is negative.  
Clearly,  $J$  is in the 3rd quadrant.

2.



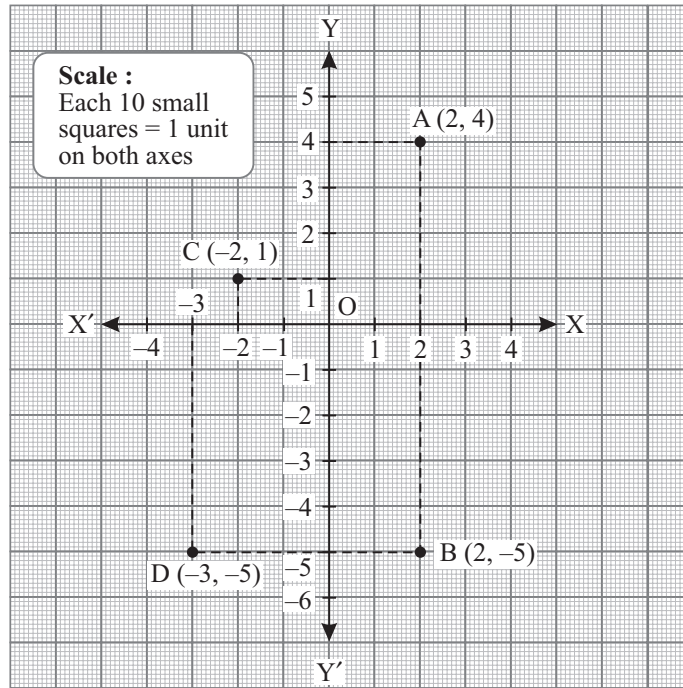
3. The coordinates of the given points are as given below.

The coordinates of  $A$  are  $(2, 4)$

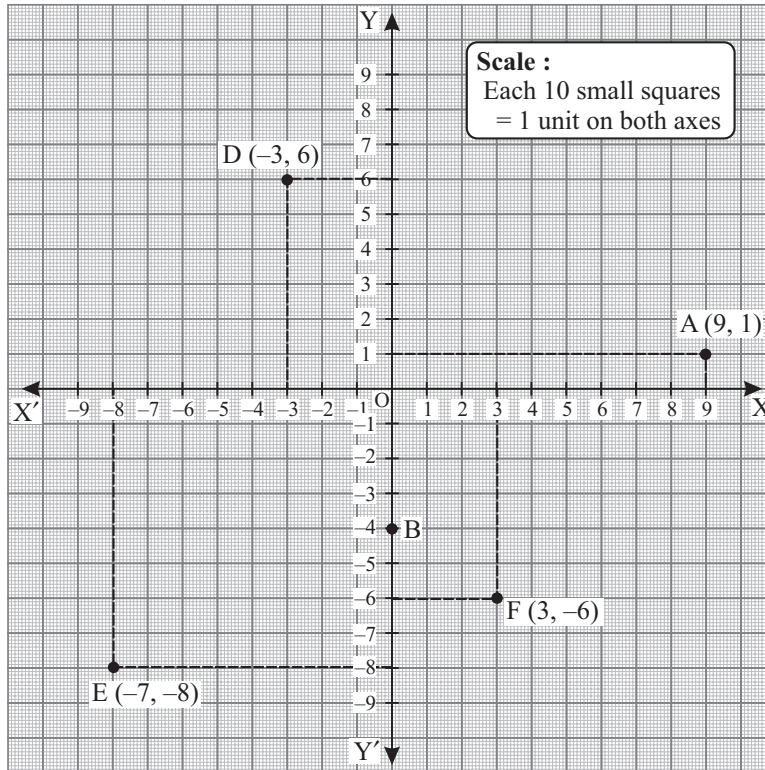
The coordinate of  $B$  are  $(2, -5)$

The coordinate of  $C$  are  $(-2, 1)$

The coordinate of  $D$  are  $(-3, -5)$ .



4. The coordinates of  $A$  are  $(9, 1)$   
 The coordinates of  $B$  are  $(0, -4)$   
 The coordinate of  $C$  are  $(-3, 0)$   
 The coordinates of  $D$  are  $(-3, 6)$   
 The coordinates of  $E$  are  $(-7, -8)$   
 The coordinates of  $F$  are  $(3, -6)$



### Exercise 14.2

1. Let  $x$  = diameter of a circle  
 and  $y$  = circumference of a circle.

We know that circumference of a circle =  $\pi \times$  diameter

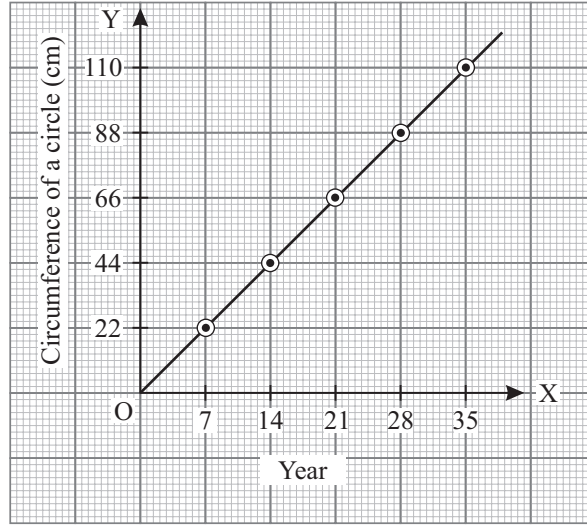
$$y = \pi \times x$$

when  $x = 7$ ,  $y = 22$ ;  $x = 14$ ,  $y = 44$ ;  $x = 21$ ,  $y = 66$

$x = 28$ ,  $y = 88$ ;  $x = 35$ ,  $y = 110$

Let us tabulate the results as follows :

$x$	7	14	21	28	35
$y$	22	44	66	88	110
$(x, y)$	$(7, 22)$	$(14, 44)$	$(21, 66)$	$(28, 88)$	$(35, 110)$



2. Let  $x$  = radius of circle,  
 $y$  = Area of the circle  
 Clearly, we get an equation  

$$y = \pi x^2$$
 as Area of area =  $\pi$  (radius)<sup>2</sup>  
 Now, we calculate different values of  $y$  for different values of  $x$ .  
 When,  $x = 0$ ,  $y = \pi \cdot (0)^2 = 0$   
 $x = 1$ ,  

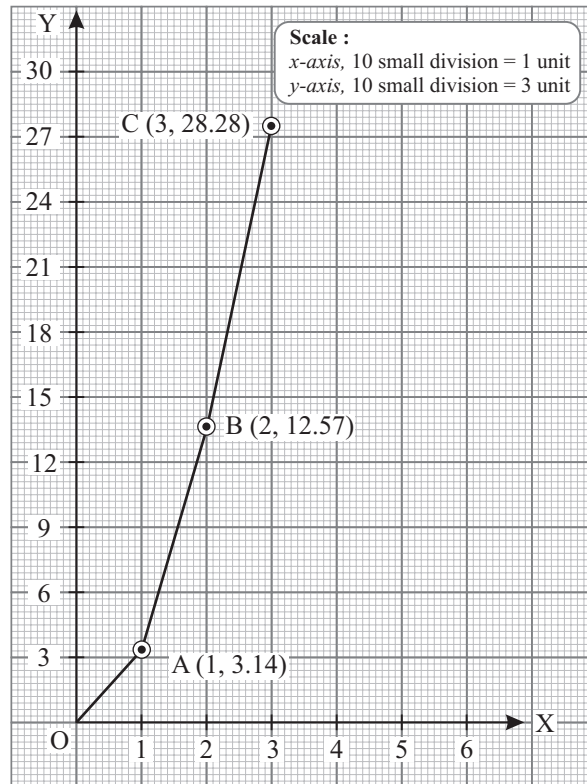
$$y = \pi \cdot (1)^2 = \frac{22}{7} \times 1 = 3.14$$
  
 $x = 2$ ,  

$$y = \pi \cdot (2)^2 = \frac{22}{7} \times 4 = 12.57$$
  
 $x = 3$ ,  

$$y = \pi \cdot (3)^2 = \frac{22}{7} \times 9 = 28.28$$

we tabulate the results as follows :

$x$	0	1	2	3
$y$	0	3.14	12.57	28.28
$(x, y)$	(0, 0)	(1, 3.14)	(2, 12.57)	(3, 28.28)



3. Let  $x$  = length of a rectangle  
and  $y$  = area of a rectangle  
We know that

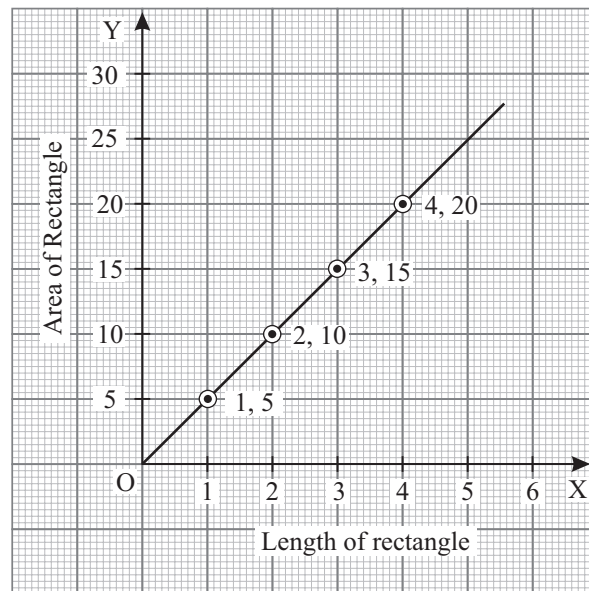
$$\text{Area of a rectangle} = \text{length} \times \text{breadth}$$

$$y = x \times 5 \quad y = 5x$$

$$\text{when } x = 1, y = 5 \quad \text{when } x = 2, y = 10$$

$$\text{when } x = 3, y = 15 \quad \text{when } x = 4, y = 20$$

$x$	1	2	3	4
$y$	5	10	15	20
$(x, y)$	(1, 5)	(2, 10)	(3, 15)	(4, 20)



4. Let  $x$  = side of a cube  
and  $y$  = volume of a cube  
We know that

$$\text{Volume of a cube} = (\text{side})^3$$

$$y = x^3$$

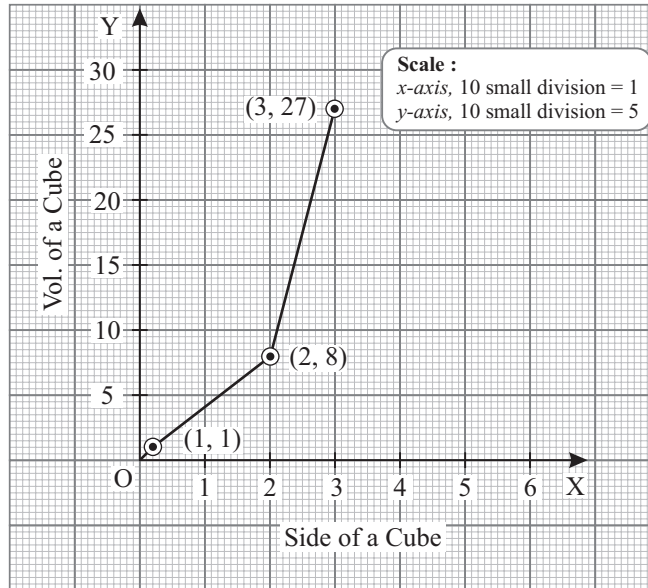
$$\text{when } x = 1, y = 1$$

$$\text{when } x = 2, y = 8$$

$$\text{when } x = 3, y = 27$$

Let us tabulate the result as follows :

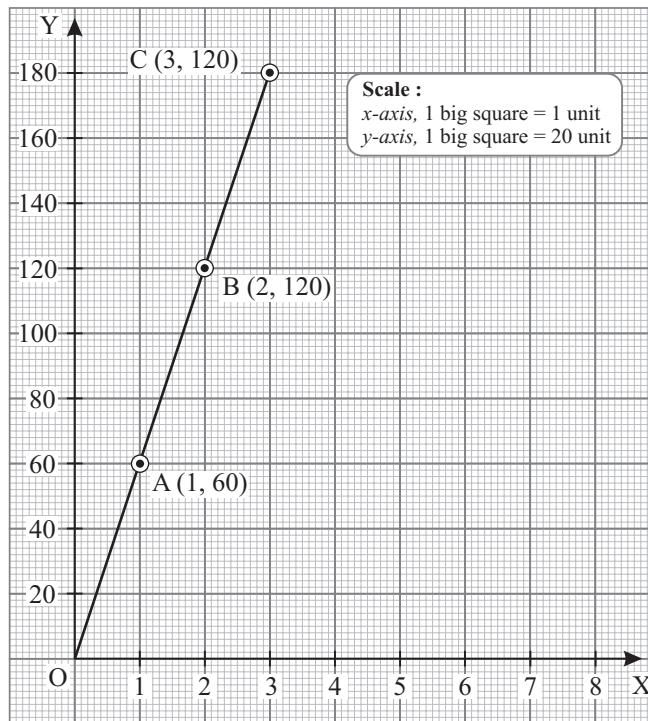
$x$	1	2	3
$y$	1	8	27
$(x, y)$	(1, 1)	(2, 8)	(3, 27)



5. Let  $x$  = rate of interest  
and  $y$  = simple interest

We know that 
$$\text{S.I.} = \frac{P \times R \times T}{100}$$

where S.I. = Simple interest,  $P$  = Principal,  $R$  = Rate,  $T$  = Time.



Given that  $P = ₹ 2000$ ,  $T = 3$  years,

Now, 
$$\text{S.I.} = \frac{P \times R \times T}{100}$$

$$y = \frac{2,000 \times x \times 3}{100}$$

$$y = 60x$$

when  $x = 1$ ,  $y = 60$ ,  
 when  $x = 2$ ,  $y = 120$   
 when  $x = 3$ ,  $y = 180$

Let us tabulate the results as follows :

$x$	1	2	3
$y$	60	120	180
$(x, y)$	(1, 60)	(2, 120)	(3, 180)

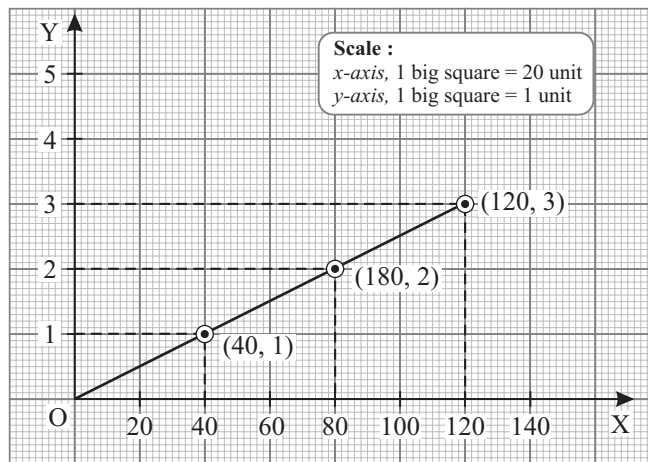
6. Let time =  $y$  sec. and distance =  $x$  sec.

We know that  $\text{time} = \frac{\text{distance}}{\text{speed}}$   $y = \frac{x}{40}$

when  $x = 40$ ,  $y = 1$ ,  
 when  $x = 80$ ,  $y = 2$   
 when  $x = 120$ ,  $y = 3$

Let us tabulated the result as follows :

$x$	40	80	120
$y$	1	2	3
$(x, y)$	(40, 1)	(80, 2)	(120, 3)



7. Let  $y =$  Simple interest,  $P =$  Principal,  $R =$  Rate of interest,  $T =$  Time  
 Given that,  $P = ₹ 2,000$ ,  $R = 4\%$

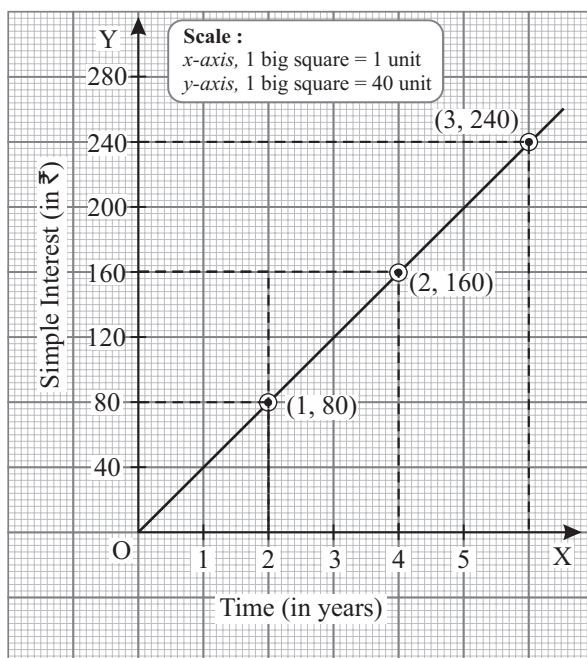
Now,

$$\begin{aligned} \text{S.I.} &= \frac{P \times R \times T}{100} \\ y &= \frac{2000 \times 4 \times x}{100} \\ y &= 80x \end{aligned}$$

when  $x = 1$ ,  $y = 80$ , when  $x = 2$ ,  $y = 160$ , when  $x = 3$ ,  $y = 240$

Let us tabulate the result as follows :

$x$	1	2	3
$y$	80	160	240
$(x, y)$	(1, 80)	(2, 160)	(3, 240)



### Exercise 14.3

1. (a) Speed between 0 to 10 seconds

$$\begin{aligned} &= \frac{\text{Total distance}}{\text{Total time}} \\ &= \frac{50 - 20}{10} = \frac{30}{10} \\ &= 3 \text{ m/sec.} \end{aligned}$$

- (b) Interval speed is zero between 15th and 20th seconds and between 20th and 25th seconds.  
 (c) At 10th sec., speed is abruptly too high.  
 (d) Total distance travelled in 25 seconds.

$$\begin{aligned} &= (50 - 20) + (50 - 20) + 0 + (50 - 20) + 0 \\ &= 30 + 30 + 30 = 90 \text{ m.} \end{aligned}$$

2. (a) Average speed =  $\frac{\text{Total distance}}{\text{Total time}} = \frac{50+50}{10}$   
 $= \frac{100}{10} = 10 \text{ m/sec.}$
- (b) Speed =  $\frac{\text{distance}}{\text{time}} = \frac{50}{5} = 10 \text{ m/sec.}$
3. (a) If  $x$  changes from  $-4$  to  $0$ ,  $y$  changes from  $0$  to  $2$ .  
 (b) If  $x$  changes from  $0$  to  $4$ ,  $y$  changes from  $2$  to  $4$ .  
 (c) Change in  $y$  is same in (i) and (ii) because change in  $x$  is same in (i) and (ii).
4. (a) Speed between  $0$  to  $2$  seconds =  $\frac{\text{Total distance}}{\text{Total time}} = \frac{0}{2} = 0$ .
- (b) Speed between  $2$  to  $4$  seconds =  $\frac{\text{Total distance}}{\text{Total time}} = \frac{40}{2} = 20 \text{ m/sec.}$
- (c) Speed between  $4$  to  $8$  seconds =  $\frac{\text{Total distance}}{\text{Total time}} = \frac{100-80}{4}$   
 $= \frac{20}{4} = 5 \text{ m/sec.}$
- (d) Average Speed =  $\frac{\text{Total distance}}{\text{Total time}}$   
 $= \frac{0 + (80 - 40) + (100 - 80)}{8}$   
 $= \frac{40 + 20}{8} = \frac{60}{8}$   
 $= \frac{15}{2} = 7.5 \text{ m/sec.}$
5. (a) When  $x$  changes from  $0$  to  $2$ ,  $y$  changes from  $8$  to  $4$ .  
 (b) When  $x$  changes from  $2$  to  $4$ ,  $y$  remains constant.  
 (c) When  $x$  changes from  $4$  to  $8$ ,  $y$  changes from  $4$  to  $0$ .  
 (d) When  $x$  changes from  $0$  to  $8$ ,  $y$  changes from  $8$  to  $0$ .

### MCQ's

1. (a) 2. (c) 3. (d) 4. (b) 5. (c) 6. (d) 7. (a).

### Formative Assessment-4

1. (a) 2. (c) 3. (b) 4. (c) 5. (b) 6. (b) 7. (c) 8. (d) 9. (a) 10. (b) 11. (d) 12. (a) 13. (c) 14. (a)  
 15. (b) 16. 18. (c) 19. (c) 20. (c).

### Summative Assessment-2

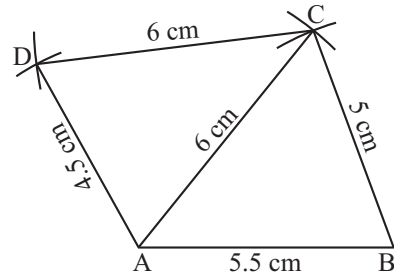
1. (b) 2. (a) 3. (c) 4. (b) 5. (b) 6. (c) 7. (d) 8. (a)  
 9. Total students in the class =  $40$

$$\begin{aligned} \text{Number of students who got distinction} &= 40 \times 60\% \\ &= \frac{40 \times 60}{100} = 24 \end{aligned}$$

So, the number of students who could not get distinction =  $40 - 24 = 16$

**10. Steps for construction**

- (i) Draw  $AB = 5.5$  cm.
- (ii) With  $A$  and  $B$  as centres and radii 6 cm and 5 cm draw arcs intersecting each other.
- (iii) Join  $A$  to  $C$  and  $B$  to  $C$ .
- (iv) Again, with  $A$  and  $C$  as centres, and radii 4.5 cm and 6 cm draw arcs intersecting each other at  $D$ .
- (v) Join  $D$  to  $C$  and  $A$  to  $D$ .



- 11.** Length of smaller side = 16 cm  
 Length of bigger side = 20 cm  
 Distance between them = 12 cm

$$\begin{aligned} \text{Then Area of trapezium} &= \frac{1}{2} (\text{sum of parallel side}) \times \text{height} \\ &= \frac{1}{2} \times (16 + 20) \times 12 = \frac{1}{2} \times (36) \times 12 \\ &= \frac{1}{2} \times 36 \times 12 = 216 \text{ cm}^2 \end{aligned}$$

Hence, the area of trapezium =  $216 \text{ cm}^2$

- 12.** Length of cuboid = 12 cm  
 Breath of cuboid = 2 cm  
 Height of cuboid = 5 cm  
 Then, the surface of cardboard =  $2(lb + bh + l \times h)$   
 $= 2(24 + 10 + 60)$   
 $= 2(94) = 188 \text{ cm}^2$

13.	Class-interval	Tally marks	frequency
	1500–1550		3
	1550–1600		4
	1600–1650		5
	1650–1700		9
	1700–1750		4
	1750–1800		3
	1800–1850		5
	1850–1900		3

- 14.** (i) Total possible events = 6 (1, 2, 3, 4, 5, 6)  
 Total even number = 3 (2, 4, 6)  
 So the probability of even number =  $\frac{3}{6} = \frac{1}{2}$
- (ii) Odd numbers = 3 (1, 3, 5)  
 So, the probability of odd number =  $\frac{3}{6} = \frac{1}{2}$

15. Marked price of radio = ₹ 500

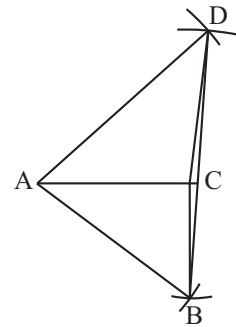
Discount = 15%

$$\begin{aligned} \text{then selling price} &= \left( \frac{100 - \text{discount}\%}{100} \right) \times \text{M.P.} \\ &= \frac{100 - 15}{100} \times 2500 \\ &= \frac{85}{100} \times 2500 = 2125 \end{aligned}$$

Hence, the selling price of radio = ₹ 2125 Ans.

16. **Steps of Construction**

- (i) Draw a line  $AC = 4$  cm (diagonal)
- (ii) Taking  $A$  as centre and  $AB (= 5$  cm) as radius, draw an arc below the line  $AC$ .
- (iii) Taking  $C$  as centre and  $BC (= 3$  cm) as radius, draw another arc below the line, intersecting the arc in step 2 at  $B$ . Join  $AB$  and  $BC$ .
- (iv) Taking  $B$  as centre and  $BD (= 7$  cm) as radius, draw an arc above the line  $AC$ .
- (v) Taking  $A$  as centre and  $AD (= 6$  cm) as radius, draw another arc intersecting the arc in step 4 at  $D$ . Join  $AD$  and  $BD$ .
- (vi) Now join  $CD$ .



Hence, the quadrilateral  $ABCD$  is the required quadrilateral.

17. Area of the rhombus =  $240 \text{ cm}^2$

Length of one diagonal = 20 cm

Let the second diagonal be  $x$ .

Then Area of rhombus =  $\frac{1}{2} \times \text{first diagonal} \times \text{second diagonal}$

$$240 \text{ cm}^2 = \frac{1}{2} \times 20 \times x$$

$$x = \frac{240 \times 2 \text{ cm} \times \text{cm}}{20 \text{ cm}}$$

$$x = 24 \text{ cm}$$

Hence, the length of second diagonal = 24 cm

18. Circumference of the base of the cylinder = 12 cm

$$2\pi r = 12$$

$$r = \frac{12 \times 7}{2 \times 22} = \frac{84}{44} \text{ m}$$

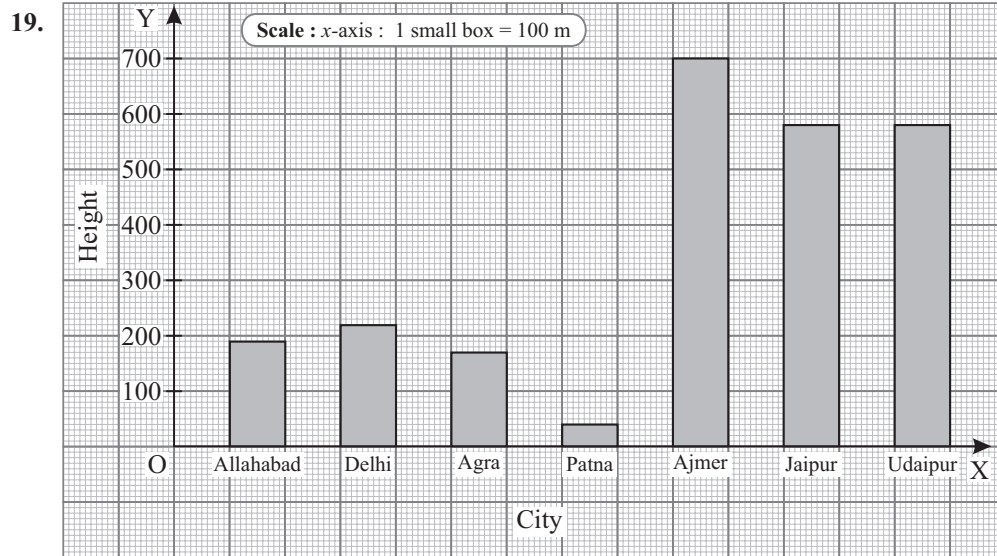
Height of the cylinder = 77 m

$\therefore$  Volume of cylinder =  $\pi r^2 h$

$$= \frac{22}{7} \times \frac{84}{44} \times \frac{84}{44} \times 77$$

$$= \frac{6 \times 84 \times 7}{4}$$

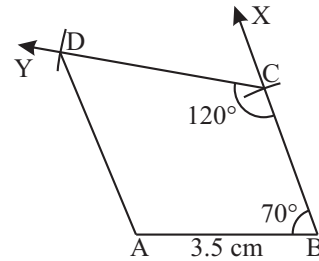
$$= \frac{3528}{4} = 882 \text{ m}^3$$



20. In a dice there are 6 possibilities in one dice.  
So, the total possible outcomes =  $6 \times 6 \times 6 = 216$

21. **Steps of Construction :**

- Draw a line  $AB = 3.5$  cm.
- At point  $B$  on line  $AB$ , draw  $\angle B = 70^\circ$  using a protractor.
- Taking  $B$  as centre and  $BC (= 3$  cm) as radius cut an arc on ray  $BX$  intersecting it at point  $C$ .
- At point  $C$  on line  $BC$ , draw  $\angle C = 120^\circ$  using a protractor.
- Taking  $C$  as centre and  $CD (= 4$  cm) as radius, cut an arc on  $CY$  intersecting it at point  $D$ .
- Join  $AD$  and



The quadrilateral  $ABCD$  is a required quadrilateral.

22. Area of trapezium shaped field =  $480 \text{ m}^2$   
Height = 16 cm  
Length of the one of the parallel side = 20 m  
Let the second of the parallel side be  $x$ .

$$\text{then Area of the trapezium} = \frac{1}{2} \times (\text{one of the parallel side} + n) \times h$$

$$480 = \frac{1}{2} \times (20 + n) \times 16$$

$$480 = 8 \times 20 + 20x$$

$$8x = 480 - 160$$

$$x = \frac{320}{8} = 40$$

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

Hence, the length of the second of the parallel side is 40 m.

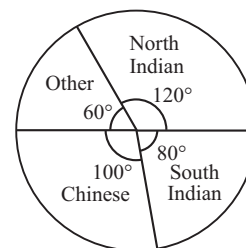
23. Total surface area of a cube =  $96 \text{ m}^2$   
 $6a^2 = 96$   
 $a^2 = \frac{96}{6} = 16$   
 $a = 4 \text{ m}$   
the volume of a cube =  $a^3 = 4 \times 4 \times 4$   
 $= 64 \text{ m}^3$

24. Total number of people = 180  
Central angle for favourite food =  $\left( \frac{\text{Number of people belongs to each choice}}{\text{Total number of people}} \times 360 \right)^\circ$

Favourite food	No. of people	Central angle
North Indian	60	$\left( \frac{60}{180} \times 360 \right)^\circ = 120^\circ$
South Indian	40	$\left( \frac{40}{180} \times 360 \right)^\circ = 80^\circ$
Chinese	50	$\left( \frac{50}{180} \times 360 \right)^\circ = 100^\circ$
Other	30	$\left( \frac{30}{180} \times 360 \right)^\circ = 60^\circ$

#### Construction of pie chart

- Draw a circle of any radius.
- Draw horizontal line as the radius of the circle.
- Starting with this horizontal radius and moving in clockwise direction, 1 form sectors with central angle  $120^\circ$ ,  $80^\circ$ ,  $100^\circ$  and  $60^\circ$  respectively.
- Shade the various sectors with different colours and name them.

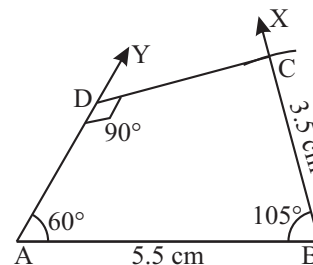


Hence, the required pie chart's constructed.

25. Cost of an A.C. (C.P.) = ₹ 16500  
Rate of VAT = 12%  
 $\therefore \text{VAT} = 12\% \text{ of } ₹ 16500 = ₹ \frac{16500 \times 12}{100} = ₹ 1980$   
So, the chargeable amount = ₹ (16500 + 1980)  
= ₹ 18480.

#### 26. Steps of construction

- Draw a line  $AB = 5.5 \text{ cm}$ .
- At point B on line AB, draw  $\angle B = 105^\circ$  using a protractor.
- Taking B as centre and  $BC (= 3.5 \text{ cm})$  as radius cut an arc on  $BX$  intersecting at C.
- At point A draw  $\angle A = 60^\circ$  using a protractor.



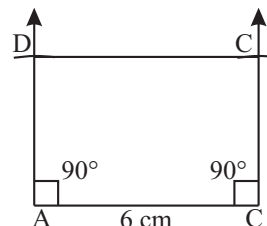
- (v) Now, from point  $C$  draw a perpendicular on the ray  $AY$ . Which cut the ray at  $D$ .  
Hence, the quadrilateral  $ABCD$  is the required quadrilateral.

Or

### Step of Construction

**Note :** In a rectangle, all angles are of  $90^\circ$  and opposite sides are equal.

- (i) Draw a line  $AB = 6$  cm.
- (ii) At point  $A$  and  $B$ ,  
Masks  $ABX = \angle BAY = 90^\circ$   
(using a protractor (or compass).
- (iii) Taking  $B$  as centre and  $BC (= 4$  cm) as radius, drawn an arc on line  $BX$  intersecting it at point  $C$ . Joint  $CB$ .
- (iv) Taking  $A$  as centre and  $AD = 4$  cm ( $\because BC = AD$ ) as radius, draw an arc on  $AY$  intersecting it at  $D$ .
- (v) Now join  $C$  and  $D$ .



This is the required rectangle  $ABCD$ .

27. Top of the trapezium shaped canal = 12 m  
Bottom of the trapezium shaped canal = 8 m  
Let the depth of the cross-section be  $x$ .

$$\text{then Area of trapezium} = \frac{1}{2}(a + b) \times x$$

$$40 = \frac{1}{2}(12 + 8) \times x$$

$$\frac{20}{2}x = 40$$

$$x = \frac{80}{20} = 4$$

$$x = 4 \text{ m}$$

Hence, depth trapezium shaped cross section is 4 m.

28. Perimeter of the floor of a hall = 250 m

Floor is squared shaped

$$\text{then } 4 \times \text{side} = 250$$

$$\text{side} = \frac{250}{4} = 62.5 \text{ m}$$

$\therefore$  Length of the wall = 62.5 m

and Breadth of the wall = 4 m

$$\text{Now, Area of each wall} = \text{length} \times \text{breadth}$$

$$= 62.5 \times 4$$

$$= 250 \text{ m}^2$$

$$\text{Total area of 4 wall} = 250 \text{ m}^2 \times 4$$

$$= 1000 \text{ m}^2$$

then

$\therefore$  Cost of painting for 1 square metre = 12

$\therefore$  Cost of painting for 1000 square metre =  $12 \times 1000$   
 $= 12000 \text{ m}^2$

Reason of Strike	Central Angle	Percentage
a. Accident	60°	$\frac{60}{360} \times 100 = 16.7\%$
b. Rivalary in unions	100°	$\frac{100}{360} \times 100 = 27.8\%$
c. Demands not met	40°	$\frac{40}{360} \times 100 = 11.1\%$
d. Electric failure	50°	$\frac{50}{360} \times 100 = 13.9\%$

30. Number of red ball in the bag = 3

Number of black ball in the bag = 7

Total number of balls in the bag = 3 + 7 = 10

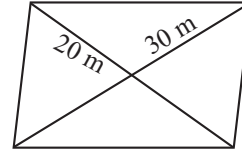
$$(a) \text{ Probability of red ball} = \frac{\text{no. of red ball}}{\text{total no. of balls}} = \frac{3}{10}$$

$$(b) \text{ Probability of black ball} = \frac{\text{no. of black ball}}{\text{total no. of balls}} = \frac{7}{10}$$

31. First diagonal ( $d_1$ ) = 30 m

Second diagonal ( $d_2$ ) = 20 m

$$\begin{aligned} \text{Now, Area of rhombus} &= \frac{1}{2} \times d_1 \times d_2 \\ &= \frac{1}{2} \times 30 \times 20 \\ &= \frac{600}{2} \\ &= 300 \text{ m}^2 \end{aligned}$$



then cost of leveling the 1 square metre ground = ₹ 2

$$\begin{aligned} \therefore \text{ cost of leveling the 300 square metre ground} &= ₹ 2 \times 30 \\ &= ₹ 600 \end{aligned}$$

32. Radius of well = 2 m

Depth of well ( $h$ ) = 14 m

$$\begin{aligned} \text{Volume of the wall} &= \pi r^2 h \\ &= \frac{22}{7} \times 2 \times 2 \times 14 \\ &= 176 \text{ cubic metre} \end{aligned}$$

Now,

$$\therefore \text{ cost of diging 1 m}^3 \text{ well} = ₹ 1.20$$

$$\begin{aligned} \therefore \text{ cost of diging 176 m}^3 \text{ well} &= ₹ 1.20 \times 176 \\ &= ₹ 211.20 \end{aligned}$$

33. (i) Music club is most popular among students.

(ii) Dance club has the minimum number of member, i.e. 20.

(iii) Number of members of science club = 40

Number of members of maths club = 60

Total number of member of science and mathematics =  $40 + 60 = 100$

(iv) 5 clubs are considered in bar graph.

**34.** Volume of a right circular cylinder =  $1,100 \text{ m}^3$

Radius of its base ( $r$ ) = 5 m

$$\therefore \pi r^2 h = 1,100$$

$$\therefore h = \frac{1100 \times 7}{22 \times 5 \times 5} = 14 \text{ m}$$

$$\begin{aligned} \text{Then curved surface area} &= 2 \pi r h \\ &= \frac{2 \times 22 \times 5 \times 14}{7} \\ &= 440 \text{ m}^2 \end{aligned}$$

Hence, the curve surface area =  $440 \text{ m}^2$