EXERCISE 3.1   PAGE: 62

1.   Find the range of heights of any ten students of your class. Solution:-

Let us assume heights (in cm) of 10 students of our class.

= 130, 132, 135, 137, 139, 140, 142, 143, 145, 148

By observing the above mentioned values, the highest value is = 148 cm

By observing the above mentioned values, the lowest value is = 130 cm

Then,

Range of Heights = Highest value – Lowest value

= 148 – 130

= 18 cm

2.   Organise the following marks in a class assessment, in a tabular form. 4, 6, 7, 5, 3, 5, 4, 5, 2, 6, 2, 5, 1, 9, 6, 5, 8, 4, 6, 7

(i) Which number is the highest? (ii) Which number is the lowest?

(iii) What is the range of the data? (iv) Find the arithmetic mean. Solution:-

First, we have to arrange the given marks in ascending order.

= 1, 2, 2, 3, 4, 4, 4, 5, 5, 5, 5, 5, 6, 6, 6, 6, 7, 7, 8, 9

Now, we will draw the frequency table of the given data.

Marks	Tally Marks	Frequency
1			1
2				2
3			1
4					3
5	ΗΗ	5
6						4
7				2
8			1
9			1

(i) By observing the table clearly, the highest number among the given data is 9.
(ii) By observing the table clearly, the lowest number among the given data is 1.

(iii) We know that, Range = Highest value – Lowest value

$$= 9 - 1$$
$$= 8$$

(iv) Now we have to calculate Arithmetic Mean,

Arithmetic mean = (Sum of all observations)/ (Total number of observation)

Then,

Sum of all observation = 1 + 2 + 2 + 3 + 4 + 4 + 4 + 5 + 5 + 5 + 5 + 5 + 6 + 6 + 6 + 6 + 7 + 7

$$+ 8 + 9$$
$$= 100$$

Total Number of Observation = 20

Arithmetic mean = (100/20)

$$= 5$$

3.   Find the mean of the first five whole numbers. Solutions:-

The first five Whole numbers are 0, 1, 2, 3, and 4.

Mean = (Sum of first five whole numbers)/ (Total number of whole numbers)

Then,

Sum of five whole numbers = 0 + 1 + 2 + 3 +4

$$= 10$$

Total Number of whole numbers = 5

Mean = (10/5)

$$= 2$$

∴Mean of first five whole numbers is 2.

4. A cricketer scores the following runs in eight innings:

58, 76, 40, 35, 46, 45, 0, 100. Find the mean score.

Solution:-

Mean score = (Total runs scored by the cricketer in all innings)/ (Total number of innings

Played by the cricketer)

Total runs scored by the cricketer in all innings = 58 + 76 + 40 + 35 + 46 + 45 + 0 + 100

$$= 400$$

Total number of innings = 8

Then,

Mean = (400/8)

$$= 50$$

∴Mean score of the cricketer is 50.

5. Following table shows the points of each player scored in four games:

Player	Game 1	Game 2	Game 3	Game 4
A	14	16	10	10
B	0	8	6	4
C	8	11	Did not Play	13

Now answer the following questions:
(i) Find the mean to determine A's average number of points scored per game.
(ii)   To find the mean number of points per game for C, would you divide the total points by 3 or by 4? Why?
(iii) B played in all the four games. How would you find the mean?

(iv)   Who is the best performer? Solution:-
(i) A's average number of points scored per game = Total points scored by A in 4 games/ Total number of games

= (14 + 16 + 10 + 10)/ 4

= 50/4

= 12.5 points

(ii) To find the mean number of points per game for C, we will divide the total points by 3. Because C played only 3 games.
(iii)   B played in all the four games, so we will divide the total points by 4 to find out the mean.
Then,

Mean of B's score = Total points scored by B in 4 games/ Total number of games
= (0 + 8 + 6 + 4)/ 4
= 18/4
= 4.5 points
(vi) Now, we have to find the best performer among 3 players.
So, we have to find the average points of C = (8 + 11 + 13)/3

= 32/3

= 10.67 points

By observing, the average points scored A is 12.5 which is more than B and C.
Clearly, we can say that A is the best performer among three.

6.   The marks (out of 100) obtained by a group of students in a science test are 85,

76, 90, 85, 39, 48, 56, 95, 81 and 75. Find the:
(i) Highest and the lowest marks obtained by the students.

(ii) Range of the marks obtained.
(iii)   Mean marks obtained by the
group. Solution:-
First we have to arrange the marks obtained by a group of students in a science test in an ascending order,

= 39, 48, 56, 75, 76, 81, 85, 85, 90, 95

(i) The highest marks obtained by the student = 95
    The lowest marks obtained by the student = 39
(ii) We know that, Range = Highest marks – Lowest marks
                               = 95 – 39
                               = 56
(iii)   Mean of Marks = (Sum of all marks obtained by the
                        group of students)/ (Total number of marks)
                 = (39 + 48 + 56 + 75 + 76 + 81 + 85 + 85 + 90 + 95)/ 10

                 = 730/10
                 = 73

7.   The enrolment in a school during six consecutive years was as
follows: 1555, 1670, 1750, 2013, 2540, 2820.
Find the mean enrolment of the school for this period.
Solution:-
Mean enrolment = Sum of all observations/ Number of observations
                 = (555 + 1670 + 1750 + 2013 + 2540 + 2820)/ 6
                 = (12348/6)

                 = 2058

∴The mean enrolment of the school for this given period is 2058.

8. The rainfall (in mm) in a city on 7 days of a certain week was recorded as follows:

Day	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
Rainfall (in mm)	0.0	12.2	2.1	0.0	20.5	5.5	1.0

(i) Find the range of the rainfall in the above data.
(ii) Find the mean rainfall for the week.
(iii)   On how many days was the rainfall less than the mean
rainfall. Solution:-
(i) Range of rainfall = Highest rainfall – Lowest rainfall

$$= 20.5 - 0.0$$

= 20.5 mm

(ii) Mean of rainfall = Sum of all observations/ Number of observation

= (0.0 + 12.2 + 2.1 + 0.0 + 20.5 + 5.5 + 1.0)/ 7

= 41.3/7

= 5.9 mm

(iii)   We may observe that for 5 days i.e. Monday, Wednesday, Thursday, Saturday and Sunday the rainfall was less than the average rainfall.

9.   The heights of 10 girls were measured in cm and the results are as follows: 135, 150, 139, 128, 151, 132, 146, 149, 143, 141.
(i) What is the height of the tallest girl?   (ii) What is the height of the shortest girl?
(iii) What is the range of the data?   (iv) What is the mean height of the girls?

(v) How many girls have heights more than the mean height.
Solution:-
First we have to arrange the given data in an ascending order,

= 128, 132, 135, 139, 141, 143, 146, 149, 150, 151

(i) The height of the tallest girl is 151 cm

(ii) The height of the shortest girl is 128 cm

(iii) Range of given data = Tallest height – Shortest height

= 151 – 128

= 23 cm

(iv) Mean height of the girls = Sum of height of all the girls/ Number of girls

= (128 + 132 + 135 + 139 + 141 + 143 + 146 + 149 + 150 + 151)/ 10

= 1414/10

= 141.4 cm

(v) 5 girls have heights more than the mean height (i.e. 141.4 cm).

EXERCISE 3.2   PAGE: 68

**1.   The scores in mathematics test (out of 25) of 15 students is as
follows: 19, 25, 23, 20, 9, 20, 15, 10, 5, 16, 25, 20, 24, 12, 20
Find the mode and median of this data. Are they same?**
Solution:-
Arranging the given scores in an ascending order, we get
        5, 9, 10, 12, 15, 16, 19, 20, 20, 20, 20, 23, 24, 25,
        25
Mode,

        Mode is the value of the variable which occurs most frequently.
Clearly, 20 occurs maximum number of times.
Hence, mode of the given sores is 20
Median,

        The value of the middle-most observation is called the median of the data.

Here n = 15, which is odd.
Where, n is the number of the students.
∴median = value of ½ (n + 1)th observation.
        = ½ (15 + 1)
        = ½ (16)

        = 16/2

        = 8
Then, value of 8th term = 20
Hence, the median is 20.
Yes, both the values are same.

**2.   The runs scored in a cricket match by 11 players is as
follows: 6, 15, 120, 50, 100, 80, 10, 15, 8, 10, 15
Find the mean, mode and median of this data. Are the three same?**
Solution:-
Arranging the runs scored in a cricket match by 11 players in an ascending order, we get
        6, 8, 10, 10, 15, 15, 15, 50, 80, 100, 120
Mean,

Mean of the given data = Sum of all observations/ Total number of observations
                        = (6 + 8 + 10 + 10 + 15 + 15 + 15 + 50 + 80 + 100 + 120)/ 11
                        = 429/11

= 39

Mode,

Mode is the value of the variable which occurs most frequently.
Clearly, 15 occurs maximum number of times.
Hence, mode of the given sores is 15
Median,
        The value of the middle-most observation is called the median of the data.
Here n = 11, which is odd.

Where, n is the number of the students.

∴median = value of ½ (n + 1)th observation.
        = ½ (11 + 1)
        = ½ (12)
        = 12/2
        = 6

Then, value of 6th term = 15
Hence, the median is 15.
No, these three are not same.

3. The weights (in kg.) of 15 students of a class are:
38, 42, 35, 37, 45, 50, 32, 43, 43, 40, 36, 38, 43, 38, 47

(i) Find the mode and median of this data.

(ii)   Is there more than one
mode? Solution:-
Arranging the given weights 15 students of a class in an ascending order, we get
        32, 35, 36, 37, 38, 38, 38, 40, 42, 43, 43, 43, 45, 47, 50
(i)   Mode and
Median Mode,
        Mode is the value of the variable which occurs most frequently.

Clearly, 38 and 43 both occurs 3 times.
Hence, mode of the given weights are 38 and 43.
Median,
        The value of the middle-most observation is called the median of the data.

Here n = 15, which is odd.

Where, n is the number of the students.
∴median = value of ½ (n + 1)th observation.
        = ½ (15 + 1)
        = ½ (16)

= 16/2

= 8

Then, value of 8th term = 40
Hence, the median is 40.
(ii) Yes, there are 2 modes for the given weights of the students.

4. Find the mode and median of the data: 13, 16, 12, 14, 19, 12, 14, 13, 14 Solution:-

Arranging the given data in an ascending order, we get

= 12, 12, 13, 13, 14, 14, 14, 16, 19
Mode,
    Mode is the value of the variable which occurs most frequently.
Clearly, 14 occurs maximum number of times.
Hence, mode of the given data is 14.
Median,

    The value of the middle-most observation is called the median of the data.
Here n = 9, which is odd.
Where, n is the number of the students.
∴median = value of ½ (9 + 1)th observation.
        = ½ (9 + 1)

        = ½ (10)

        = 10/2
        = 5
Then, value of 5th term = 14
Hence, the median is 14.

5. Tell whether the statement is true or false:
(i) The mode is always one of the numbers in a data. Solution:-
The statement is given above is true.
Because, Mode is the value of the variable which occurs most frequently in the given data.
Hence, mode is always one of the numbers in a data.

(ii) The mean is one of the numbers in a data. Solution:-
The statement is given above is false.
Because, mean is may be or may not be one of the number in a data.

(iii) The median is always one of the numbers in a data. Solution:-

The statement is given above is true.

Because, median is the value of the middle-most observation in the given data while arranged in ascending or descending order.

Hence, median is always one of the numbers in a data

(iv) The data 6, 4, 3, 8, 9, 12, 13, 9 has mean 9.

Solution:-

Mean = Sum of all given observations/ number of observations
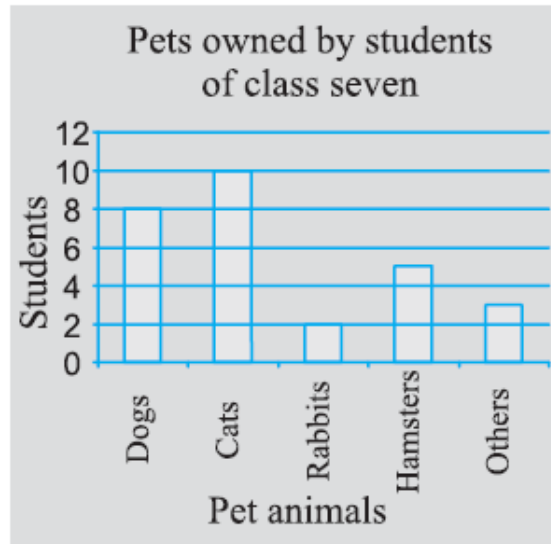
= (6 + 4 + 3 + 8 + 9 + 12 + 13 + 9)/8

= (64/8)

= 8

Hence, the given statement is false.

EXERCISE 3.3   PAGE: 72

1. Use the bar graph (Fig 3.3) to answer the following questions.
(a) Which is the most popular pet? (b) How many students have dog as a pet?

Pets owned by students of class seven

Solution:-
The bar graph represents the pets owned by the students.
(a)   From bar graph, the most popular pet is Cat. It is owned by the 10 students out of 12 students.
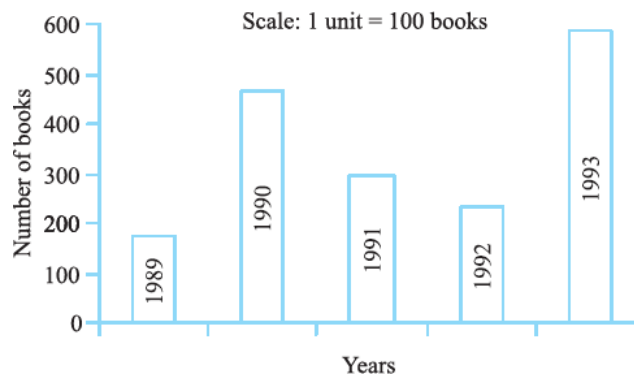(b) From the bar graph, 8 students have dog as a pet out of 12 students.

2.   Read the bar graph (Fig 3.4) which shows the number of books sold by a
bookstore during five consecutive years and answer the following questions:
(i) About how many books were sold in 1989? 1990? 1992?
(ii) In which year were about 475 books sold? About 225 books sold?
(iii) In which years were fewer than 250 books sold?
(iv) Can you explain how you would estimate the number of books sold in 1989?

Solution:-
(i) By observing bar graph,
175 books were sold in the year 1989.
475 books were sold in the year 1990.
225 books were sold in the year 1992.

(ii) By observing bar graph,
475 books were sold in the year 1990.
225 books were sold in the year 1992.

(iii) By observing bar graph,
In the years 1989 and 1992, the number of books sold were less than 250.

(iv) By observing the bar graph, we can conclude that,
The number of books sold in the year 1989 is about 1 and ¾th part of 1 cm.
WKT, Scale is taken as 1 cm = 100 books

$$= 100 + (¾ × 100)$$
$$= 100 + (3 × 25)$$

$$= 100 + 75$$

$$= 175$$

3.   Number of children in six different classes are given below. Represent the data on a bar graph.

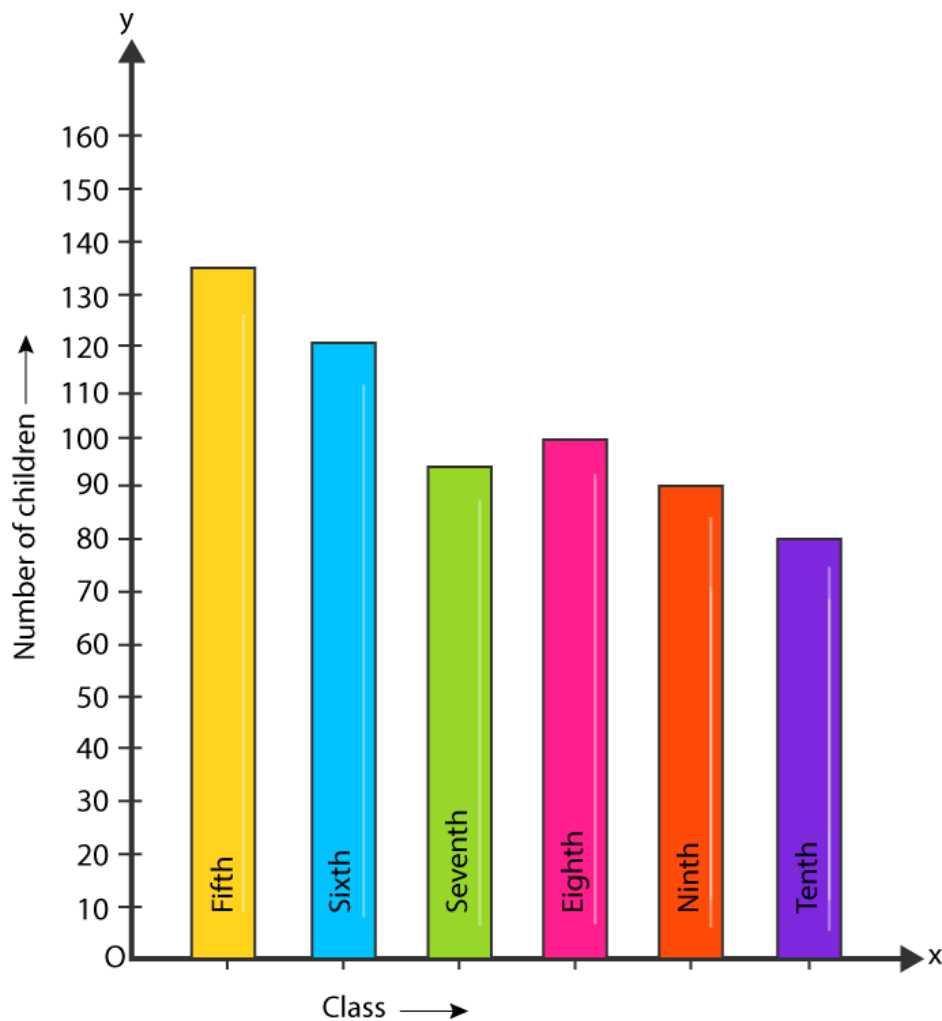| Class	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
Number of Children	135	120	95	100	90	80

(a) How would you choose a scale?
(b) Answer the following questions:
(i) Which class has the maximum number of children? And the minimum?
(ii)   Find the ratio of students of class sixth to the students of class eight. Solution:-

(a)   We will take the scale as 1 unit = 10 children. Because, we can represent a better and clear difference among the number of students of class 7th and class 9th.

(b)   (i) Class 5th has the maximum number of children i.e. 135 and class 7th has the minimum number of children i.e. 95.

(ii) The total number of students in class 6th is 120 and the total number of students in class 8th is 100
Then,
Ratio between the number of students of class 6th and 8th,

        = (120/100)
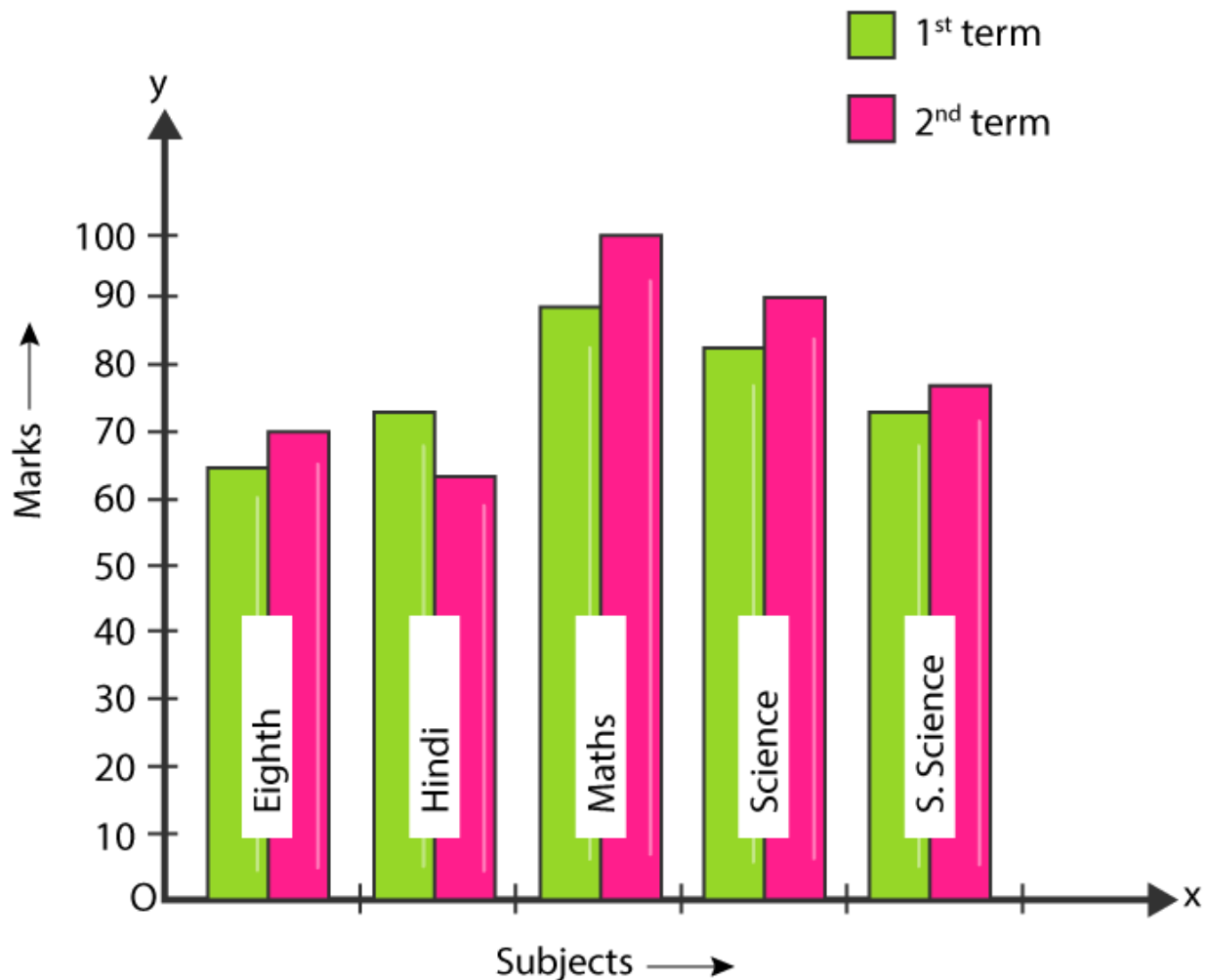   = 6/5

        = 6: 5

4. **The performance of a student in 1st Term and 2nd Term is given. Draw a double bar graph choosing appropriate scale and answer the following:**

Subject	English	Hindi	Maths	Science	S. Science
1st Term (M.M. 100)	67	72	88	81	73
2nd Term (M.M. 100)	70	65	95	85	75

(i) In which subject, has the child improved his performance the most?

(ii) In which subject is the improvement the least?

(iii) **Has the performance gone down in any subject? Solution:-**

(i)   By observing the double bar graph, there was a maximum marks increase in the Maths subject. So, the child has improved his performance in Maths.

(ii) By observing the double bar graph, the improvement was the least in S. Science.

(iii) By observing the double bar graph, the performance In Hindi has gone down.
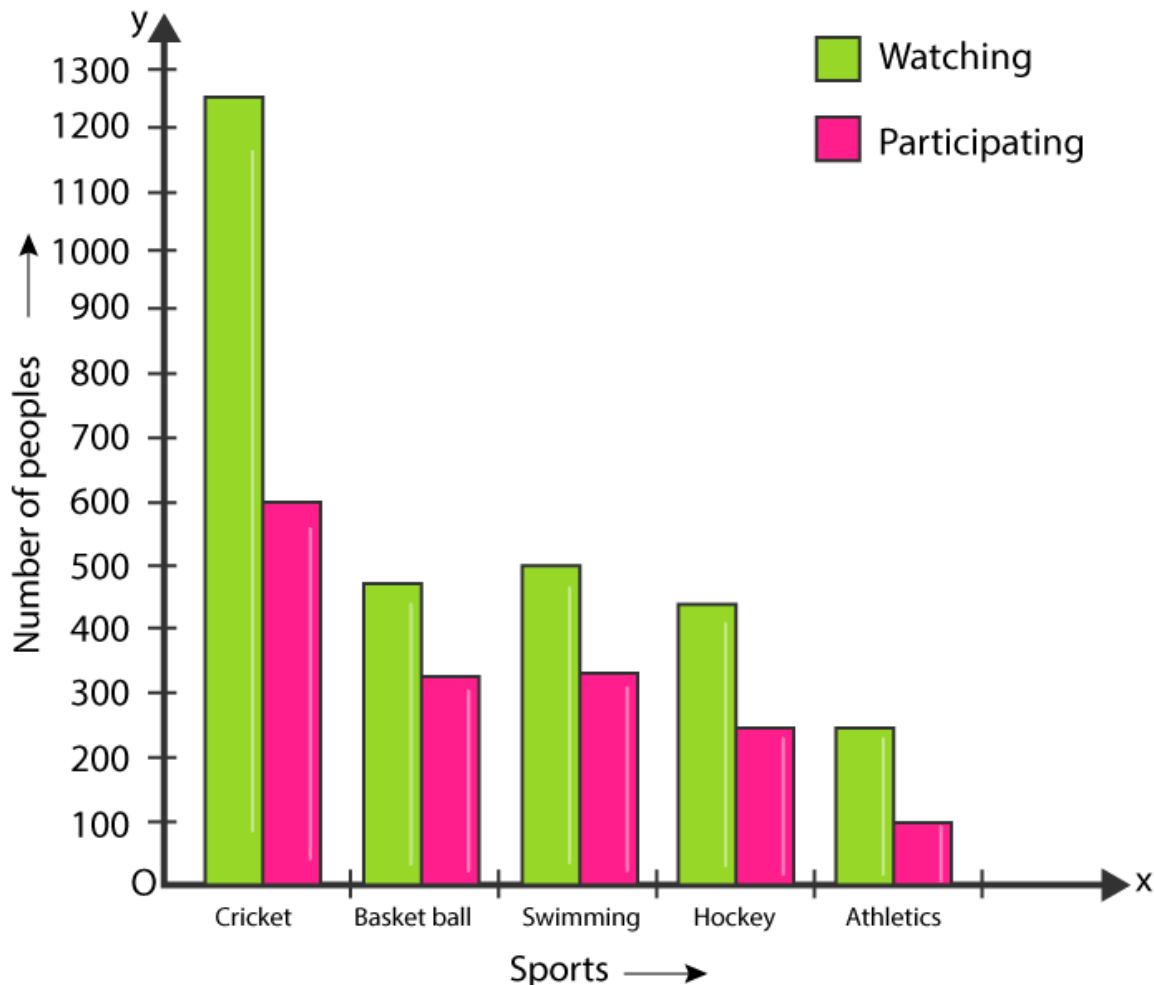
5. Consider this data collected from a survey of a colony.

Favourite Sport	Cricket	Basket Ball	swimming	Hockey	Athletics
Watching	1240	470	510	430	250
Participating	620	320	320	250	105

(i) Draw a double bar graph choosing an appropriate scale. What do you infer from the bar graph?
(ii) Which sport is most popular?
(iii) Which is more preferred, watching or participating in sports? Solution:-

(i)   The fig above is the double bar graph. Which represents the people who prefer either watching or participating in different sports. By observing the double bar graph, we came to conclude that most of the people like watching and participating cricket while least number of people like watching and participating in Athletics.

(ii)   By observing the double bar graph, we came to conclude that the people who like watching and participating in cricket is the tallest among all the bars. So, cricket is the most popular sport.

(iii)   By observing the double bar graph, we came to conclude that watching sports has more preference, rather than participating in sports.

6.   Take the data giving the minimum and the maximum temperature of various cities given in the beginning of this Chapter (Table 3.1). Plot a double bar graph using the data and answer the following:
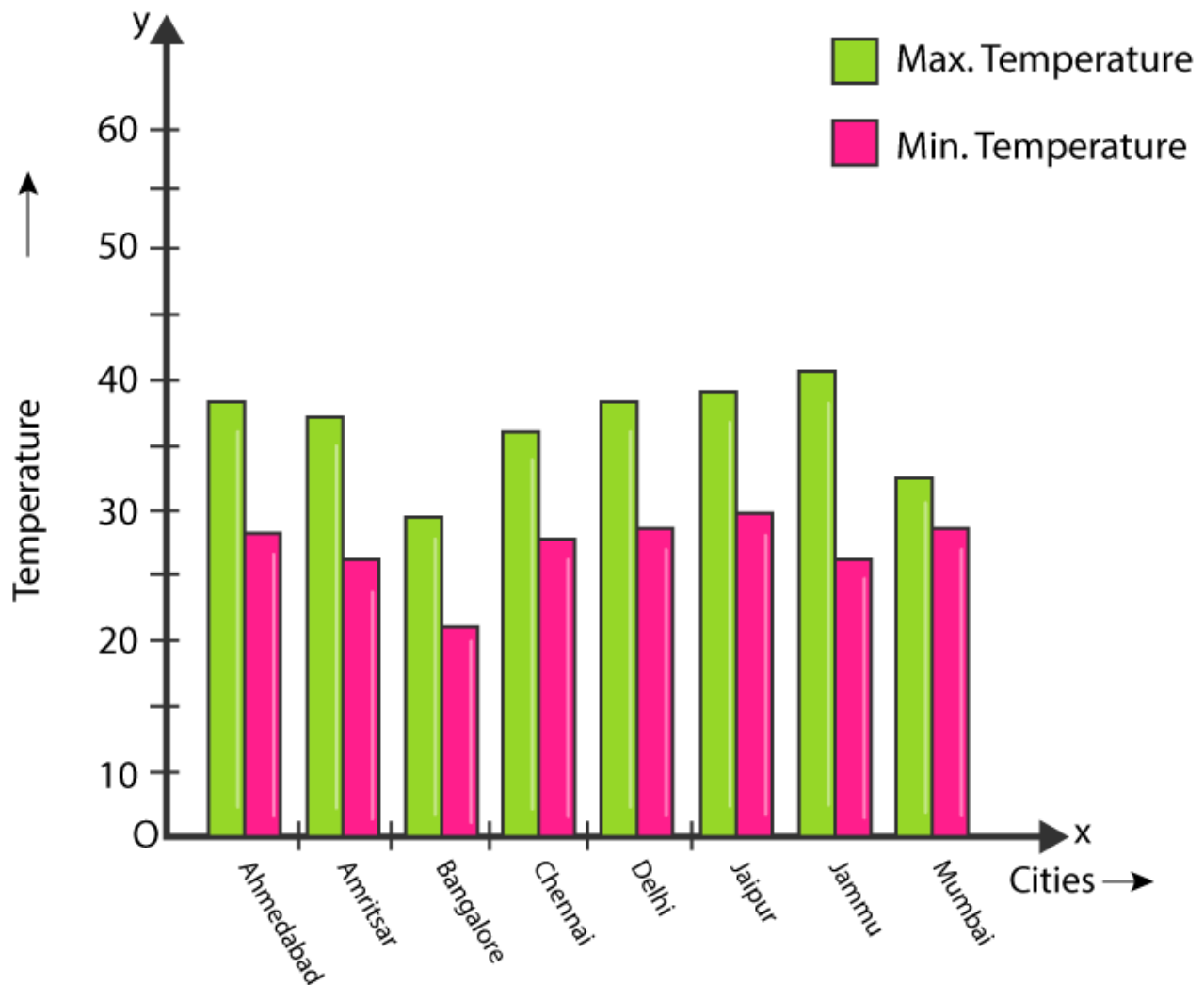**(i)   Which city has the largest difference in the minimum and maximum temperature on the given date?**
(ii) Which is the hottest city and which is the coldest city?

(iii)   Name two cities where maximum temperature of one was less than the minimum temperature of the other.
(iv)   Name the city which has the least difference between its minimum and the maximum temperature.
Solution:-

(i) By observing the double bar graph, we came to conclude that Jammu has the largest difference in the minimum and maximum temperature on 20.6.2006.

(ii)   By observing the double bar graph, we came to conclude that Jammu is the hottest city and Bangalore is the coldest city.

(iii)   By observing the double bar graph, Bangalore and Jaipur, Bangalore and Ahmedabad. For Bangalore, the maximum temperature was 28°C, while minimum temperature of both Ahmadabad and Jaipur was 29°C.

(iv)   By observing the double bar graph, Mumbai has the least difference between its minimum and the maximum temperature.

EXERCISE 3.4   PAGE: 76

1.   Tell whether the following is certain to happen, impossible, can happen but not certain.

(i)   You are older today than yesterday. Solution:-

It is certain to happen.

(ii)   A tossed coin will land heads up. Solution:-

It can happen but not certain.

(iii)   A die when tossed shall land up with 8 on top. Solution:-

It is impossible. Because, there are only six faces on a die is marked as 1, 2, 3, 4, 5, and 6 on it.

(iv)   The next traffic light seen will be green. Solution:-

It can happen but not certain.

(v)   Tomorrow will be a cloudy day. Solution:-

It can happen but not certain.

2. There are 6 marbles in a box with numbers from 1 to 6 marked on each of them.

(i)   What is the probability of drawing a marble with number 2? Solution:-

From the question, it is given that

There are 6 marbles in the box with numbers from 1 to 6 are marked.

Probability of drawing a marble with number 2 = Number of favourable outcomes/

Number of possible outcomes

$$= (1/6)$$

(ii)   What is the probability of drawing a marble with number 5? Solution:-

From the question, it is given that

There are 6 marbles in the box with numbers from 1 to 6 are marked.
Probability of drawing a marble with number 5 = Number of favourable outcomes/
Number of possible outcomes
= (1/6)

3.   A coin is flipped to decide which team starts the game. What is the probability that your team will start?
Solution:-

A coin has two faces one is Head and other one is Tail.
Now, one team can choose either Head or Tail.
Probability of our team starts first= Number of favourable outcomes/
Number of possible outcomes
= ½