3 ■ ■ ■ ■ Data Handling

Learn and Remember

1. The collection of facts which are expressed numerically is called data.
2. Arranging the data in the form of descending and ascending order is called array.
3. Frequency is the number of times a particular observation occurs in a data.
4. Average is a number shows the central tendency of a group of observation or data.
5. Arithmetic mean $= \dfrac{\text{Sum of all observations}}{\text{Number of observations}}$.
6. The mode of a set of observations is the observation that occur most often.
7. Median value which lies in the middle of the data when data are forms in array.
8. A bar graph is a representation of numbers using bar of uniform widths.
9. Double bar graphs help to compare two collection of data at a glance.
10. There are situations in our life, that are certain to happen, some that are impossible and some that may or may not happen. The situation that may or may not happen has a chance of happening.

TEXTBOOK QUESTIONS SOLVED

Exercise 3.1 *(Page No. 62-63)*

Q1. Find the range of heights of any ten students of your class.

Sol. Represent the heights of ten students are in tabular form:

S.No.	Name of students	Heights (feet)
1.	Rashmi	4.2
2.	Jaya	4.5

S.No.	Name of students	Heights (feet)
3.	Pawan	5
4.	Avnish	5.1
5.	Anuj	5.2
6.	Gaurav	5.3
7.	Rakesh	5.1
8.	Prakash	4.7
9.	Hema	4.9
10.	Shanu	4.5

Range = highest height – lowest height

$$= 5.3 - 4.2$$

$$= 1.1 \text{ feet.}$$

Q2. 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.

Sol. Given marks in a class assessment represented by tabular form.

S.No.	Marks	Tally marks	Frequency (Number of students)
1.	1	I	1
2.	2	II	2
3.	3	I	1
4.	4	III	3
5.	5	ʖʖI	5
6.	6	IIII	4
7.	7	II	2
8.	8	I	1
9.	9	I	1

(i) The highest number is 9.

(ii) The lowest number is 1.

(iii) The range of the data is $9 - 1 = 8$.

(iv) Arithmetic mean =

$$\frac{4+6+7+5+3+5+4+5+2+6+2+5+1+9+6+5+8+4+6+7}{20}$$

$$= \frac{100}{20} = 5.$$

Q3. Find the mean of the first five whole numbers.

Sol. We know, the first five whole numbers are 0, 1, 2, 3 and 4.

Now, mean of first five whole numbers = $\dfrac{\text{Sum of numbers}}{\text{Total number}}$

$$= \frac{0+1+2+3+4}{5} = \frac{10}{5} = 2$$

Thus, the mean of first five whole numbers is 2.

Q4. A cricketer scores the following runs in eight innings:

58, 76, 40, 35, 46, 45, 0, 100.

Find the mean score.

Sol. Given runs are 58, 76, 40, 35, 46, 45, 0, 100.

Number of innings = 8.

Now, mean of score = $\dfrac{\text{Sum of scores}}{\text{Number of innings}}$

$$= \frac{58+76+40+35+46+45+0+100}{8}$$

$$= \frac{400}{8} = 50$$

Thus, the mean score is 50.

Q5. 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?**

Sol. (i) Given score in four games by player A are 14, 16, 10 and 10.

$\therefore$ Mean of player A = $\dfrac{\text{Sum of scores by A}}{\text{Number of games played by A}}$

$= \dfrac{14+16+10+10}{4} = \dfrac{50}{4} = 12.5$

Therefore, player A's score mean is 12.5.

(ii) We should divide the total points by 3 because player C played only in three games.

(iii) Player B played in all the four games.

$\therefore$ Mean of player B = $\dfrac{0+8+6+4}{4} = \dfrac{18}{4} = 4.5$.

(iv) To find the best performer, first we calculate the mean of all players.

Mean of player A = 12.5   (From (i) part)

Mean of player B = 4.5   (From (iii) part)

Now, mean of player C = $\dfrac{8+11+13}{3} = \dfrac{32}{3} = 10.67$.

Therefore, on comparing the means, player A is the best performer.

Q6. 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.**

Sol. Given marks of students in a science test are

85, 76, 90, 85, 39, 48, 56, 95, 81 and 75.

(i) Highest marks obtained by the student = 95

Lowest marks obtained by the student = 39

(ii) Range of the marks = highest marks – lowest marks

$= 95 - 39 = 56$

(iii) Mean of obtained marks = $\dfrac{\text{Sum of marks}}{\text{Total number of marks}}$

$= \dfrac{85+76+90+85+39+48+56+95+81+75}{10}$

$= \dfrac{730}{10} = 73$

Thus, mean marks obtained by the group of students is 73.

Q7. 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.

Sol. Numbers of enrolment of a school are

1555, 1670, 1750, 2013, 2540, 2820.

$\therefore$ Mean enrolment = $\dfrac{\text{Sum of the numbers of enrolment}}{\text{Total numbers of enrolment}}$

$= \dfrac{1555+1670+1750+2013+2540+2820}{6}$

$= \dfrac{12,348}{6} = 2,058$

Thus, the mean enrolment of the school is 2,058.

Q8. 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.**

Sol. (i) The range of the rainfall = Highest rainfall – Lowest rainfall

$= (20.5 - 0.0)$ mm $= 20.5$ mm

Thus, range of the rainfall is 20.5 mm.

(ii) Mean rainfall = $\dfrac{\text{Sum of rainfall recorded}}{\text{Total number of days}}$

$= \dfrac{0.0 + 12.2 + 2.1 + 0.0 + 20.5 + 5.5 + 1.0}{7}$

$= \dfrac{41.3}{7}$ mm = 5.9 mm

Thus, the mean rainfall is 5.9 mm for the week.

(iii) 5 days i.e., Mon, Wed, Thurs, Sat and Sun rainfalls were less than the mean rainfall.

Q9. 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?

Sol. The heights (in cm) of 10 girls are

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

  (i) The height of the tallest girl = 151 cm.

  (ii) The height of the shortest girl = 128 cm.

  (iii) The range of the data = heighest height – lowest height

$= 151 - 128 = 23$ cm

  (iv) The mean height = $\dfrac{\text{Sum of heights of the girls}}{\text{Total number of girls}}$

$= \dfrac{135 + 150 + 139 + 128 + 151 + 132 + 146 + 149 + 143 + 141}{10}$

$= \dfrac{1414}{10}$ cm = 141.4 cm

Thus, 141.4 cm is the mean height of the girls.

  (v) Five girls i.e., 150, 151, 146, 149, 143 have heights (in cm) more than the mean height.

Exercise 3.2 (Page No. 68)

Q1. 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?

Sol. Arranging the data in ascending order. We get,

5, 9, 10, 12, 15, 16, 19, 20, 20, 20, 20, 23, 24, 25, 25.

Mode is the observation occurred the highest number of times.

Therefore, mode = 20.

Median is the middle observation.

Therefore, median = 20.

Yes, mode and median are same of given observations.

Q2. 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?

Sol. First we arrange the given data in ascending order.

We get,

6, 8, 10, 10, 15, 15, 15, 50, 80, 100, 120

Mean = $\dfrac{\text{Sum of observations}}{\text{Number of observations}}$

$= \dfrac{6 + 8 + 10 + 10 + 15 + 15 + 15 + 50 + 80 + 100 + 120}{11}$

$= \dfrac{429}{11} = 39$

Therefore, the mean of the observations is 39.

Mode is the observation occurred the highest number of times.

∴ Mode = 15

Median is the middle observation.

∴ Median = 15.

Therefore, mode and median is 15.

No, the three are not same.

Q3. 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?

Sol. We arrange the given data in ascending order:

32, 35, 36, 37, 38, 38, 38, 40, 42, 43, 43, 43, 45, 47, 50

(i) Mode is the observation occurred the highest number of times.

∴ Mode = 38 and 43.

Median is the middle observation.

∴ Median = 40.

(ii) Yes, there are 2 modes.

Q4. Find the mode and median of the data:

13, 16, 12, 14, 19, 12, 14, 13, 14.

Sol. Arranging the given data in ascending order:

12, 12, 13, 13, 14, 14, 14, 16, 19

∴ Mode = 14   (Here '14' occurred the highest number of times.)

∴ Median = 14   (Middle observation.)

Q5. Tell whether the statement is true or false:

(i) The mode is always one of the numbers in a data.

(ii) The mean is one of the number in a data.
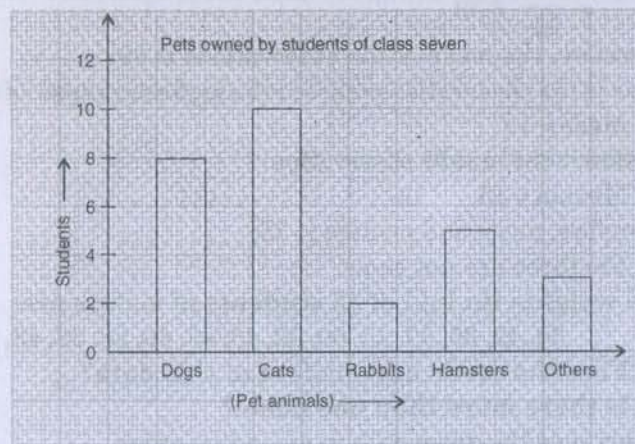
(iii) The median is always one of the numbers in a data.

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

Sol. (i) True   (ii) False   (iii) True   (iv) False.

Exercise 3.3 *(Page No. 72-73)*

Q1. Use the bar graph to answer the following questions.
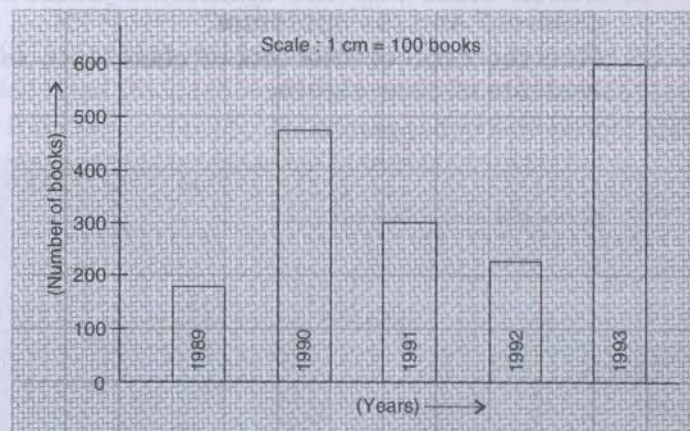

(a) Which is the most popular pet?

(b) How many students have dog as a pet?

Sol. (a) Cat is the most popular pet.

(b) 8 students have dog as a pet.

Q2. Read the bar graph 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?

Sol. According to the given bar graph:

(i) (a) In 1989, 180 books were sold,

(b) In 1990, 475 books were sold and

(c) In 1992, 225 books were sold.

(ii) In 1990 year, about 475 books were sold and in 1992 year, about 225 books were sold.

(iii) In 1989 and 1992 year fewer than 250 books were sold.

(iv) By reading the graph we calculate that 180 books were sold in 1989.

Q3. 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 eighth.

**Sol.** Data represented by bar graph:
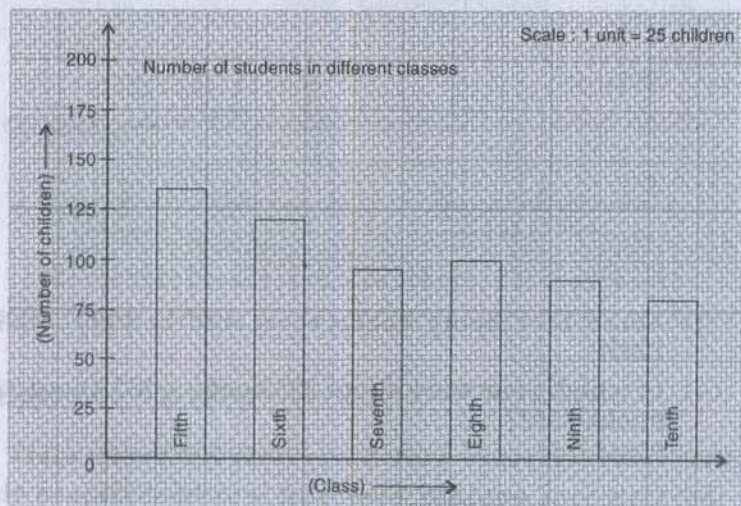
(a) Scale: 1 unit = 25 children.

(b) (i) Fifth class has the **maximum number** of children and tenth class has the **minimum number** of children.

    (ii) Ratio $= \dfrac{\text{Number of students in class sixth}}{\text{Number of students in class eighth}} = \dfrac{120}{100}$

$$= \frac{6}{5} = 6 : 5.$$

Q4. 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?

Sol. Data represented by double bar graph:
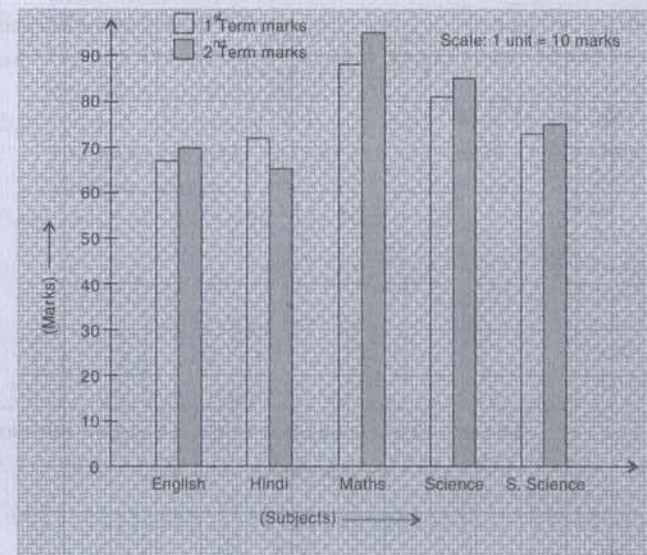
Find the difference of marks of 1st Term and 2nd Term

English $= 70 - 67 = 3$,   Hindi $= 65 - 72 = -7$

Maths $= 95 - 88 = 7$,   Science $= 85 - 81 = 4$

S. Science $= 75 - 73 = 2$

    (i) He has most improved in Maths subject.

    (ii) In S. Science subject, his improvement is less.

   (iii) Yes, in Hindi subject, his performance has gone down.

Q5. Consider this data collected from a survey of a colony.

Favourite Sport	Cricket	Basket ball	Swimming	Hockey	Athletics
Watching	1240	470	510	423	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?**

Sol. Data represented by the double bar-graph:
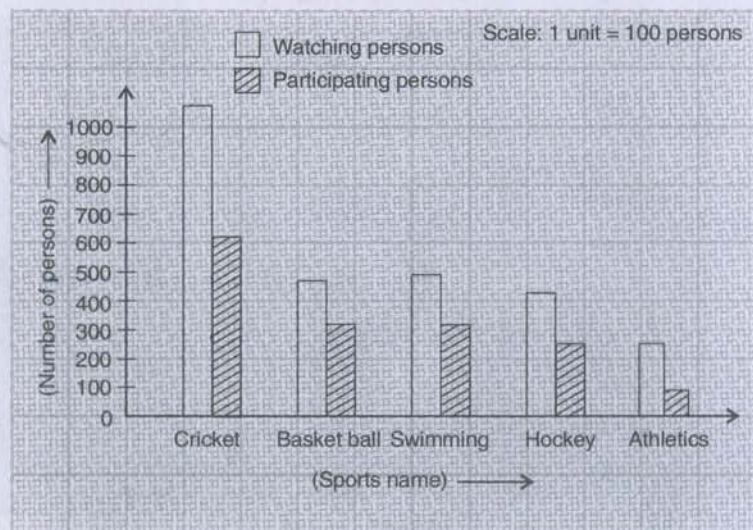
(i) This bar graph represent the number of persons whose are watching and participating in their favourite sports.

(ii) Cricket is most popular.

(iii) Watching sports is more preferred.

Q6. 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:

Temperatures of Cities as on 20.6.2006

City	Ahmedabad	Amritsar	Bangalore	Chennai
Max.	38°C	37°C	28°C	36°C
Min.	29°C	26°C	21°C	27°C
City	Delhi	Jaipur	Jammu	Mumbai
Max.	38°C	39°C	41°C	32°C
Min.	28°C	29°C	26°C	27°C

(i) **Which city has the largest difference in the minimum and maximum temperature on the given data?**

(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.**

Sol. Data represented by double bar graph:
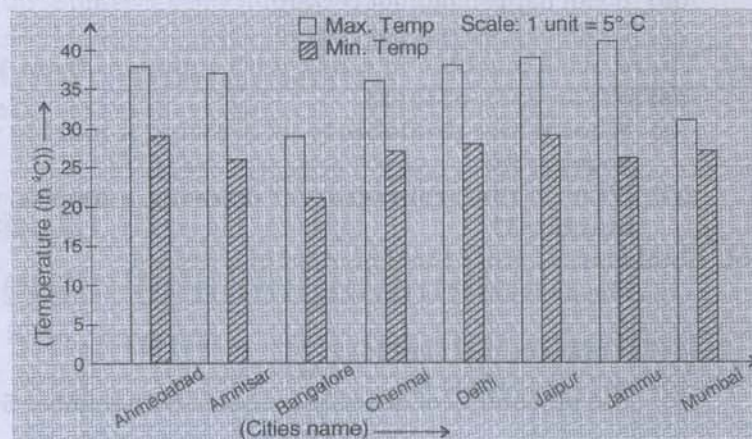
By reading the bar graph:

(i) Jammu has the largest difference in temperature i.e., Maximum temperature = 41°C and minimum temperature = 26°C

∴ Difference = 41°C − 26°C = (41 − 26)°C = 15°C.

(ii) Jammu is the hottest city due to maximum temperature is high and Bangalore is the coldest city due to maximum temperature is low.

(iii) Maximum temperature of Bangalore = 28°C.

Minimum temperature of two cities whose minimum temperature is higher than the maximum temperature of Bangalore are Ahmedabad and Jaipur = 29°C.

(iv) Mumbai has the least difference in temperature i.e., maximum temperature = 32°C and minimum temperature = 27°C

∴ Difference = 32°C – 27°C

$$= (32 - 27)°C = 5°C.$$

Exercise 3.4 (Page No. 76)

Q1. Tell whether the following is certain to happen, impossible can happen but not certain.

   (i) You are older today than yesterday.

  (ii) A tossed coin will land heads up.

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

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

  (v) Tomorrow will be a cloudy day.

Sol.   (i) It is certain to happen.

    (ii) It can happen but not certain.

  (iii) It is impossible.

  (iv) It can happen but not certain.

   (v) It can happen but not certain.

Q2. 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?

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

Sol. Total marbles from 1 to 6 marked in a box = 6

   (i) The probability of drawing a marble with number 2

$$P(\text{drawing one marble}) = \frac{1}{6}.$$

  (ii) The probability of drawing a marble with number 5

$$P(\text{drawing one marble}) = \frac{1}{6}.$$

Q3. A coin is flipped to decide which team starts the game. What is the probability that your team will start?

Sol. A coin has two possible outcomes Head and Tail.

Probability of getting Head or Tail is equal.

So, probability (starting game) $= \frac{1}{2}.$

□□