Chapter 17

Data Handling

Question 1.
The number of rooms in 25 houses of a locality is as given below:
4, 3, 2, 6, 4, 3, 2, 1, 5, 3, 2, 3, 4, 3, 5, 1, 6, 1, 3, 4, 2, 3, 4, 3, 5
(i) Arrange the above data in ascending order.
(ii) Find the range of the data.
(iii) Construct a frequency distribution table for the above data.
(iv) Find the number of houses which have 4 or more than 4 rooms.
(v) Drawbar graph to represent the above data.
Solution:

(i) Arranging the given data in ascending order,

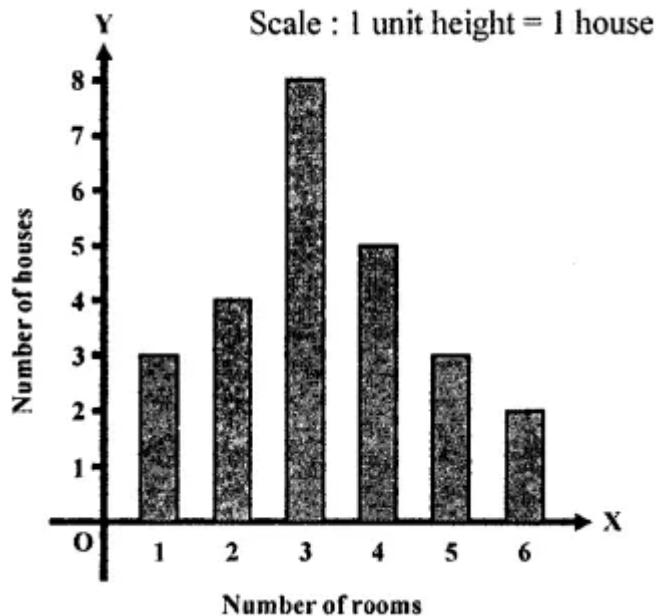(ii) Smallest data = 1 and highest data = 6

Range = 6 – 1 = 5

(iii) Frequency table of the given data is given below:

Number of rooms	Tally marks	Number of houses (Frequency)
1	III	3
2	IIII	4
3	ℍℍ III	8
4	ℍℍ	5
5	III	3
6	II	2
Total		25

(iv) Number of houses which have 4 or more rooms = 5 + 3 + 2= 10
(v) The bar graph showing the given data.

Scale : 1 unit height = 1 house

Number of houses (Y-axis)
Number of rooms (X-axis)

Question 2.
The given bar graph shows the number of books sold by a bookstore for five consecutive years. Read the bar graph and answer the following questions:
(i) About how many books were sold in 2008, 2009 and 2011 years?
(ii) In which years were about 475 books and 225 books sold?

Scale: 1 cm = 100 books

Number of books sold (Y-axis)
Years (X-axis)

Solution:

Given figure shows the number of books sold by a bookstore during 5 consecutive years.

(i) Number of books sold in 2008 = 140

Number of books sold in 2009 = 360

Number of books sold in 2011 = 180

(ii) In the year 2012, 475 books were sold and in 2010, 225 books were sold.

Question 3.

Two hundred students of 6th and 7th class were asked to name their favorite colour so as to decide upon what should be the colour of their school building. The results are shown in the following table:

Favourite colour	Red	Green	Blue	Yellow	Orange
Number of students	43	19	55	49	34

Represent the given data on a bar graph.

Answer the following questions with the help of the bar graph:

(i) Which is the most preferred colour?

(ii) Which is the least preferred colour?

(iii) How many colors are there in all? What are they?

Solution:

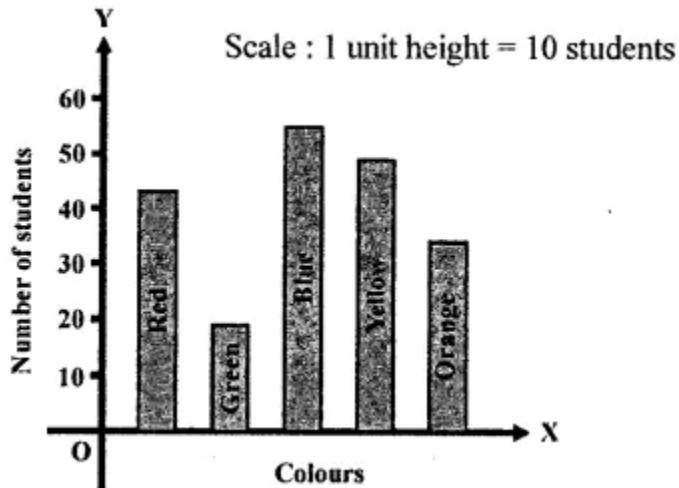Number of total students 43 + 19 + 55 + 49 + 34 = 200

Favourite colour	Red	Green	Blue	Yellow	Orange
Number of students	43	19	55	49	34

Bar graph:

(i) Blue colour.

(ii) Green colour.

(iii) 5 colours : red, green, blue, yellow and orange.

Y

60

50

40

30

20

10

Number of students

Red

Green

Blue

Yellow

Orange

O

Colours

X

Question 4.
Sale of English and Hindi books in four consecutive years is given below:

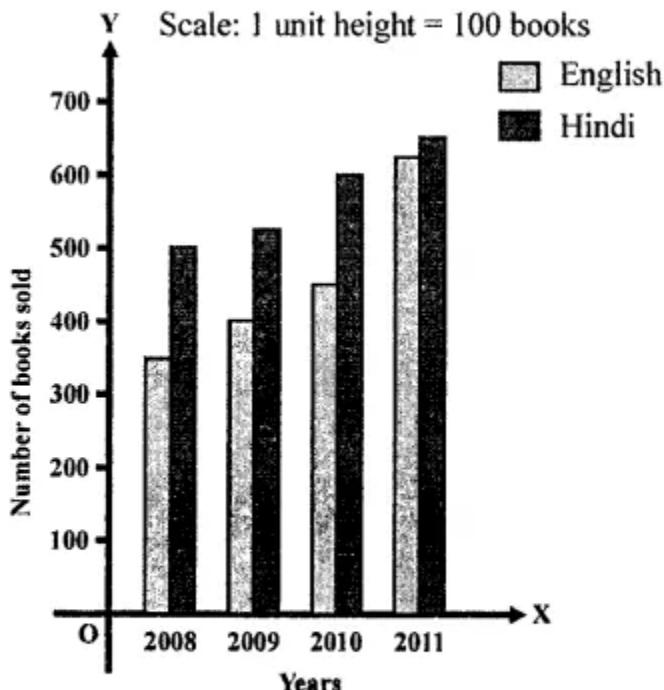| Years	2008	2009	2010	2011
English	350	400	450	620
Hindi	500	525	600	650

Draw a double bar graph to represent the above data and answer the following questions:
(i) In which year was the difference in the sale of two language books least?
(ii) Can you say that the demand for English books rose faster? Justify your answer.
Solution:

Years	2008	2009	2010	2011
English	350	400	450	620
Hindi	500	525	600	650

The bar graph is drawn as given below:

Scale: 1 unit height = 100 books

(i) In 2011 the difference is 650 − 620 = 30 which is least.
(ii) Yes, the increase in the sale of English books = 620 − 350 = 170
and increase in sale of Hindi books = 650 − 500 = 150

Question 5.
Consider the following data collected from a survey of a colony:

Favourite sport	Cricket	Basketball	Swimming	Hockey	Athletics
Watching	1240	470	510	430	250
Participating	620	320	320	250	110

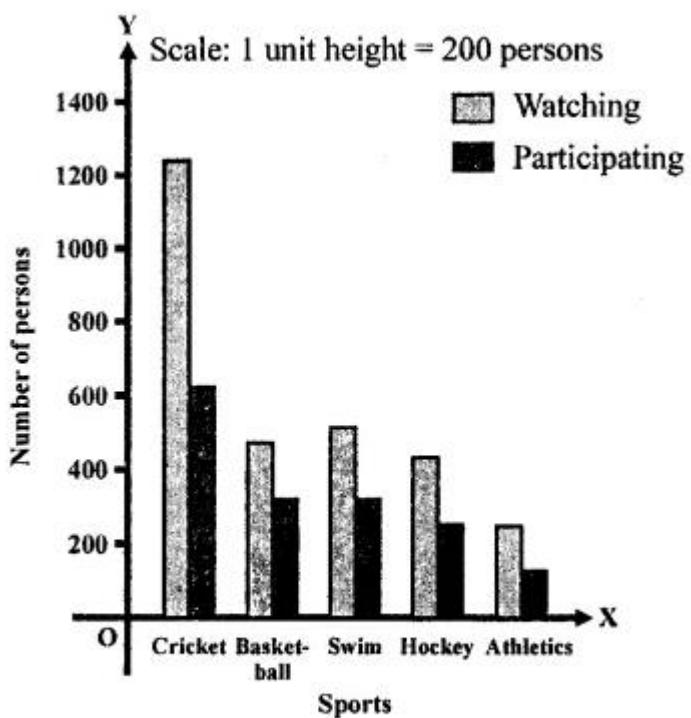Draw a double bar graph choosing an appropriate scale.
Answer the following questions using the bar graph:
(i) Which sports is most popular?
(ii) Which is more preferred, watching or participating in sports?
Solution:

Favourite sport	Cricket	Basketball	Swimming	Hockey	Athletics
Watching	1240	470	510	430	250
Participating	620	320	320	250	110

Bar graph is drawn as given below:

(i) Cricket is the most popular sports.

(ii) Watching is more preferred.

Question 1.
Find the mean of the following data:
(i) 40, 30, 30, 0, 26, 60
(ii) 3, 5, 7, 9, 11, 13, 15
Solution:

(i) Mean of 40, 30, 30, 0, 26, 60

No. of data (n) = 6

$$\therefore \text{Mean} = \frac{40+30+30+0+26+60}{6} = \frac{186}{6} = 31$$

(ii) Mean of 3, 5, 7, 9, 11, 13, 15

No. of data = 7

$$\therefore \text{Mean} = \frac{3+5+7+9+11+13+15}{7} = \frac{63}{7} = 9$$

Question 2.
Find the mean of the first five whole numbers.
Solution:

First 5 whole numbers are 0, 1, 2, 3, 4

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

Question 3.
A batsman scored the following number of runs in six innings:
36, 35, 50, 46, 60, 55
Calculate the mean runs scored by him in an inning.
Solution:

In six innings, run scored was 36, 35, 50, 46, 60, 55

$$\therefore \text{Mean} = \frac{36+35+50+46+60+55}{6} = \frac{282}{6} = 47$$

Question 4.
The enrolment in a school for six consecutive years was as follows:
1555, 1670, 1750, 2013, 2540, 2825
Find the mean enrolment of the school for this period.

Solution:

Enrolment for 6 consecutive years is 1555, 1670, 1750, 2013, 2540, 2825

$$\therefore \text{Mean} = \frac{1555 + 1670 + 1750 + 2013 + 2540 + 2825}{6}$$

$$= \frac{12353}{6} = 2058.83 = 2059$$

Question 5.
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, 75
Find the:
(i) highest and lowest marks obtained by the students.
(ii) range of the marks obtained.
(iii) mean marks obtained by the students.
Solution:

Marks obtained by a group of students in science test

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

(i) Highest marks obtained = 95

Lowest marks = 39

(ii) Range of marks = 95 − 39 = 56

(iii) Mean marks

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

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

Question 6.
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 mean height of the girls?
(iv) How many girls have heights more than the mean height?

Solution:

Heights of 10 girls (in cm)

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

(i) Height of the tallest girls is 151 cm.

(ii) Height of the shortest girls = 128 cm.

(iii) Mean height of the girls $= \dfrac{135+150+139+138+151+132+146+149+143+141}{10}$

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

(iv) The number of girls whose height is more than mean height = 5.

Question 7.
If the arithmetic mean of 8, 4, 6, x, 2, 7 is 5, then find the value of x.

Solution:

8, 4, 6, x, 2, 7

Arithmetic mean = 5

$$\text{Mean} = \dfrac{8+4+6+x+2+7}{6} = \dfrac{27+x}{6}$$

$\therefore \dfrac{27+x}{6} = 5 = 27 + x = 30$

$\Rightarrow x = 30 - 27 = 3$

$\therefore x = 3$

Question 8.
Find the mean of the following data:

Marks obtained	2	3	4	7	10
Number of students	3	2	6	7	2

Solution:

Marks (x_1)	Number of students (f_1)	$f_1 \times x_1$
2	3	6
3	2	6
4	6	24
7	7	49
10	2	20
Total	20	105

$$\text{Mean} = \frac{\Sigma f_1 \times x_1}{\Sigma f_1} = \frac{105}{20} = 5.25$$

Exercise 17.3

Question 1.
Find the median of the following data:
(i) 3, 1, 5, 6, 3, 4, 5
(ii) 3, 1, 5, 6, 3, 4, 5, 6
Solution:

(i) 3, 1, 5, 6, 3, 4, 5

Arranging in ascending order, 1, 3, 3, 4, 5, 5, 6

Here, N = 7 which is odd

Median = $\frac{7+1}{2}$ th term = 4th term = 4

(ii) 3, 1, 5, 6, 3, 4, 5, 6

Arranging in ascending order, 1, 3, 3, 4, 5, 5, 6, 6

Here, N = 8 which is even

$$\therefore \text{ Median} = \frac{1}{2}\left[\frac{n}{2}\text{th term} + \left(\frac{n}{2}+1\right)\text{th term}\right]$$

$$= \frac{1}{2}\left[\frac{8}{2}\text{th term} + \left(\frac{8}{2}+1\right)\text{th term}\right]$$

$$\therefore = \frac{1}{2}[\text{4th} + \text{5th}]\text{ term}$$

$$= \frac{1}{2}(4+5) = \frac{9}{2} = 4.5$$

Question 2.
Find the mode of the following data:
(i) 3, 1, 5, 6, 3, 4, 5, 3
(ii)

Marks obtained	15	17	20	22	25
Number of students	6	17	12	18	13

Solution:
(i) 3, 1, 5, 6, 3, 4, 5, 3
Arranging in order, 1, 3, 3, 3, 4, 5, 5, 6
Here, 3 comes maximum times
Mode = 3
(ii)

Marks obtained	15	17	20	22	25
Number of students	6	17	12	18	13

Here, 22 comes maximum times
Mode = 18

Question 3.
Find the median and the mode of the data:
13, 16, 12, 14, 19, 12, 14, 13, 14
Solution:
13, 16, 12, 14, 19, 12, 14, 13, 14
Arranging in ascending order, 12, 12, 13, 13, 14, 14, 14, 16, 19
(i) Median = $\frac{9+1}{2}$ th = $\frac{10}{2}$ th = 5th term = 14
(Here n = 9 which is odd)
(ii) 14 comes maximum times
Mode = 14

Question 4.
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:
19, 25, 23, 20, 9, 20, 15, 10, 5, 16, 25, 20, 24, 12, 20
Arranging in ascending order, 5, 9, 10, 12, 15, 16, 19, 20, 20, 20, 20, 23, 24, 25, 25
Here, N = 15 which is odd

(i) Median = $\frac{15+1}{2}$ th term = 8th term = 20

Mode = 20 comes maximum times

Mode = 20

Yes, they are same.

Question 5.
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 median and mode of this data.
(ii) Is there more than one mode?
Solution:

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

Arranging in ascending order, 32, 35, 36, 37, 38, 38, 38, 40, 42, 43, 43, 43, 45, 47, 50

Here n = 15 which is odd

Median = $\frac{15+1}{2}$ th = 8th term = 40

Mode : 38 and 43 have come maximum times

Mode is 38 or 43

Yes, there is more than one mode : 38 and 43

Question 6.
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:

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

Arranging in ascending order, 6, 8, 10, 10, 15, 15, 15, 50, 80, 100, 120

Here n = 11 which is odd

$$(i)\ \text{Mean} = \frac{6+8+10+10+15+15+15+50+80+100+120}{11}$$

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

(ii) Median = $\frac{11+1}{2}$ th term = 6 th term = 15

(iii) Mode : 15 comes maximum times

Mode = 15

No, the three are not same, only median and mode are same.

Question 7.
Find the mode of the following data:
12, 14, 12, 15, 16, 13, 14, 18, 19, 12, 14, 15, 16, 15, 16, 16, 15, 17, 13, 16, 16, 15, 15, 13, 15, 17, 15, 14, 15, 13, 15, 14.

Solution:

Number	Tally marks	Frequency
12	III	3
13	IIII	4
14	ℍℍ	5
15	ℍℍ ℍℍ	10
16	ℍℍ I	6
17	II	2
18	I	1
19	I	1

We see that the frequency of 15 is the maximum.

Mode = 15

Exercise 17.4

Question 1.
Tell whether the following is certain to happen, impossible to happen, can happen but not certain:
(i) You are older today than yesterday.
(ii) Two hundred people can sit in a Maruti car.
(iii) A tossed coin will land heads up.
(iv) A die when tossed shall land up with 8 on top.
(v) India will win the next test series.
(vi) Tomorrow will be a cloudy day.
(vii) The next traffic light seen will be green.
Solution:
(i) Certain to happen.

(ii) Impossible, as two hundred can't sit in a car.

(iii) It can happen but not certain.

(iv) Impossible as a die has 1 to 6 marks.

(v) It can happen but not certain.

(vi) It can happen but not certain.

(vii) It can happen but not certain.

Question 2.
A coin is flipped to decide which team starts the game. What is the probability that your team will start the game?
Solution:
A coin is flipped to decide which team starts the game (A coin has two sides)

Possibility (P) = $\frac{1}{2}$

Question 3.
There are 6 marbles in a box with numbers 1 to 6 marked on them.
(i) What is the probability of drawing a marble with number 5?
(ii) What is the probability of drawing a marble with number 2?
Solution:
Number of total marbles with number 1 to 6

(i) Probability of drawing marble of getting number 5 = $\frac{1}{6}$

(ii) Probability of drawing a marble of getting number 2 = $\frac{1}{6}$.

Question 4.
A die is tossed once. Find the probability of getting
(i) a number less than 3
(ii) a prime number
(iii) a number greater than 2
Solution:

A die is tossed once

Total number of favourable outcome = 6

(i) Probability of getting a number less than three

$(1, 2) = \frac{2}{6} = \frac{1}{3}$

(ii) Probability of getting a prime number $(2, 3, 5) = \frac{3}{6} = \frac{1}{2}$

(iii) Probability of getting a number greater than 2 $(3, 4, 5, 6) = \frac{4}{6} = \frac{2}{3}$

Question 5.
A box contains 3 defective mangoes and 21 good mangoes. One mango is drawn from the box at random. Find the probability of getting
(i) a defective mango
(ii) a good mango
Solution:

In a box, there are 3 defective mangoes and 21 good mangoes.

Total mangoes = 3 + 21 = 24

One mango is drawn at random, then

(i) Probability of a defective mango = $\frac{3}{24} = \frac{1}{8}$

(ii) Probability of a good mango = $\frac{21}{24} = \frac{7}{8}$

Question 6.
A card is drawn from a well-shuffled pack of 52 playing cards. Find the probability of getting
(i) a red card
(ii) a king
(iii) a card of spades

Solution:

Number of playing cards = 52

In which 13 cards are of each suit and number suit is 4.

There are two colour: Red and Black.

Now one card is drawn at random:

(i) Probability of being a red card = $\frac{26}{52} = \frac{1}{2}$

(ii) Probability of being a king = $\frac{4}{52} = \frac{1}{13}$ (There are 4 cards of king)

(iii) Probability of being a card of spades = $\frac{13}{52} = \frac{1}{4}$

Objective Type Questions

Question 1.
Fill in the blanks:
(i) The number of times a particular observation occurs in a data is called ………. of that observation.
(ii) The frequency of 9 is written symbolically as ………. using tally marks.
(iii) In a bar graph, the height (or length) of a bar is equal to or proportional to the frequency of the ……….
(iv) Double bar graphs help us in comparing two ……….. at a glance.
(v) The most common representative value of a statistical data is the ……….. of the data.
(vi) Mode of a data is the observation which occurs …………. number of times in the given data.
(vii) The arithmetic mean of first 10 natural numbers is ……….
(viii) When a die is rolled, the probability of getting a number more than 5 is ………..
(ix) The probability of an ………. event is 0.
(x) The probability of a …………. event is 1.
(xi) Median is one of the observations is the data if the number of observations is ………..
Solution:

(i) The number of times a particular observation occurs in a data is called frequency of that observation.

(ii) The frequency of 9 is written symbolically as IIII using tally marks.

(iii) In a bar graph, the height (or length) of a bar is equal to or proportional to the frequency of the corresponding observation.

(iv) Double bar graphs help us in comparing two collection data at a glance.

(v) The most common representative value of statistical data is the arithmetic mean of the data.

(vi) Mode of a data is the observation which occurs a maximum number of times in the given data.

(vii) The arithmetic mean of first 10 natural numbers is 5.5.

(viii) When a die is rolled, the probability of getting a number more than 5 is $\frac{1}{6}$.

(ix) The probability of an impossible event is 0.

(x) The probability of a sure event is 1.

(xi) Median is one of the observations is the data if the number of observations is odd.

Question 2.
State whether the following statements are true (T) or false (F):
(i) Mean is the value of observation that occurs most frequently.
(ii) The range of the data -3, 4, -5, 1, -2, 0 is -9.
(iii) Mode is always one of the numbers in a data.
(iv) There is only one mode for a given data.
(v) Mean is always one of the numbers in a data.
(vi) The data 6, 4, 3, 8,9, 12, 13, 9 has mean 9.
(vii) Median of the data may or may not be from given given data.
(viii) The measures of central tendency may not lie between the maximum and minimum value of data.
(ix) If the extreme observations on both ends of a data arranged in ascending order are removed, then the median gets affected.
(x) The probability of getting an ace out of a deck of playing cards can be greater than 1.
(xi) Median of 4, 5, 9, 2, 6, 8, 7 is 2.
Solution:

(i) Mean is the value of observation that occurs most frequently. (False)

Correct:

It is mode not mean.

(ii) The range of the data -3, 4, -5, 1, -2, 0 is -9. (False)

Correct:

Range is difference between 4 and -9 = 13 not 9.

(iii) Mode is always one of the numbers in a data. (True)

(iv) There is only one mode for a given data. (False)

Correct:

Mode can be more than one.

(v) Mean is always one of the numbers in a data. (False)

Correct:

It can be other than the given number.

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

Correct:

$$\text{Mean} = \frac{6+4+3+8+9+12+13+9}{8}$$

$$= \frac{64}{8} = 8 \text{ not } 9$$

(vii) Median of the data may or may not be from given given data. (True)

(viii) The measures of central tendency may not lie between the maximum and minimum value of data. (False)

Correct:

It lies between minimum and maximum value of the data given.

(ix) If the extreme observations on both ends of a data arranged in ascending order are removed, then the median gets affected. (False)

Correct:

There is no effect on median.

(x) The probability of getting an ace out of a deck of playing cards can be greater than 1. (False)

Correct:

Probability occurs between 0 to 1 not greater than 1.

(xi) Median of 4, 5, 9, 2, 6, 8, 7 is 2. (False)

Correct:

Median of (2,4, 5, 6, 7, 8, 9) is the 4th term which is 6.

Multiple Choice Questions

Choose the correct answer from the given four options (3 to 18):
Question 3.
Which of the following is not a central tendency of a data?
(a) Mean
(b) Median
(c) Mode
(d) Range
Solution:

Range is not a central tendency of a data. (d)

Question 4.
The difference between the highest and the lowest observations in a data is its
(a) frequency
(b) width
(c) range
(d) mode

Solution:

The difference between the highest and the lowest observations in data is its range. (c)

Question 5.
A cricketer scored 38, 79, 25, 52, 0, 8, 100 runs in seven innings. The range of the runs scored is
(a) 100
(b) 92
(c) 52
(d) 38
Solution:

Range = Difference of the highest and lowest observation

Range is 100 – 0 = 100 (a)

Question 6.
If the mean of 3, 1, 5, x and 9 is 4, then the value of x is
(a) 6
(b) 4
(c) 2
(d) 0
Solution:

Mean of 3, 1, 5, x, 9 is 4

$$\Rightarrow \frac{3+1+5+x+9}{5} = 4$$

$$\frac{18+x}{5} = 4$$

18 + x = 20

$\Rightarrow$ x = 20 – 18 = 2 (c)

Question 7.
The number of goals scored by a football team in a series of matches are: 3, 5, 0, 1, 2, 0, 4, 1, 3. The median of this data is
(a) 3
(b) 2
(c) 2.5
(d) 1

Solution:

Goals in the matches are:

3, 5, 0, 1, 2, 0, 4, 1, 3

Arranging in order: 0, 0, 1, 1, 2, 3, 4, 5

Which are 9 which is odd

median = $\frac{9+1}{2}$ = 5th term = 2 (b)

Question 8.
The median of the first 49 natural numbers is
(a) 24
(b) 25
(c) 25.5
(d) 26
Solution:

Median of first 49 natural number (i.e., 1 to 99)

= $\frac{49+1}{2}$ = 25th term = 25 (b)

Question 9.
The mean of three different natural numbers is 40. If lowest is 19, what could be highest possible number of remaining two numbers?
(a) 40
(b) 71
(c) 81
(d) 100
Solution:

The mean of three different natural numbers = 40

Lowest = 19, then highest possible of the remaining two numbers

Total = 40 × 3 = 120

Lowest = 19

Remaining total = 120 – 19 = 101

Both of the remaining numbers are greater than 19

So, if second is 20, then third = 101 – 20 = 81

Highest = number = 81 (c)

Question 10.
The mode of the data:
3, 5, 1, 2, 0, 2, 3, 5, 0, 2, 1, 6 is
(a) 6

(b) 3
(c) 2
(d) 1
Solution:

Mode of 3, 5, 1, 2, 0, 2, 3, 5, 0, 2, 1, 6 = 2

as it came highest times (c)

Question 11.
The probability of a sure event is
(a) 0
(b) 14
(c) 12
(d) 1
Solution:

The probability of a sure event is 1. (d)

Question 12.
The probability of an impossible event is
(a) -1
(b) 0
(c) 12
(d) 1
Solution:

The probability of an impossible event is 0. (b)

Question 13.
The probability of a newly born baby to be a girl is
(a) 0
(b) 14
(c) 12
(d) 1
Solution:

The probability of a newly born baby to be a girl is $\frac{1}{2}$. (c)

Question 14.
The probability of selecting letter G from the word GIRL is
(a) 1
(b) 12
(c) 14
(d) 13
Solution:

Probability of letter G from the word GIRL is $\frac{1}{4}$. (c)

Question 15.
The probability of selecting a vowel from the word ALPHABET is
(a) 12
(b) 17
(c) 27
(d) 38
Solution:

The probability of selecting a vowel

from the word ALPHABET (Vowels are A, A, E)

$= \frac{3}{8}$ (d)

Question 16.
When a die is thrown, the probability of getting a composite number is
(a) 12
(b) 13
(c) 14
(d) 23
Solution:

When a die is thrown,

probability of a composite number (4, 6) $= \frac{2}{6} = \frac{1}{3}$ (b)

Question 17.
A bag contains 5 white balls and 10 black balls. The probability of drawing a white ball from the bag is
(a) 510
(b) 515
(c) 1015
(d) 1
Solution:

A bag contains 5 white and 10 black balls.

Total balls in the bag = 5 + 10 = 15

Probability of drawing a white ball $= \frac{5}{15} = \frac{1}{3}$ (b)

Question 18.
In a school, only 2 out of 5 students can participate in a quiz. What is the probability that a student picked at random makes it to the competition?
(a) 50%
(b) 40%
(b) 30%
(d) 20%

Solution:

In a school, 2 out of 5 students can participate in a quiz

Probability of 2 students picked at random $= \frac{2}{5}$

$= \frac{2}{5} \times 100 = 40\%$ (b)
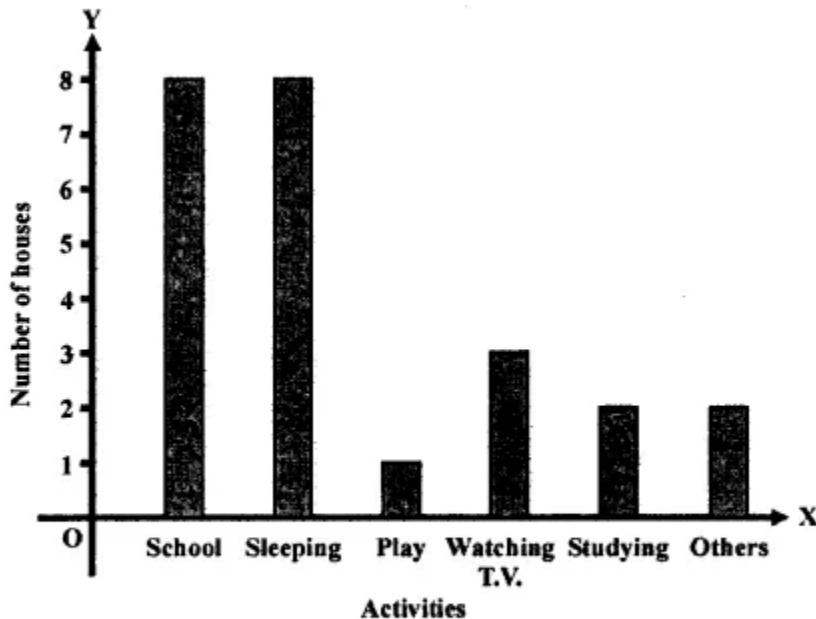
Value Based Questions

Question 1.
The following table shows the time (in hours) spent by a student of class VII in a day:

Activity	School	Sleeping	Playing	Watching T.V.	Studying	Others
Number of Hours	8	8	1	3	2	2

Draw a bar graph to represent the above data. Is it correct to watch T.V. for 3 hours and studying just 2 hours daily?
Solution:

Bar graph of the given data is given below:

Watch T.V. for 3 hours and studying only for 2 hours is not correct.

A student must give more time to study.

Question 2.
In a game, a fair coin is tossed. A person is paid ₹ 5 if he gets head and he pays ₹ 2 if he gets

tail. Find the probability of winning ₹ 5. Is gambling a good way of earning money?
Solution:

In a game, a fair coin is tossed.

A person gets ₹ 5 for head and he pays ₹ 2 for getting tail.

So, probability of winning ₹ 5 = $\frac{1}{2}$

Gambling a bad habit.

It ruins the whole family.

At the end, he loses everything.

Higher Order Thinking Skills (HOTS)

Question 1.
The mean of 6 observations is 17.5. If five of them are 14, 9, 23, 25 and 10, find the sixth observation.
Solution:

Mean of 6 observations = 17.5

Total = 17.5 × 6 = 105

Sum of 5 observations = 14 + 9 + 23 + 25 + 10 = 81

6th observation = 105 − 81 = 24

Question 2.
The mean height of 10 students is 151.8 cm. Two more students of heights 157.6 cm and 154.4 cm join the group. What is the new mean height?
Solution:

Mean height of 10 students = 151.8 cm

Their total height = 151.8 × 10 = 1518 cm

Heights of two more students = 157.6 + 154.4 = 3120

Sum of 10 + 2 = 12 students = 1518 + 312 = 1830 cm

Their mean height = $\frac{1830}{12}$ = 152.5 cm

Question 3.
The following observations have been arranged in ascending order. If the median of the data is 13, find the value of x:
3, 6, 7, 10, x, x + 4, 19, 20, 25, 28

Solution:

Following observations have been arranged in order:

3, 6, 7, 10, x, x + 4, 19, 20, 25, 28

Here, n= 10 which is even

$$\therefore \text{Median} = \frac{1}{2}\left[\frac{n}{2}\text{th term} + \left(\frac{n}{2}+1\right)\text{th term}\right]$$

$$= \frac{1}{2}\left[\frac{10}{2}\text{th term} + \left(\frac{10}{2}+1\right)\text{th term}\right]$$

$$= \frac{1}{2}[\text{5th term} + \text{6th term}]$$

$$= \frac{1}{2}(x + x + 4)$$

$$= \frac{1}{7}(2x + 4) = x + 2$$

But median = 13

x + 2 = 13 ⇒ x = 13 − 2 = 11

x = 11

Question 4.
If the mean of the data (given below) is 4.5, then find the median of the data:
5, 7, 7, 8, x, 3, 1, 5, 4, 2
Solution:

Mean of following data = 4.5

5, 7, 7, 8, x, 3, 1, 5, 4, 2

Here n = 10

$$\text{Mean} = \frac{5+7+7+8+x+3+1+5+4+2}{10}$$

$$= \frac{42+x}{10}$$

$\frac{42+x}{10}$ = 4.5

⇒ 42 + x = 4.5 × 10

⇒ 42 + x = 45

⇒ x = 45 − 42 = 3

Now arranging in ascending order,

1, 2, 3, 3, 4, 5, 5, 7, 7, 8

$$\text{Median} = \frac{1}{2}\left[\frac{n}{2}\text{th term} + \left(\frac{n}{2}+1\right)\text{th term}\right]$$

$$= \frac{1}{2}\left[\frac{10}{2}\text{th term} + \left(\frac{10}{2}+1\right)\text{th term}\right]$$

$$= \frac{1}{2}[5\text{th term} + 6\text{th term}]$$

$$= \frac{1}{2}(4+5) = \frac{9}{2} = 4.5$$

Question 5.
Find the probability of getting 53 Sunday's in a leap year.
Solution:

Probability of 53 Sunday's in a leap year

Number of weeks in 366 days = 52

and remaining days = 2

Number of days in a week = 7

Probability = $\frac{2}{7}$

<u>Check Your Progress</u>

Question 1.
State whether the following statement is true or false. Justify your answer:
"The median is always one of the numbers in data."
Solution:

False.

As median of observations can depend on its odd number or even number.

In case of even observations, it will be the mean of two middle observation.

Question 2.
Marks obtained by five students of class VII in quarterly and half-yearly examination in Mathematics (out of 25) are given below:
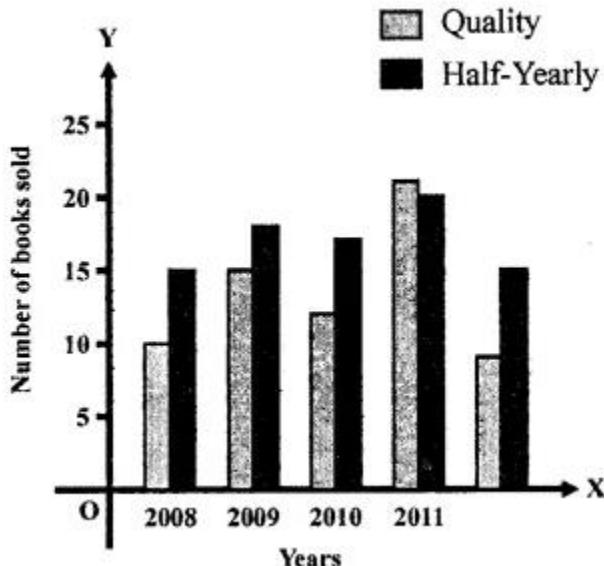
Students	Ashish	Arun	Kavish	Maya	Rita
Quarterly	10	15	12	21	9
Half-Yearly	15	18	16	20	15

Represent the above data by a bar graph and answer the following questions:
(i) Do you see any improvement? Justify your answer.
(ii) Who has not done better?
Solution:

(i) Yes, we see that all bars representing half-yearly marks are higher in all cases except one in Maya's case.

So, there is an improvement.

(ii) Maya has not done better.

Question 3.
Find the mean of the factors of 12.
Solution:
Factors of 12

1, 2, 3, 4, 6, 12

$$\therefore \text{ Mean} = \frac{1+2+3+4+6+12}{6} = \frac{28}{6} = \frac{14}{3}$$

Question 4.
Find the median and the mode of the following data:
2, 14, 16, 12, 13, 14, 16, 13, 10, 14, 18, 9
Solution:
Arranging in ascending order:

2, 9, 10, 12, 13, 13, 14, 14, 14, 16, 16, 18

Here n = 12 which is even

$$(i) \text{ Median} = \frac{1}{2}\left[\frac{n}{2}\text{th term} + \left(\frac{n}{2}+1\right)\text{th term}\right]$$

$$= \frac{1}{2}\left[\frac{12}{2}\text{th term} + \left(\frac{12}{2}+1\right)\text{th term}\right]$$

$$= \frac{1}{2}[6\text{th term} + 7\text{th term}]$$

$$= \frac{1}{2}(13 + 14) = \frac{27}{2} = 13.5$$

Mode: Observation 14 came the highest time.

Mode = 14

Question 5.
Heights (in cm) of 25 students are given below:
168, 165, 163, 160, 163, 161, 162, 164, 163, 162, 164, 163, 160, 163, 157, 165, 148, 163, 164, 160, 165, 163, 152, 155, 163.
What is the mode of their heights?
Solution:

Arranging in ascending order:

148, 152, 155, 157, 160, 160, 160, 161, 162, 162, 163, 163,

163, 163, 163, 163, 163, 163, 164, 164, 164, 165, 165, 168

We see that 163 comes maximum times

Mode = 163

Question 6.
A die is thrown, what is the probability of getting an odd prime number?
Solution:

A die is thrown,

Probability of odd prime number are 3, 5

Now, total outcomes = 6

and favourable outcomes = 2

Probability = $\frac{2}{6} = \frac{1}{3}$

Question 7.
A letter is chosen at random from the letters of the word MATHEMATICS, what is the probability of getting
(i) letter M
(ii) a vowel
(iii) a consonant?
Solution:

Word: MATHEMATICS

Total number of letters = 11

(i) Probability of getting M = $\frac{2}{11}$

(ii) Probability of a vowel (n) = $\frac{4}{11}$

(iii) Probability of getting a consonant (11 − 4 = 7) = $\frac{7}{11}$