1 Statistics

Statistics is the science which deals with the collection, classification, analysis and interpretation of numerical data.

Classification of Data

Data must be classified or arranged in a systematic way before they can be analysed or interpreted. Data that are not arranged in a systematic way are called unclassified data or raw data. It is quite impossible to analyse or interpret such data. For example, Table 1.1 shows the number of chocolates consumed by 40 students of a class in a day. Looking at it, one would not be able to draw any conclusions about the number of students who ate 3 chocolates or the number of students who did not eat any chocolate at all.

Table 1.1 Raw data

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

Arrayed data

The simplest way to organise raw data is to arrange them in either ascending or descending order. Data arranged this way are called arrayed data.

Table 1.2 Arrayed data

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

The data in Table 1.1 can be represented as arrayed data in either of the ways shown in Table 1.2 and 1.3. It should be obvious that Table 1.3 gives more precise information than Table 1.2.

Table 1.3 Arrayed data

Number of chocolates	Number of students
0	6
1	11
2	13
3	7
4	2
5	1

Frequency distribution table

The frequency of a term is the number of times it occurs in a collection of data. For example, Table 1.3 shows that 11 students ate 1 chocolate.

So, the frequency of 1 chocolate is 11.

Similarly, the frequency of 2 chocolates is 13.

Tally marks (\) are made to count the number of times a term appears in a collection of data. So, tally marks tell us the frequency of a term. The following table shows how tally marks are made. Notice that 𝍸, and not ||||| represents the frequency 5.

Table 1.4 Making tally marks

Frequency	1	2	3	4	5	6	7	10	11	16
Tally marks	|	||	|||	||||	𝍸	𝍸 |	𝍸 ||	𝍸 𝍸	𝍸 𝍸 |	𝍸 𝍸 𝍸 |

A frequency distribution table shows the frequencies of observations or terms. Now that we know how to represent the frequencies of observations by making tally marks, we can proceed to make a frequency distribution table for the data in Table 1.3.

Table 1.5 Frequency distribution table

Number of chocolates consumed (observation)	Tally marks	Frequency (number of students)
0	𝍸 |	6
1	𝍸 𝍸 |	11
2	𝍸 𝍸 |||	13
3	𝍸 ||	7
4	||	2
5	|	1
		Total = 40

The range of data is the difference between the largest observation and the smallest observation in a collection of data. For example, the range of the data in Table 1.5 = largest observation – smallest observation = 5 – 0 = 5.

EXAMPLE **The number of children in the families of a village are listed below.**

1 2 1 1 2 2 2 3 2 2 2 4 1 2 3 2 2 1 1 0 0 1 2 0 1 2 0 1 2 2 2 2 1 2 3 3 4 2 1 2

Represent this as arrayed data and prepare a frequency distribution table. Also, find the range of the data.

Solution The data in ascending order

0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 3 3 3 3 4 4

The frequency distribution table for the data is as follows.

Number of children	Tally marks	Frequency (number of families)
0	||||	4
1	𝍸 𝍸 |	11
2	𝍸 𝍸 𝍸 ||||	19
3	||||	4
4	||	2
		Total = 40

The range of data = 4 – 0 = 4.

Graphical Representation of Data

Showing data in the form of pictures is called graphical or pictorial representation of data. You may have seen such pictures in newspapers, magazines and on TV. They help people to get a quick understanding of numerical data. There are many ways of representing data through pictures. Some of these are pie charts, bar graphs and histograms.

Pie graph or pie chart

In a pie graph, the angles of the sectors of a circle represent the size (or frequency) of the entry. The angle is calculated by the formula:

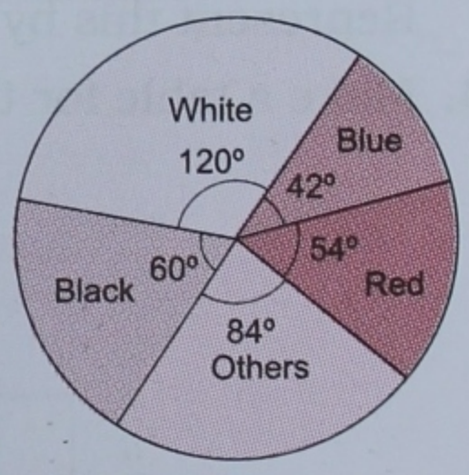
$$\text{Sectorial angle} = \frac{\text{size of the entry}}{\text{sum of sizes of all the entries}} \times 360°$$

EXAMPLE **The following table shows the number of cars of different colours in a parking space. Draw a pie graph for the data.**

Colour	Red	Blue	White	Black	Others
Number of cars	9	7	20	10	14

Solution The total number of cars = 9 + 7 + 20 + 10 + 14 = 60.

Colour	Number of cars	Angle
Red	9	$\frac{9}{60} \times 360° = 54°$
Blue	7	$\frac{7}{60} \times 360° = 42°$
White	20	$\frac{20}{60} \times 360° = 120°$
Black	10	$\frac{10}{60} \times 360° = 60°$
Others	14	$\frac{14}{60} \times 360° = 84°$
	Total = 60	



Column graph or bar graph

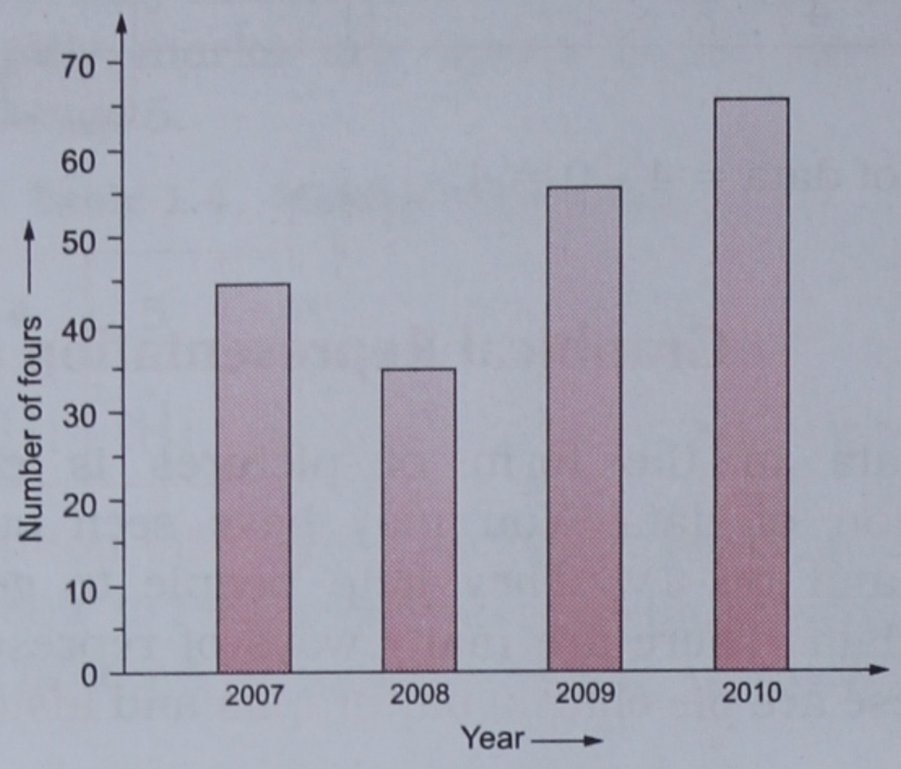
In such a graph, data are represented by a number of bars of equal width. The height of the bars represents the magnitude or frequency of the items or entries. The space between the bars is usually uniform.

EXAMPLE **The number of fours hit by a cricketer in different years is as follows.**

2007—44, 2008—35, 2009—56, 2010—66.

Represent the data by a column graph.

Solution



EXERCISE 1A

1. The marks obtained by 25 students in a test are:

5, 5, 1, 6, 7, 7, 7, 5, 2, 6, 7, 5, 7, 8, 9, 10, 7, 8, 6, 3, 1, 4, 9, 4, 8

Represent this as arrayed data and construct a frequency distribution table.

2. The number of hours for which the children of 25 families are allowed to watch cartoon channels every day is as follows.

0, 1, 2, 1, 2, 0, 0, 3, 2, 1, 0, 1, 2, 1, 1, 2, 1, 3, 2, 1, 1, 2, 4, 0, 1.

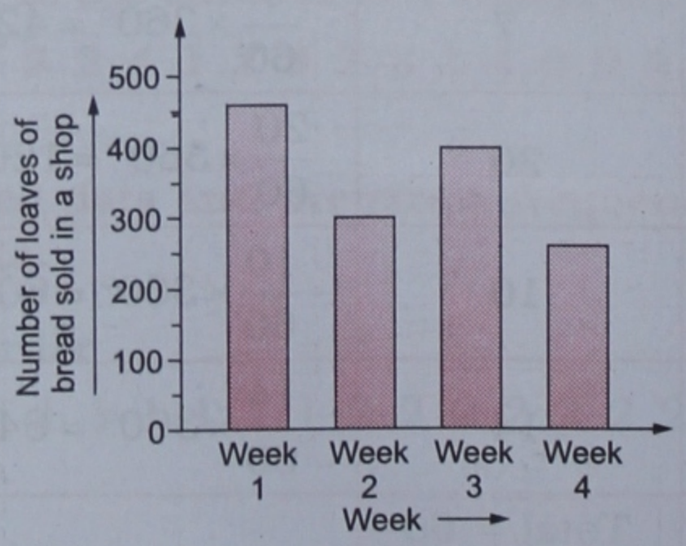
Represent this (i) as arrayed data, (ii) by a frequency distribution table, and (iii) by a bar graph.

3. The table shows how Robin spends a holiday.

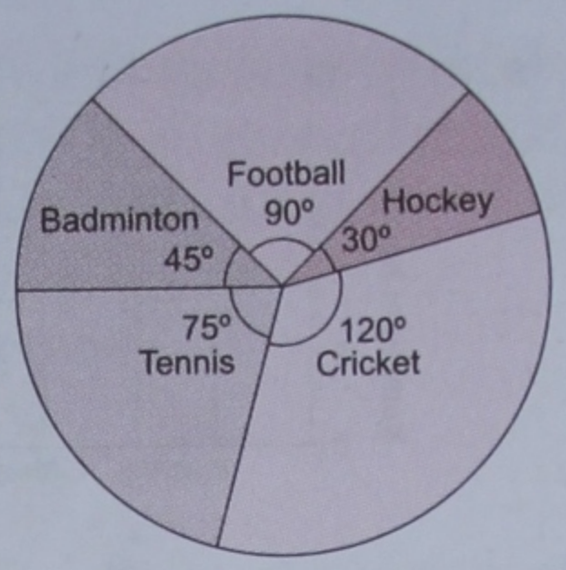
Activity	Studying	Sleeping	Playing	Eating	Others
Number of hours	8	8	3	1	4

Represent this by (i) a bar diagram and (ii) a pie chart.

4. Make a table for the bar graph.



5. The pie chart shows the preference of 240 children for various sports. Calculate the actual number of children who like each sport.



6. Study the bar diagram showing the mode of transport used by students of Model School and answer the following questions.

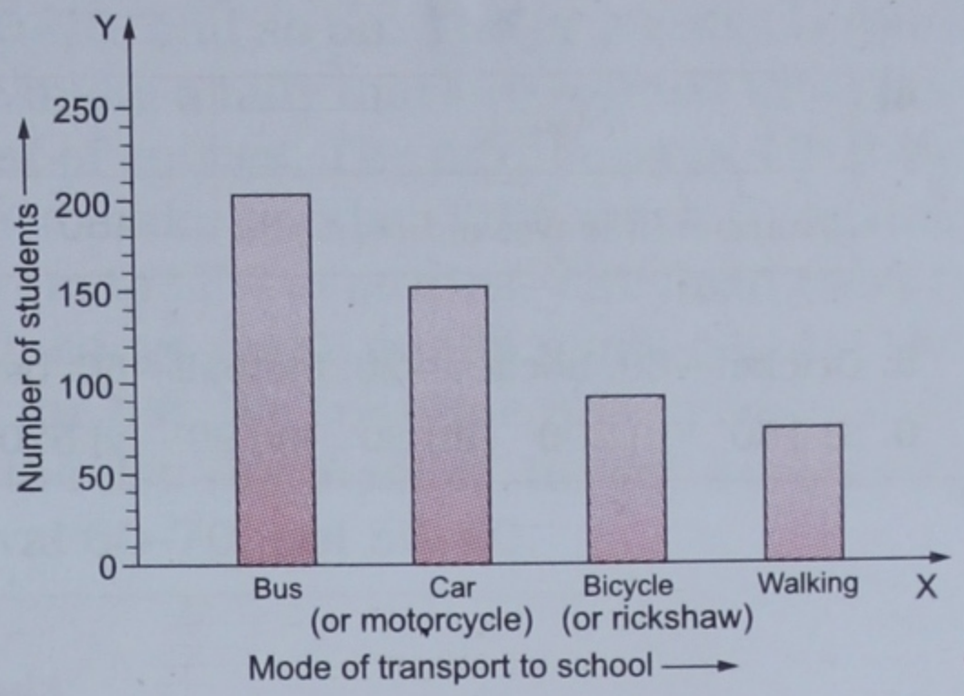
(i) How many students come to school by car (or motorcycle)?

(ii) How many students travel by bus?

(iii) How many students prefer walking?

(iv) Find the total number of students who cycle to school or take a rickshaw.

(v) What is the total number of students in Model School?



ANSWERS

1. Arrayed data : 1, 1, 2, 3, 4, 4, 5, 5, 5, 5, 6, 6, 6, 7, 7, 7, 7, 7, 7, 8, 8, 8, 9, 9, 10

Frequency distribution table:

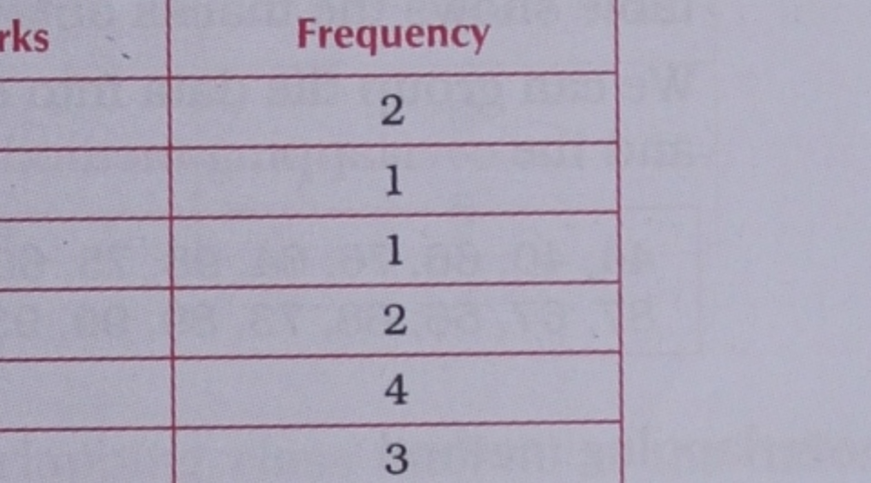
Marks	Tally marks	Frequency
1	||	2
2	|	1
3	|	1
4	||	2
5	||||	4
6	|||	3
7	𝍸 |	6
8	|||	3
9	||	2
10	|	1
		Total = 25

2. (i) 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 3, 3, 4

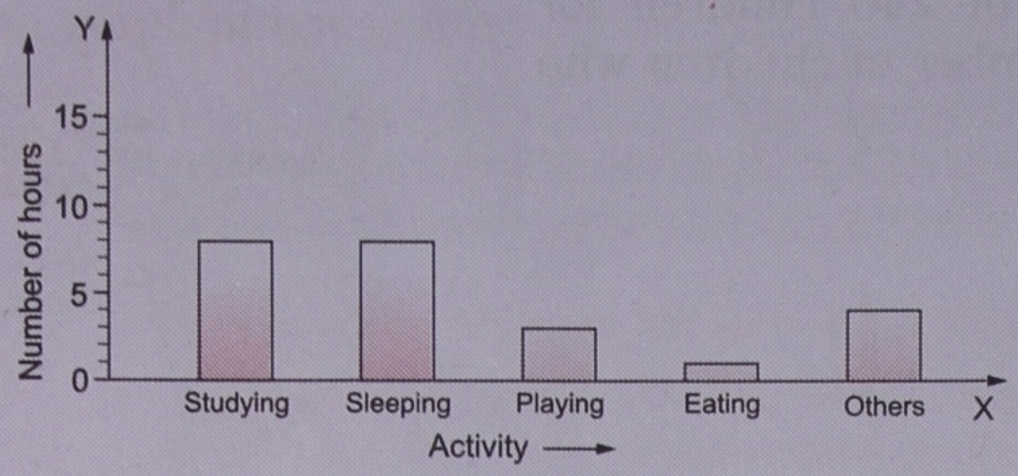
(ii)

No. of hours	Tally marks	Frequency
0	𝍸	5
1	𝍸 𝍸	10
2	𝍸 ||	7
3	||	2
4	|	1
		Total = 25

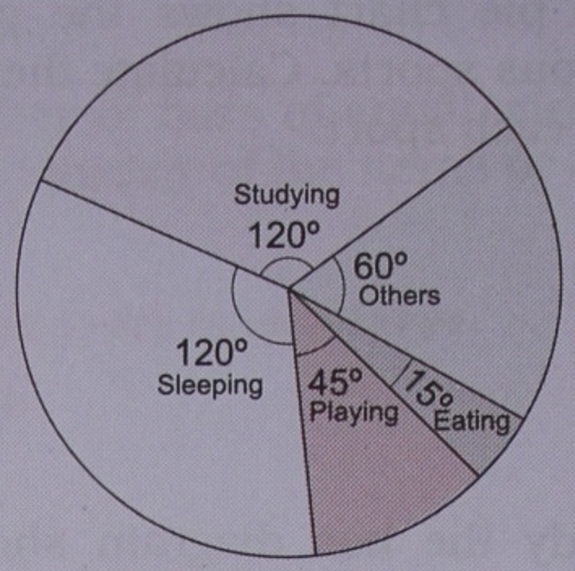
(iii)



3. (i)



(ii)



4.

Week	1	2	3	4
Number of loaves of bread sold	450	300	400	250

5. Cricket—80, hockey—20, football—60, badminton—30, tennis—50

6. (i) 150 (ii) 200 (iii) 80 (iv) 90 (v) 520

Grouped Data

When the data involves a large number of observations (items), it is convenient to group the observations into different classes. Then we can calculate the frequency of all the observations in a class rather than for individual observations. Data divided into classes are called grouped data. The following table shows the marks obtained by 30 students in a test.

We can group the data into classes in two ways—by the nonoverlapping method and the overlapping method.

44, 40, 66, 76, 84, 98, 75, 60, 64, 68, 55, 73, 97, 73, 75, 78, 84, 78, 83, 75, 97, 86, 87, 67, 56, 68, 73, 89, 99, 93.

Nonoverlapping method

We can group the marks, which range from 40 to 99, into 6 classes or class intervals: from 40 to 49 (written as 40–49), from 50 to 59 (50–59), from 60 to 69 (60–69), from 70 to 79 (70–79), from 80 to 89 (80–89) and from 89 to 99 (89–99).

Let us consider the class 40–49. Its lower limit is 40, while its upper limit is 49. We include both the lower and the upper limits in the class when we use the nonoverlapping or inclusive method of grouping data. That means when we calculate the frequency of this class, we consider all the marks from 40 to 49, including both 40 and 49.

We could have grouped the data into 12 classes (40–44, 45–49, 50–54, and so on) or any other number of classes. What is important to remember is that however we group the data, we include both the upper and lower limits in a class when we use the inclusive method.

Overlapping method

In the overlapping method or exclusive method, we generally include the lower limit in a class and exclude the upper limit. For example, if we group the given

data into the classes 40–50, 50–60, 60–70, and so on, we will include 50 in the class 50–60 and exclude it from the class 40–50. Similarly, if we group the data into the classes 40–45, 45–50, 50–55, and so on, we will include 45 in the class 45–50 and exclude it from the class 40–45.

In this chapter, we will study only the overlapping method.

Grouped frequency distribution table

Now let us make a grouped frequency distribution table for the marks obtained, using the class intervals 40–50, 50–60, 60–70, and so on. The first entry is 44. It belongs to the class interval 40–50, so we make a tally mark (\) against this class in the table, and strike out 44 from the list of entries. The next entry is 40. It too belongs to the class interval 40–50. So, we make another tally mark (\) against this class in the table, and strike out 40 from the list of entries. The third entry is 66. It belongs to the class interval 60–70, so we make a tally mark against this class in the table and strike out 66 from the list. We continue this process until we have crossed out all the entries from the list. (Remember, in the overlapping method, 60 will belong to the class interval 60–70, not 50–60.

Class interval	Tally marks	Frequency (number of students)
40–50	||	2
50–60	||	2
60–70	𝍸 |	6
70–80	𝍸 ||||	9
80–90	𝍸 |	6
90–100	𝍸	5

Class size

The class size or class width of an overlapping class interval is the difference between the upper and lower class limits.

Class size (overlapping) = upper class limit – lower class limit

For example, the class size of the overlapping class interval 40–50 = (50 – 40) = 10.

In the case of a nonoverlapping class interval:

Class size (nonoverlapping) = (upper class limit – lower class limit) + 1

For example, the class size of the nonoverlapping class interval 40–49 = (49 – 40) + 1= 10.

Class mark

The class mark of a class interval is the value that lies midway between the upper and lower class limits.

$$\text{Class mark} = \frac{\text{lower class limit} + \text{upper class limit}}{2}$$

For example, the class mark of the class interval $60–70 = \frac{60+70}{2} = 65$.

Note The class sizes of the classes 0–10, 10–20 and 20–30 are the same, but the class marks are different.

EXAMPLE **Construct a grouped frequency distribution table from the following list, which shows the daily wages (in ₹) of 30 workers of a factory.**

290, 368, 298, 310, 368, 292, 342, 311, 290, 300, 320, 319, 304, 402, 318, 406, 295, 354, 298, 310, 340, 380, 320, 408, 315, 358, 336, 390, 400, 395

Solution The minimum observation = 290 and the maximum observation = 408.

$\therefore$ the range = 408 – 290 = 118. It would be convenient to have 6 classes, each of width 20.

Daily wages	Tally marks	Frequency (number of workers)
290–310	𝍸 III	8
310–330	𝍸 III	8
330–350	III	3
350–370	IIII	4
370–390	I	1
390–410	𝍸 I	6
		Total = 30

EXAMPLE **Construct a grouped frequency table for the ages (in years) of the teachers of a school given below.**

42, 25, 31, 31, 33, 36, 39, 26, 33, 32, 40, 48, 38, 34, 27, 27, 45, 36, 41, 28, 34, 28, 44, 36, 29, 35, 28, 35, 30, 36, 29, 54

Solution The range of the data = (54 – 25) years = 29 years. Thus, it would be convenient to have 6 classes, each of width 5.

Age (in years)	Tally marks	Frequency (number of teachers)
25–30	𝍸 IIII	9
30–35	𝍸 III	8
35–40	𝍸 III	8
40–45	IIII	4
45–50	II	2
50–55	I	1
	Total = 32	

Histogram

Grouped data can be represented graphically by histograms, which are rectangles of breadth equal (or proportional) to the size of the class interval. The height of a histogram is equal (or proportional) to the corresponding frequency. Thus, histograms are somewhat similar to bar graphs, which are used to represent arrayed data or a simple frequency distribution. Bar graphs are, however, drawn with spaces between them, while there are no spaces between histograms.

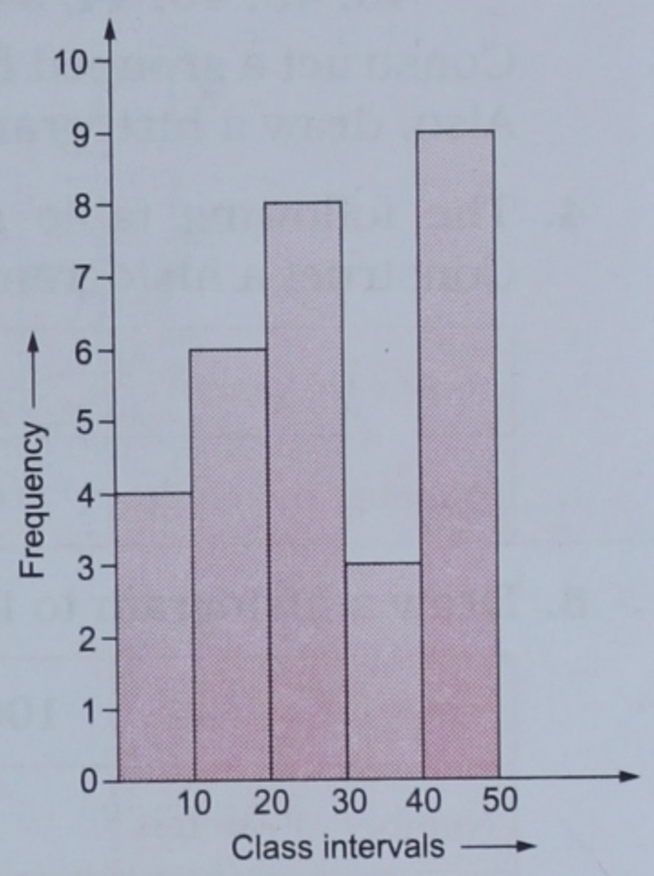
Constructing a histogram

Steps
1. Choose a suitable scale and mark the class limits of the class intervals along the x-axis. Choose an appropriate scale to represent the frequencies along the y-axis.
2. Construct vertical rectangles on the line segments representing each class interval such that the heights of the rectangles are equal (or proportional) to the corresponding frequencies.
3. Make a kink (⩘) on the x-axis between 0 and lower class limit of the first class interval. This is not necessary if the lower class limit of the first class interval happens to be 0.

EXAMPLE **Draw a histogram to illustrate the following frequency table.**

Class interval	0–10	10–20	20–30	30–40	40–50
Frequency	4	6	8	3	9

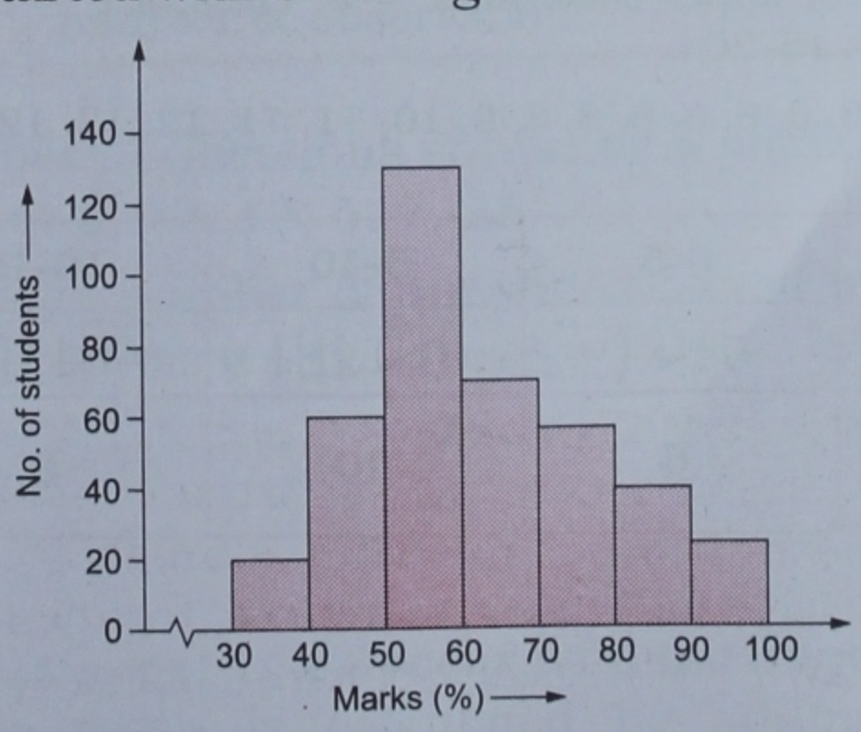
Solution Choose your own scale. Then starting with 0 at the origin, mark the class limits along the x-axis. On each line segment representing a class interval, construct a rectangle of height corresponding to its frequency. The histogram should look as the one shown in the figure.



EXAMPLE **The following table shows the marks (in percentage) obtained by 400 students who appeared at an examination. Illustrate the data using a histogram.**

Marks (%)	30–40	40–50	50–60	60–70	70–80	80–90	90–100
Number of students	20	60	130	70	58	40	22

Solution We have made a kink (⩘) on the x-axis because the first class interval starts at 30. We could also have started with 30 along the x-axis and not made a kink.



EXERCISE 1B

1. Find the lower class limit, upper class limit, class size and class mark of the classes (i) 0–10 and (ii) 0–5. Write three consecutive classes of the same size after the given class in each case.

2. The marks obtained by 30 students of a class in a test are as follows.

12, 8, 14, 6, 11, 8, 9, 12, 2, 10, 12, 4, 15, 8, 17,
15, 2, 8, 11, 3, 4, 17, 3, 12, 5, 18, 6, 5, 13, 6.

(i) Represent this as arrayed data.

(ii) Find the range of the data.

(iii) Construct a grouped frequency table using class intervals 0–5, 5–10, and so on.

3. The time taken (in seconds) by 25 students to solve a problem was:

17, 20, 24, 26, 27, 30, 38, 34, 40, 35, 47, 41, 44,
49, 45, 48, 44, 54, 50, 60, 58, 58, 63, 55, 20

Construct a grouped frequency table for the data using groups of 10–20, 20–30, and so on. Also, draw a histogram.

4. The following table gives the distribution of people living in an apartment building. Construct a histogram for the data.

Age (in years)	0–20	20–40	40–60	60–80	80–100
Number of people	5	15	20	13	2

5. Draw a histogram to illustrate the following.

Daily wages (in ₹)	100–120	120–140	140–160	160–180	180–200	200–220
Number of workers	10	5	14	9	20	5

ANSWERS

1. (i) Lower class limit = 0, upper class limit = 10, class size = 10, class mark = 5; three consecutive classes: 10–20, 20–30, 30–40

(ii) Lower class limit = 0, upper class limit = 5, class size = 5, class mark = 2.5; three consecutive classes: 5–10, 10–15, 15–20

2. (i) 2, 2, 3, 3, 4, 4, 5, 5, 6, 6, 6, 8, 8, 8, 8, 9, 10, 11, 11, 12, 12, 12, 12, 13, 14, 15, 15, 17, 17, 18

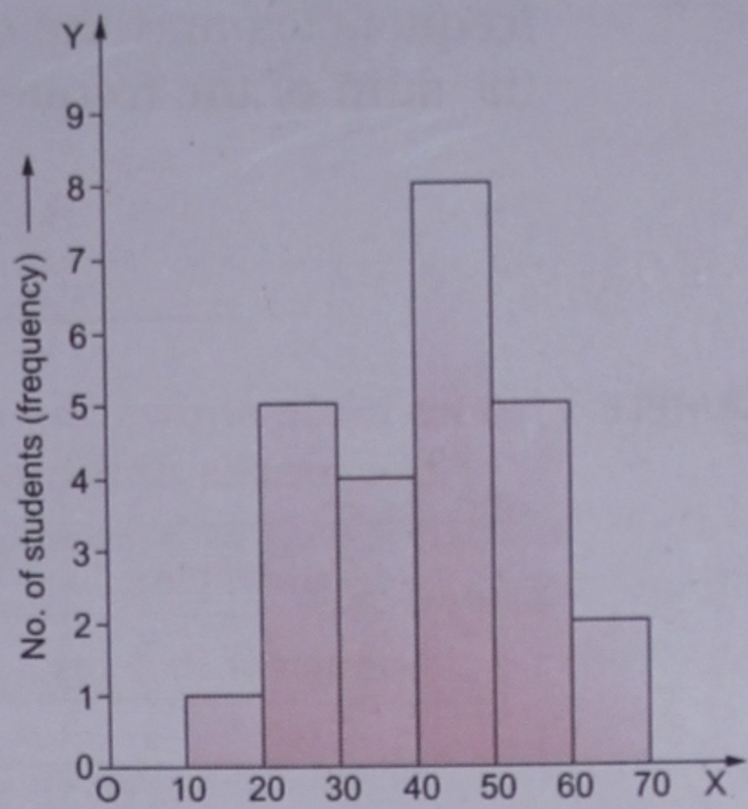
(ii) 16

(iii)

Marks (class)	0–5	5–10	10–15	15–20
Tally marks	𝍸 |	𝍸 𝍸	𝍸 ||||	𝍸
Number of students (frequency)	6	10	9	5

3.

Time (class)	Tally marks	Number of students (frequency)
10–20	|	1
20–30	𝍸	5
30–40	𝍸 -	4
40–50	𝍸 |||	8
50–60	𝍸	5
60–70	||	2



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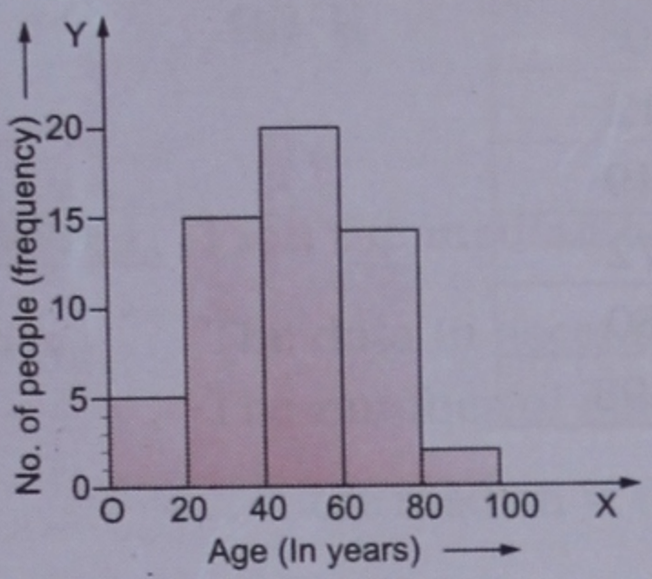

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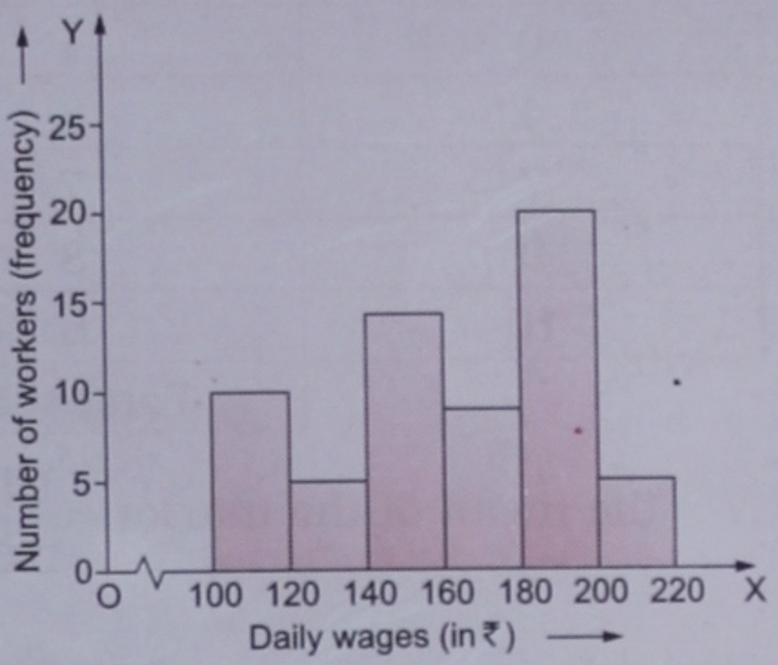


Mean, Median and Mode

Mean, median and mode are measures used to get an idea of the middle or central value of a set of observations or the most repeated observation.

Mean of raw data

The arithmetic mean (or simply the mean) of n observations $x_1, x_2, x_3, \ldots, x_n$ is given by:

$$\text{Mean} = \frac{\text{sum of observations}}{\text{number of observations}} = \frac{x_1 + x_2 + \ldots + x_n}{n}$$

Example The number of questions solved by a student on different days of a week are 6, 9, 12, 13, 5, 7, 25.

$\therefore$ the mean number of questions solved in a day

$$= \frac{6+9+12+13+5+7+25}{7} = \frac{77}{7} = 11.$$

Mean of a frequency distribution

If the observations $x_1, x_2, x_3, \ldots, x_n$ occur with the frequencies $f_1, f_2, f_3, \ldots, f_n$ respectively then the mean is calculated by adding the products of the

frequencies and the corresponding observations and then dividing the sum by the sum of the frequencies.

$$\text{Mean} = \frac{f_1x_1 + f_2x_2 + f_3x_3 + \ldots + f_nx_n}{f_1 + f_2 + f_3 + \ldots + f_n}$$

EXAMPLE **The table shows the marks obtained by 25 students in a class test. Find the mean of the marks obtained.**

Marks obtained	0	4	7	9	10
Number of students	1	3	7	8	6

Solution

Marks obtained	Number of students (frequencies)	Product of frequency and observation
0	1	$1 \times 0 = 0$
4	3	$3 \times 4 = 12$
7	7	$7 \times 7 = 49$
9	8	$8 \times 9 = 72$
10	6	$6 \times 10 = 60$
	Total = 25	Total = 193

$\therefore$ the mean of the marks $= \frac{193}{25} = 7.72$.

Mean of grouped data

If the class marks of successive class intervals are $x_1, x_2, x_3, \ldots, x_n$ and the corresponding frequencies of the class intervals are $f_1, f_2, f_3, \ldots, f_n$ then the mean is calculated by finding the sum of the products of the frequencies and the class marks of the class intervals and then dividing this sum by the sum of the frequencies.

$$\text{Mean} = \frac{f_1x_1 + f_2x_2 + f_3x_3 + \ldots + f_nx_n}{f_1 + f_2 + f_3 + \ldots + f_n}$$

EXAMPLE **Find the mean of the following data.**

Weight (in kg)	30–40	40–50	50–60	60–70	70–80
Number of persons	4	9	20	13	4

Solution

Weight (in kg) [class interval]	Class mark	Number of persons (frequency)	Product of frequency and class mark
30–40	35	4	$4 \times 35 = 140$
40–50	45	9	$9 \times 45 = 405$
50–60	55	20	$20 \times 55 = 1100$
60–70	65	13	$13 \times 65 = 845$
70–80	75	4	$4 \times 75 = 300$
		Total = 50	Total = 2790

$$\therefore \quad \text{the mean} = \frac{\text{sum of the products of frequencies and class marks of class intervals}}{\text{sum of frequencies of class intervals}}$$

$$= \frac{2790}{50} = 55.8.$$

Hence, the mean weight = 55.8 kg.

Median

When data are arranged either in ascending or descending order, the median is the observation in the middle. Suppose there are n observations in the arrayed data.

(i) If n is odd, the median = the $\left(\frac{n+1}{2}\right)$th observation.

(ii) If n is even, the median = the mean of the $\left(\frac{n}{2}\right)$th and $\left(\frac{n}{2}+1\right)$th observations.

EXAMPLE 1 **Find the median of 7, 6, 5, 3, 9, 4, 3.**

Solution The data in ascending order are 3, 3, 4, 5, 6, 7, 9.
The number of observations, $n = 7$, which is odd.

$\therefore$ the median = the $\left(\frac{n+1}{2}\right)$th, that is, $\left(\frac{7+1}{2}\right)$th observation = 4th observation = 5.

EXAMPLE 2 **Find the median of 4, 6, 2, 8, 3, 7, 9, 8.**

Solution The data in descending order are 9, 8, 8, 7, 6, 4, 3, 2.
The number of observations, $n = 8$, which is even.

$\therefore$ the median = the mean of the $\left(\frac{n}{2}\right)$th, that is, $\left(\frac{8}{2}\right)$th and $\left(\frac{n}{2}+1\right)$th, that is, $\left(\frac{8}{2}+1\right)$th observations

= the mean of the 4th and 5th observations = the mean of 7 and 6.

$$= \frac{7+6}{2} = 6.5.$$

Mode

The observation with the highest frequency in a given set of observations is called the mode of the observations.

EXAMPLE 1 **Find the mode of 4, 6, 2, 2, 1, 3, 7, 9, 2, 3, 2.**

Solution Here, the frequency of 2 is the highest.
So, the mode = 2.

EXAMPLE 2 **Find the mode of the following frequency table, which gives the marks scored by 40 students in a test.**

Marks obtained	0	1	2	3	4	5	6	7	8	9	10
Number of students	1	0	2	3	3	6	5	8	6	4	2

Solution The observation (marks) 7 has the highest frequency. So, the mode = 7.

EXAMPLE 3 **Find the mode of the following table.**

Observation (x)	1	3	9	15
Frequency (f)	17	8	16	6

Solution Here, the frequency 17 of the observation 1 is the highest. So, the mode = 1.

EXERCISE 1C

1. Find the mean of the following data.

(i) 4, 6, 8, 12, 15 (ii) 16, 39, 43, 120, 475, 248, 368

(iii) 7.5, 4.8, 24.4, 2.3

2. Find the mean of the frequency distributions.

(i)

Observation (x)	2	4	7	8
Frequency (f)	6	9	12	15

(ii)

Marks obtained	5	6	7	8	9	10
Number of students	4	5	10	20	10	1

3. Find the mean of the grouped data.

(i)

Observation (x)	0–10	10–20	20–30	30–40
Frequency (f)	20	16	12	2

(ii)

Observation (x)	0–2	2–4	4–6	6–8	8–10
Frequency (f)	3	5	7	4	1

4. Find the median of the following data.

(i) 8, 3, 4, 6, 5 (ii) 8, 7, 9, 12, 8, 17, 15, 10

(iii) 14, 18, 12, 9, 3, 5, 11, 11, 19, 2

5. Find the mode of the following data.

(i) 6, 2, 3, 4, 2, 3, 2, 4, 5 (ii) 4, 5, 6, 7, 8, 7, 6, 5, 3, 4, 6, 7, 6

(iii)

Observation (x)	3	5	9	11
Frequency (f)	16	12	24	10

6. Find the mean, median and mode of the following data.

(i) 63, 72, 72, 85, 84 (ii) 7, 19, 19, 7, 25, 7

(iii) 18, 21, 18, 3, 12, 15, 18, 42, 6, 3, 24, 12

7. The number of goals scored by a hockey team in 13 matches is 0, 1, 0, 2, 3, 0, 3, 4, 2, 0, 2, 1, 3. Find the mean, median and mode of the distribution.

8. The number of students present in a class on 16 days is 30, 23, 24, 26, 28, 24, 25, 28, 23, 29, 27, 23, 24, 28, 27, 23. Find the mean, median and mode of the distribution.

ANSWERS

1. (i) 9 (ii) 187 (iii) 9.75 **2.** (i) 6 (ii) 7.6 **3.** (i) 14.2 (ii) 4.5

4. (i) 5 (ii) 9.5 (iii) 11 **5.** (i) 2 (ii) 6 (iii) 9

6. (i) Mean = 75.2, median = 72, mode = 72 (ii) Mean = 14, median = 13, mode = 7

(iii) Mean = 16, median = 16.5, mode = 18

7. Mean = 1.6 (correct to one decimal place), median = 2, mode = 0

8. Mean = 25.75, median = 25.5, mode = 23

Revision Exercise

1. The list shows the shoe sizes of a group of children, as recorded during a survey.

3, 4, 4, 2, 4, 1, 3, 5, 2, 2, 4, 4, 4, 6, 2, 5, 3, 3, 4, 6,
2, 2, 5, 4, 5, 4, 6, 2, 5, 3, 2, 2, 2, 4, 4, 4, 3, 1, 3, 4

(i) Represent this as arrayed data.

(ii) Construct a frequency distribution table for the data.

(iii) Draw a bar diagram to illustrate the data.

2. Aditya got ₹ 400 from his grandfather. He spent ₹ 120 on toys, ₹ 110 on comics, ₹ 40 on chocolates, ₹ 80 on pens and pencils and saved ₹ 50. Illustrate this information by (i) a bar diagram (ii) a pie chart.

3. The following list shows the money (in ₹) spent by some families daily on vegetables. Construct a frequency distribution table for the data using the class intervals 20–30, 30–40 and so on. Also, draw a histogram.

51, 23, 30, 25, 27, 34, 40, 29, 42, 52, 22, 25, 45,
29, 49, 42, 50, 54, 56, 56, 56, 50, 64, 60, 68

4. Find the mean, median and mode for the following data, which represent the number of eggs produced per day at a poultry farm during the first 20 days of a month.

436, 470, 530, 420, 492, 454, 443, 486, 464, 439,
510, 472, 450, 473, 482, 471, 482, 459, 428, 434

5. Find the mean of the frequency distribution shown in the following table.

Class	0–10	10–20	20–30	30–40	40–50
Frequency	3	9	17	12	9

6. Consider the following distribution table.

Size of shirt (in inches)	36	38	40	42	44
Number of buyers	200	325	465	300	125

For which size must the shopkeeper place the biggest order?

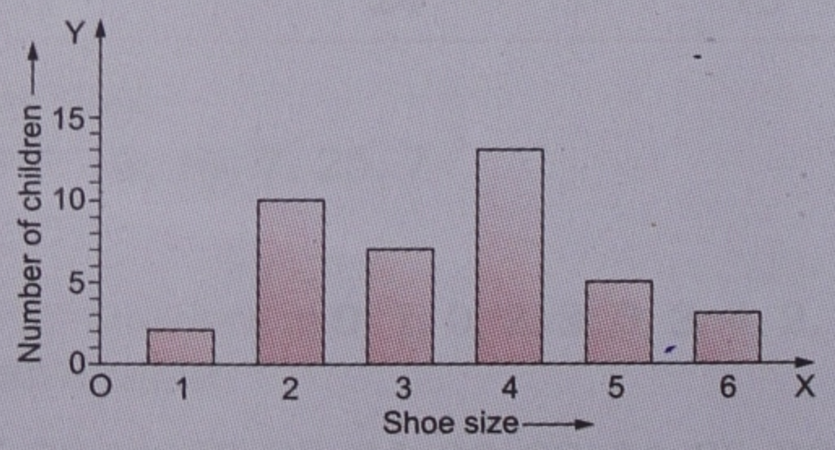
ANSWERS

1. (i) 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 5, 5, 5, 5, 5, 6, 6, 6

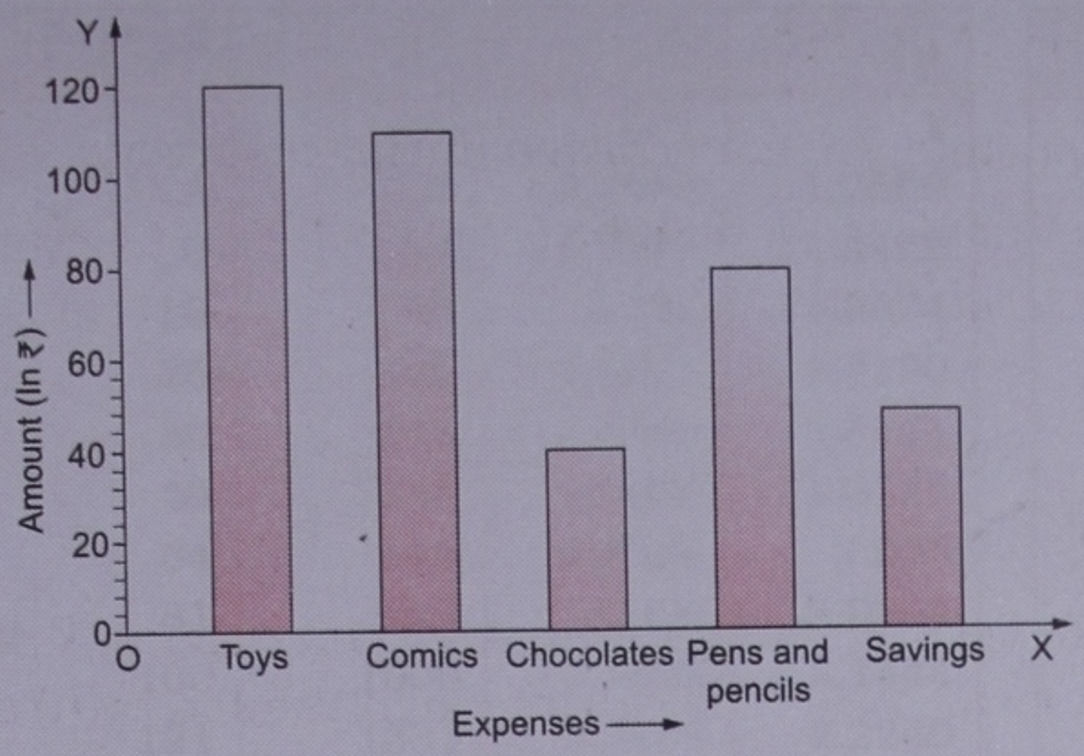
(ii)

Shoe size	Tally marks	Number of children
1	||	2
2	𝍸 𝍸	10
3	𝍸 ||	7
4	𝍸 𝍸 |||	13
5	𝍸	5
6	|||	3
		Total = 40

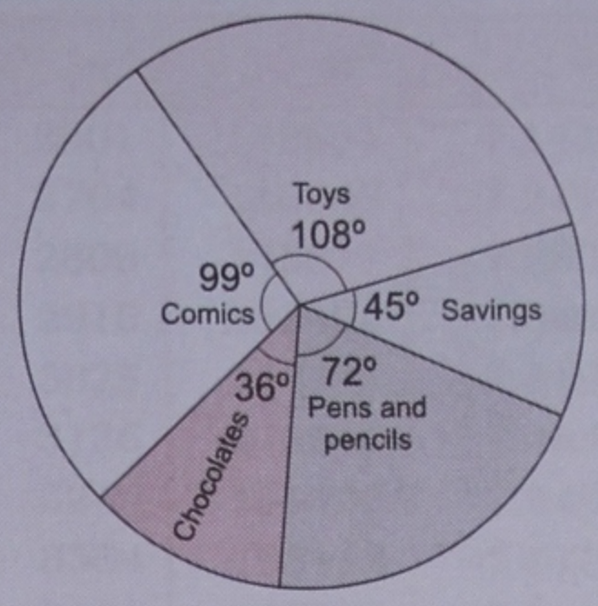
(iii)



2. (i)

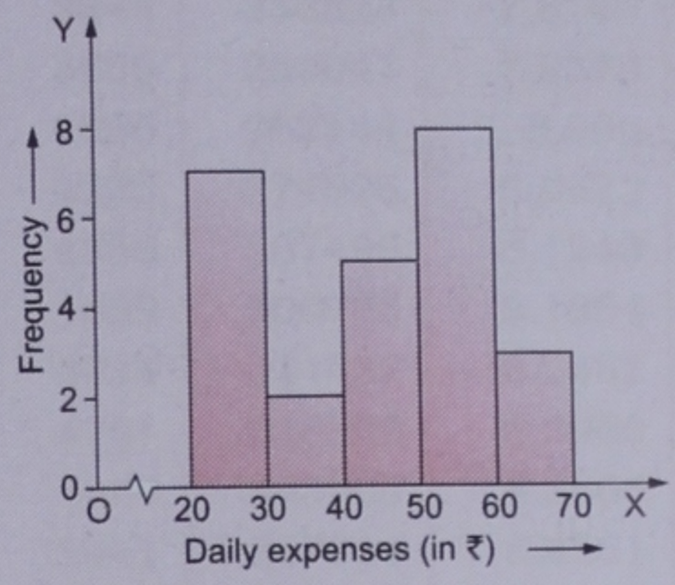


(ii)



3.

Daily expenses (in ₹)	Tally marks	Frequency
20–30	𝍸 ||	7
30–40	||	2
40–50	𝍸	5
50–60	𝍸 |||	8
60–70	|||	3
		Total = 25



4. Mean = 464.75, median = 467, mode = 482

5. Mean = 28

6. Size = 40 inches

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