Exercise 5.1

1. For which of these would you use a histogram to show the data?
(a) The number of letters for different areas in a postman's bag.
(b) The height of competitors in an athletics meet.
(c) The number of cassettes produced by 5 companies.
(d) The number of passengers boarding trains from 7:00 a.m. to 7:00 p.m. at a station.
Give reasons for each.

Answer: A histogram can be defined as a set of rectangles with bases along with the intervals between class boundaries. Each rectangle bar depicts some sort of data and all the rectangles are adjacent. It is the graphical representation of data where data is grouped into continuous number ranges and each range corresponds to a vertical bar.

(a) The number of areas cannot be represented in terms of class interval. So, we cannot use the histogram to show the data.

(b) Height of competitors can be divided into intervals. So, we can use a histogram here.

For example,

Height in (cm)	Number of competitors
150-160	10
160-170	12
170-180	5
180-190	2

(c) Companies cannot be divided into class intervals. So, we cannot use a histogram here.

(d) Time for boarding the train can be divided into intervals. So, we can use a histogram here.

For example,

Time in hours	Number of passengers
7 am – 10 am	1000
10 am – 1 pm	1500
1 pm – 4 pm	800
4 pm – 7 pm	900

We can use a histogram for cases (b) and (d) as they can be divided into class intervals.

2. The shoppers who come to a departmental store are marked as: man (M), woman (W), boy (B) or girl (G). The following list gives the shoppers who came during the first hour in the morning:

W W W G B W W M G G M M W W W W G B M W B G G M W W M M W W W M W B W G M W W W W G W M M W W M W M W G W M G W M M B G G W

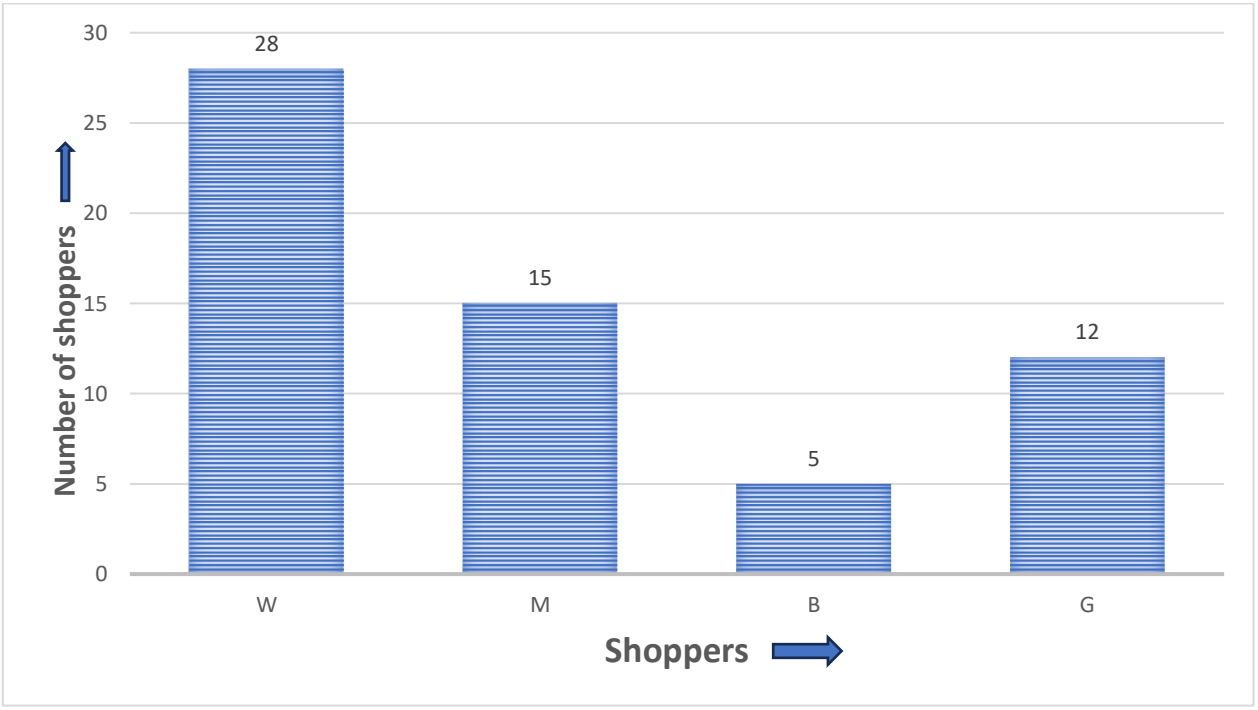
Make a frequency distribution table using tally marks. Draw a bar graph to illustrate it

Answer: A frequency distribution shows the frequency of repeated items in a graphical form or tabular form.

The frequency distribution table is shown as follows:

Shopper	Tally Marks	Number of Shoppers
W	𝍸 𝍸 𝍸 𝍸 𝍸 |||	28
M	𝍸 𝍸 𝍸	15
B	𝍸	5
G	𝍸 𝍸 ||	12
Total	**60**	

The illustration of the data using bar-graph is shown as follows:



3. The weekly wages (in ₹) of 30 workers in a factory are:

830, 835, 890, 810, 835, 836, 869, 845, 898, 890, 820, 860, 832, 833, 855, 845, 804, 808, 812, 840, 885, 835, 835, 836, 878, 840, 868, 890, 806, 840.

Using tally marks make a frequency table with intervals as 800 – 810, 810 – 820 and so on

Answer: A frequency distribution shows the frequency of repeated items in a graphical form or tabular form.

The representation of data by frequency distribution table using tally marks is as follows:

Class Intervals	Tally Marks	Frequency
800 – 810	|||	3
810 – 820	||	2
820 – 830	|	1
830 – 840	𝍸 ||||	9
840 – 850	𝍸	5
850 – 860	|	1
860 – 870	|||	3
870 – 880	|	1
880 – 890	|	1
890 – 900	||||	4
Total	**30**	

4. Draw a histogram for the frequency table made for the data in Question 3 (The weekly wages (in ₹) of 30 workers in a factory are. 830, 835, 890, 810, 835, 836, 869, 845, 898, 890, 820, 860, 832, 833, 855, 845, 804, 808, 812, 840, 885, 835, 835, 836, 878, 840, 868, 890, 806, 840), and answer the following questions

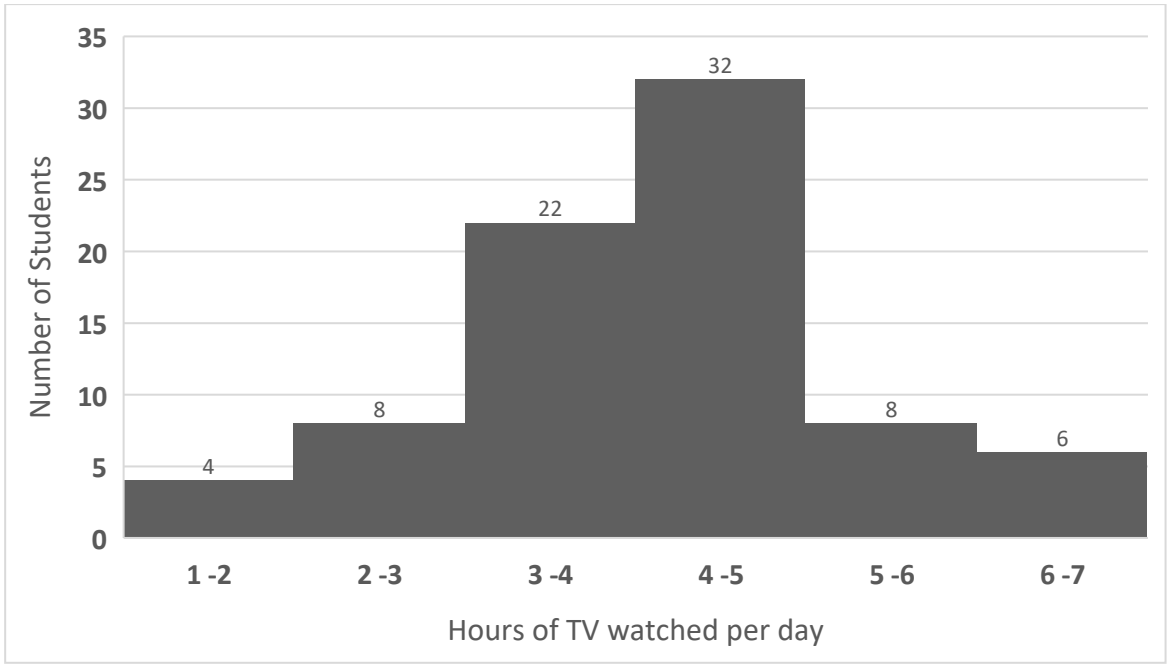
(i) Which group has the maximum number of workers?

(ii) How many workers earn ₹ 850 and more?

(iii) How many workers earn less than ₹ 850?

Answer: The histogram is drawn below:

5. The number of hours for which students of a particular class watched television during holidays is shown through the given graph.



Answer the following:

(i) For how many hours did the maximum number of students watch TV?

(ii) How many students watched TV for less than 4 hours?

(iii) How many students spent more than 5 hours in watching TV?

Solution:

A histogram can be defined as a set of rectangles with bases along wth the intervals between class boundaries. Each rectangle bar depicts some sort of data and all the rectangles are adjacent. It is the graphical representation of data where data is grouped into continuous number ranges and each range corresponds to a vertical bar.

i. The maximum number of students watched T.V. for 4 – 5 hours.

ii. 34 students watched T.V. for less than 4 hours.

iii. 14 students spent more than 5 hours in watching T.V.

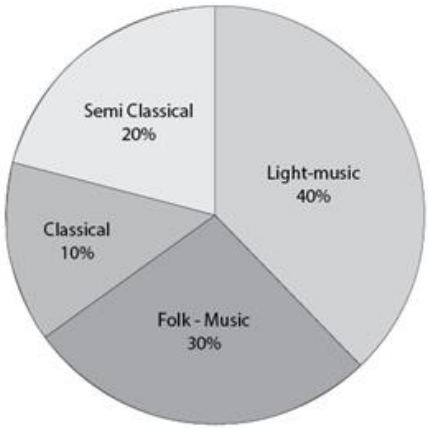
Exercise 5.2

1. A survey was made to find the type of music that a certain group of young people liked in a city. Adjoining pie chart shows the findings of this survey. From this pie chart answer the following:

(i) If 20 people liked classical music, how many young people were surveyed?

(ii) Which type of music is liked by the maximum number of people?

(iii) If a cassette company were to make 1000 CD's, how many of each type would they make?



Answer: A circle graph or Pie chart shows the relationship between a whole and its parts.

(i) Since classical consists of 10% from the given figure, therefore 10% represents 20 people.

Thus,100% represents = 100 × 20/10 = 200 people

Hence, 200 young people were surveyed.

(ii) From the pie chart, it can be easily observed that the light music represents the maximum part of the pie chart (i.e. 40%).

Hence, Light music is liked by the maximum number of people.

(iii) Number of CD's of classical music = 10% of 1000 = 10 × 1000 / 100 = 100

Number of CD's of semi-classical music = 20% of 1000 = 20 × 1000 / 100 = 200

Number of CD's of light music = 40% of 1000 = 40 × 1000 / 100 = 400

Number of CD's of folk music = 30% of 1000 = 30 × 1000 / 100 = 300

2. A group of 360 people were asked to vote for their favourite season from the three seasons rainy, winter and summer. (i) Which season got the most votes? (ii) Find the central angle of each sector. (iii) Draw a pie chart to show this information.

Season	No. of votes
Summer	90
Rainy	120
Winter	150

Answer: A pie chart is a pictorial representation of data in the form of a circular chart or pie where the slices of the pie show the size of the data.

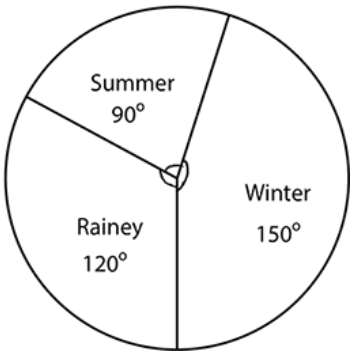
(i) By observing the given data, winter season got the greatest number of votes.

(ii) Central angle of summer = $\left(\frac{90^0}{360^0}\right)$ × 360° = 90°

Central angle of rainy season = $\left(\frac{120^0}{360^0}\right)$ × 360° = 120°

Central angle of winter season = $\left(\frac{150^0}{360^0}\right)$ × 360° = 150°

Pie chart :



3. Draw a pie chart showing the following information. The table shows the colors preferred by a group of people.

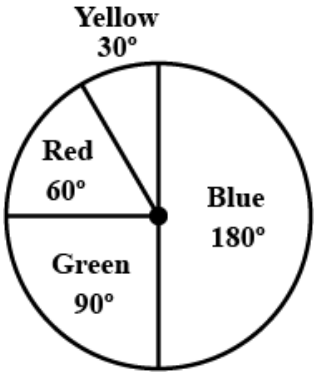
Colours	Number of people
Blue	18
Green	9
Red	6
Yellow	3
Total	36

Answer: A circle graph or pie chart shows the relationship between a whole and its parts.

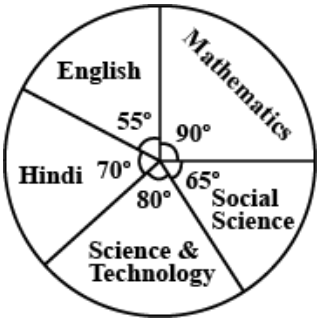
Here, Total angle = 360° and Total number of people = 36

The central angle for each color can be calculated as shown below:

Colors	Number of people	Fraction (Number of people/36)	Central angles
Blue	18	$\frac{18}{36} = \frac{1}{2}$	$\frac{1}{2}$ x $360^0 = 180^0$
Green	9	$\frac{9}{36} = \frac{1}{4}$	$\frac{1}{4}$ x $360^0 = 90^0$
Red	6	$\frac{6}{36} = \frac{1}{6}$	$\frac{1}{6}$ x $360^0 = 60^0$
Yellow	3	$\frac{3}{36} = \frac{1}{13}$	$\frac{1}{13}$ x $360^0 = 20^0$



4. The adjoining pie chart gives the marks scored in an examination by a student in Hindi, English, Mathematics, Social Science and Science. If the total marks obtained by the students were 540, answer the following questions.



(i) In which subject did the student score 105 marks? (Hint: for 540 marks, the central angle = 360°. So, for 105 marks, what is the central angle?)

(ii) How many more marks were obtained by the student in Mathematics than in Hindi?

(iii) Examine whether the sum of the marks obtained in Social Science and Mathematics is more than that in Science and Hindi. (Hint: Just study the central angles).

Answer: A circle graph or pie chart shows the relationship between a whole and its parts. Sum of the total angles in a pie chart is equal to 360°.

The central angle for each color is given and the marks are calculated below:

Subject	Central angle (^{0})	Marks Obtained
Mathematics	90	$\frac{90^0}{360^0}$ x 540 = 135
Social Science	65	$\frac{65^0}{360^0}$ x 540 = 97.5
Science	80	$\frac{80^0}{360^0}$ x 540 = 120
Hindi	70	$\frac{70^0}{360^0}$ x 540 = 105
English	55	$\frac{55^0}{360^0}$ x 540 = 82.5

(i) The student scored 105 marks in Hindi.

(ii) Marks obtained in Mathematics = 135
Marks obtained in Hindi = 105
Difference = 135 – 105 = 30

Thus, 30 more marks were obtained by the student in Mathematics than in Hindi.

(iii) The sum of marks in Social Science and Mathematics = 97.5 + 135 = 232.5
The sum of marks in Science and Hindi = 120 + 105 = 225

Yes, the sum of the marks in Social Science and Mathematics is more than that in Science and Hindi.

5. The number of students in a hostel, speaking different languages is given below. Display the data in a pie chart.

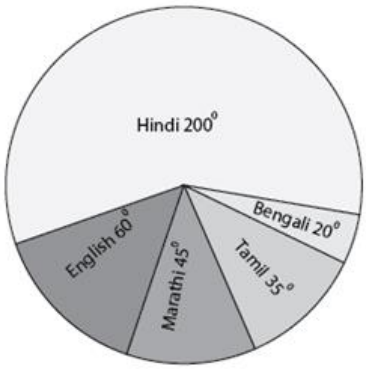
Language	Hindi	English	Marathi	Tamil	Bengali	Total
Number of students	40	12	9	7	4	72

Answer: A circle graph or pie chart shows the relationship between a whole and its parts. Sum of the total angles in a pie chart is equal to 360°.

The central angle for each language can be calculated as below:

Language	Number of students	Fraction (Number of people/72)	Central angles
Hindi	40	$\frac{40}{72} = \frac{5}{9}$	$\frac{5}{9}$ x $360^0 = 200^0$
English	12	$\frac{12}{72} = \frac{1}{6}$	$\frac{1}{6}$ x $360^0 = 60^0$
Marathi	9	$\frac{9}{72} = \frac{1}{8}$	$\frac{1}{8}$ x $360^0 = 40^0$
Tamil	7	$\frac{7}{72}$	$\frac{7}{72}$ x $360^0 = 35^0$
Bengali	4	$\frac{4}{72} = \frac{1}{18}$	$\frac{1}{18}$ x $360^0 = 20^0$
Total	72		

Pie chart for the above data is drawn as below:

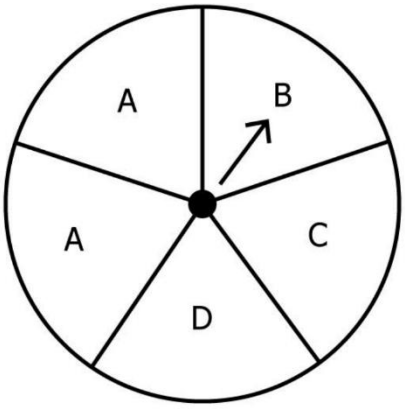


Exercise 5.3

1. List the outcomes you can see in these experiments.

(a) Spinning a wheel

(b) Tossing two coins together



Answer:

All the possibilities of an event are known as its outcomes.

(a) There are four letters A, B, C, and D in a spinning wheel. So, there are 4 outcomes.

(b) When two coins are tossed together, there are four possible outcomes HH, HT, TH, TT. (where, Head - H and Tail - T). Hence, there are 4 outcomes.

2. When a die is thrown, list the outcomes of an event of getting
(i) (a) a prime number (b) not a prime number
(ii) (a) a number greater than 5 (b) a number not greater than 5.

Answer:

All the possibilities of an event are known as its outcomes.

When a die is thrown, there are six possible outcomes 1, 2, 3, 4, 5 and 6

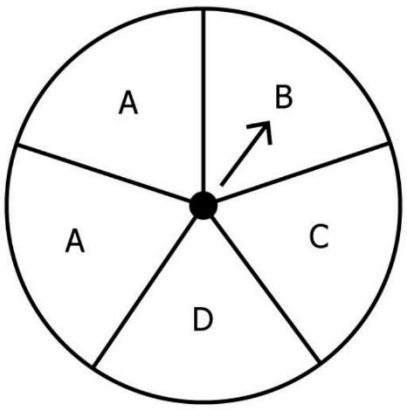
(i) (a) Outcome of the event of getting a prime number are 2, 3 and 5

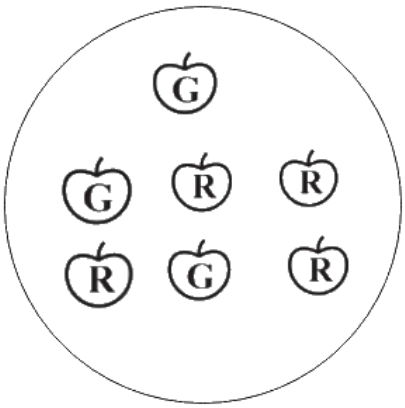
(b) Outcome of the event of not getting a prime number are 1, 4, and 6.

(ii) (a) Outcome of the event of getting a number greater than 5 is 6.

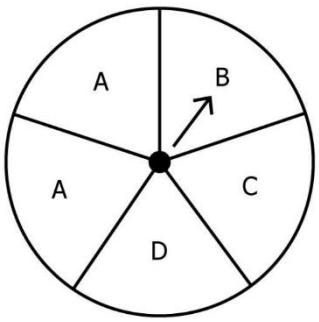
(b) Outcome of the event of not getting a number greater than 5 are 1, 2, 3, 4, and 5.

3. Find the.
(a) Probability of the pointer stopping on D in (Question 1-(a))?
(b) Probability of getting an ace from a well shuffled deck of 52 playing cards?
(c) Probability of getting a red apple. (See figure below)





Answer:



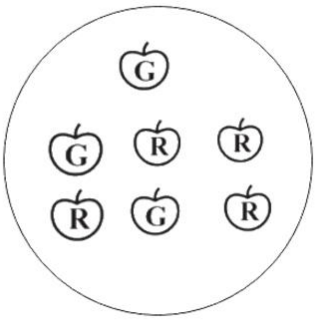
Probability is defined as the number of favorable outcomes by the total number of outcomes

(a) In a spinning wheel, there are five pointers A, A, B, C, D. So, there are five outcomes. Pointer stops at D which is 1 outcome.

So, the probability of the pointer stopping on D = 1/5

(b) There are 4 aces in a deck of 52 playing cards. So, there are 4 events of getting an ace.

So, probability of getting an ace = 4/52 = 1/13



(c) Total number of apples = 7

Number of red apples = 4

So, probability of getting red apple = $\frac{4}{7}$

4. Numbers 1 to 10 are written on ten separate slips (one number on one slip), kept in a box and mixed well. One slip is chosen from the box without looking into it. What is the probability of (i) getting a number 6? (ii) getting a number less than 6?

(iii) getting a number greater than 6? (iv) getting a 1-digit number?

Answer: We know that,

Probability = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$

i) The outcome of getting a number 6 from ten separate slips is 1

Therefore, the probability of getting a number 6 = $\frac{1}{10}$

ii) Numbers less than 6 are 1, 2, 3, 4, and 5. So, there are 5 possible outcomes.

Therefore, the probability of getting a number less than 6 = $\frac{5}{10}$ = $\frac{1}{2}$

iii) Numbers greater than 6 are 7, 8, 9, and 10. So, there are 4 possible outcomes.

Therefore, the probability of getting a number greater than 6 = = $\frac{4}{10}$ = $\frac{2}{5}$

(iv) One-digit numbers are 1, 2, 3, 4, 5, 6, 7, 8, 9 out of ten.

Therefore, the probability of getting a 1-digit number = $\frac{9}{10}$

5. If you have a spinning wheel with 3 green sectors, 1 blue sector and 1 red sector, what is the probability of getting a green sector? What is the probability of getting a non-blue sector?

Answer: We know that,

Probability = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$

Given that there is a spinning wheel with 3 green sectors, 1 blue sector and 1 red sector

Total number of sectors = 5

Total number of green sectors = 3

Therefore, probability of getting a green sector = $\frac{3}{5}$

Total number of blue sectors = 1

Total number of non-blue sectors = 5 – 1 = 4

Therefore, the probability of getting a non-blue sector = $\frac{4}{5}$

6. Find the probabilities of the events given in Question 2 (When a die is thrown, list the outcomes of an event of getting (i) (a) a prime number (b) not a prime number (ii) (a) a number greater than 5 (b) a number not greater than 5.)

Answer: We know that,

Probability = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$

When a die is thrown, there are a total of six outcomes, i.e., 1, 2, 3, 4, 5, and 6.

(i) (a) 2, 3, 5 are prime numbers. So, there are 3 outcomes out of 6.

Therefore, the probability of getting a prime number = $\frac{3}{6} = \frac{1}{2}$

(b) 1, 4, 6 are not the prime numbers. So, there are 3 outcomes out of 6.

Therefore, the probability of getting a prime number = $\frac{3}{6} = \frac{1}{2}$

(ii) (a) Only 6 is greater than 5. So, there is 1 outcome out of 6.

Therefore, the probability of getting a number greater than 5 = $\frac{1}{6}$

(b) Numbers not greater than 5 are 1, 2, 3, 4, and 5. So there are 5 outcomes out of 6.

Therefore, the probability of not getting a number not greater than 5 = $\frac{5}{6}$