EXERCISE 19.1

1. The result of a survey of 200 people about their favourite fruit is given below:
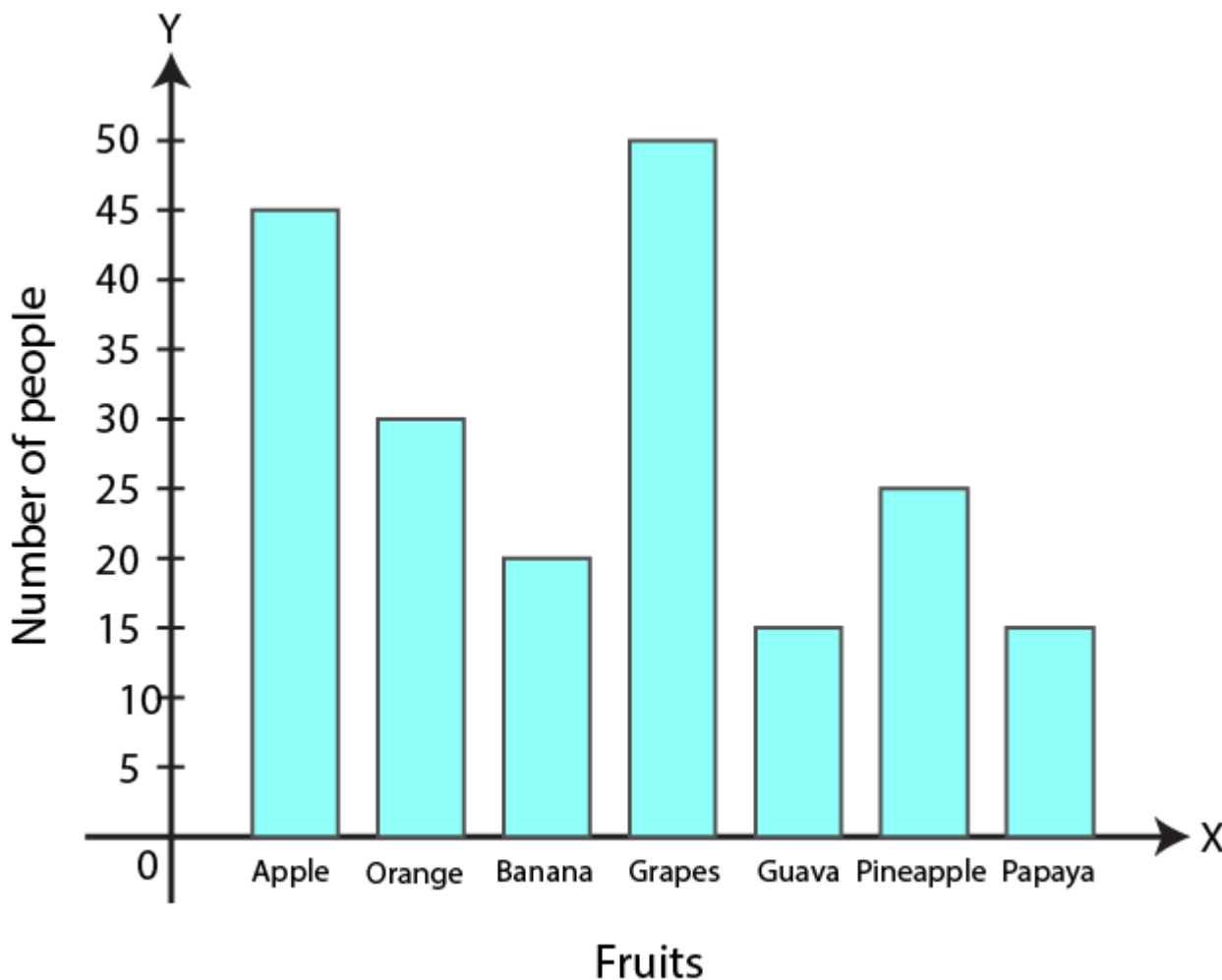
Fruit	Apple	Orange	Banana	Grapes	Guava	Pineapple	Papaya
Number of people	45	30	20	50	15	25	15

Represent the above data in a bar graph.

Solution:

Fruit	Apple	Orange	Banana	Grapes	Guava	Pineapple	Papaya
Number of people	45	30	20	50	15	25	15

The bar graph is shown below:

2. Mr Khurana has two kitchen appliance stores. He compared the sales of two stores during a month and recovered as given below:
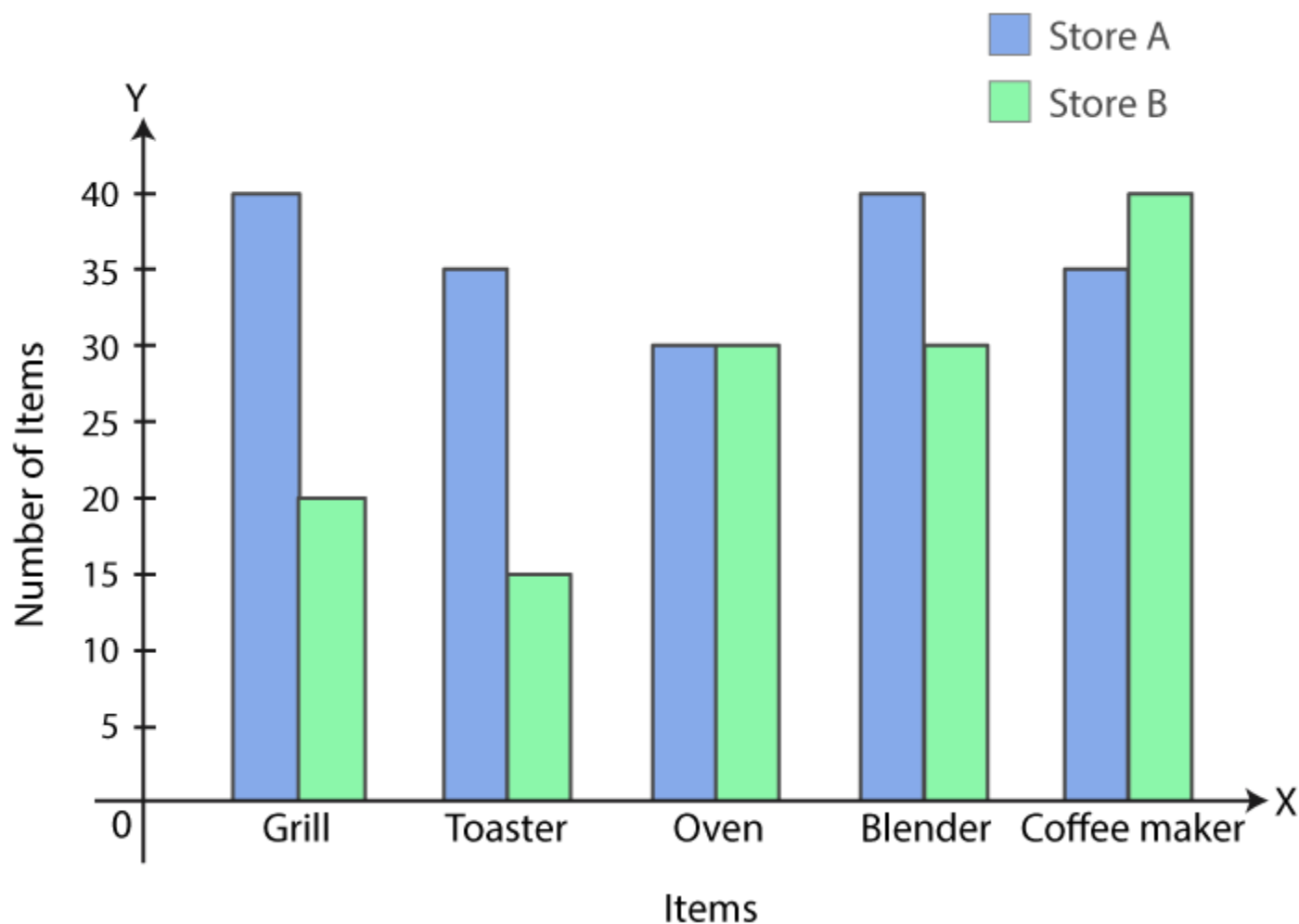
Item	Number of Items Sold	
	Store A	Store B
Grill	40	20
Toaster	35	15
Oven	30	30
Blender	40	30
Coffee maker	35	40

Represent the above data by a double bar graph.

Solution:

Item	Number of items sold	
	Store A	Store B
Grill	40	20
Toaster	35	15
Oven	30	30
Blender	40	30
Coffee maker	35	40

The double bar graph of the given data is shown below:

3. The number of goals scored by a football team in different matches is given below:

3, 1, 0, 4, 6, 0, 0, 1, 1, 2, 2, 3, 5, 1, 2, 0, 1, 0, 2, 3, 9, 2, 0, 1, 0, 1, 4, 1, 0, 2, 5, 1, 2, 2, 3, 1, 0, 0, 0, 1, 1, 0, 2, 3, 0, 1, 5, 2, 0
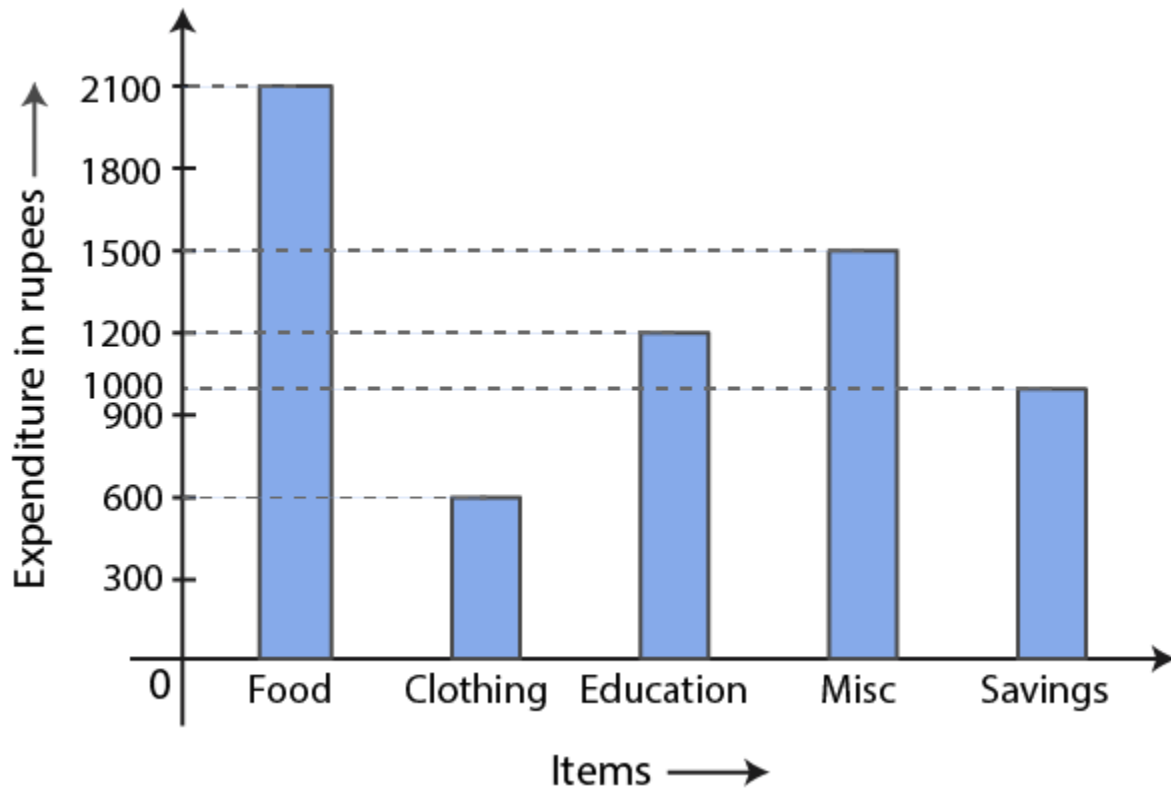
Make a frequency distribution table using tally marks

Solution:

The frequency table for the given data is as follows:

Number of Goals Scored	Tally Marks	Frequency of Matches
0 1 2 3 4 5 6 9	ٻﬃ ٻﬃ IIII ٻﬃ ٻﬃ III ٻﬃ ٻﬃ ٻﬃ || ||| | |	14 13 10 5 2 3 1 1
Total		49

4. Given below is a bar graph:

Read the bar graph carefully and answer the following questions:
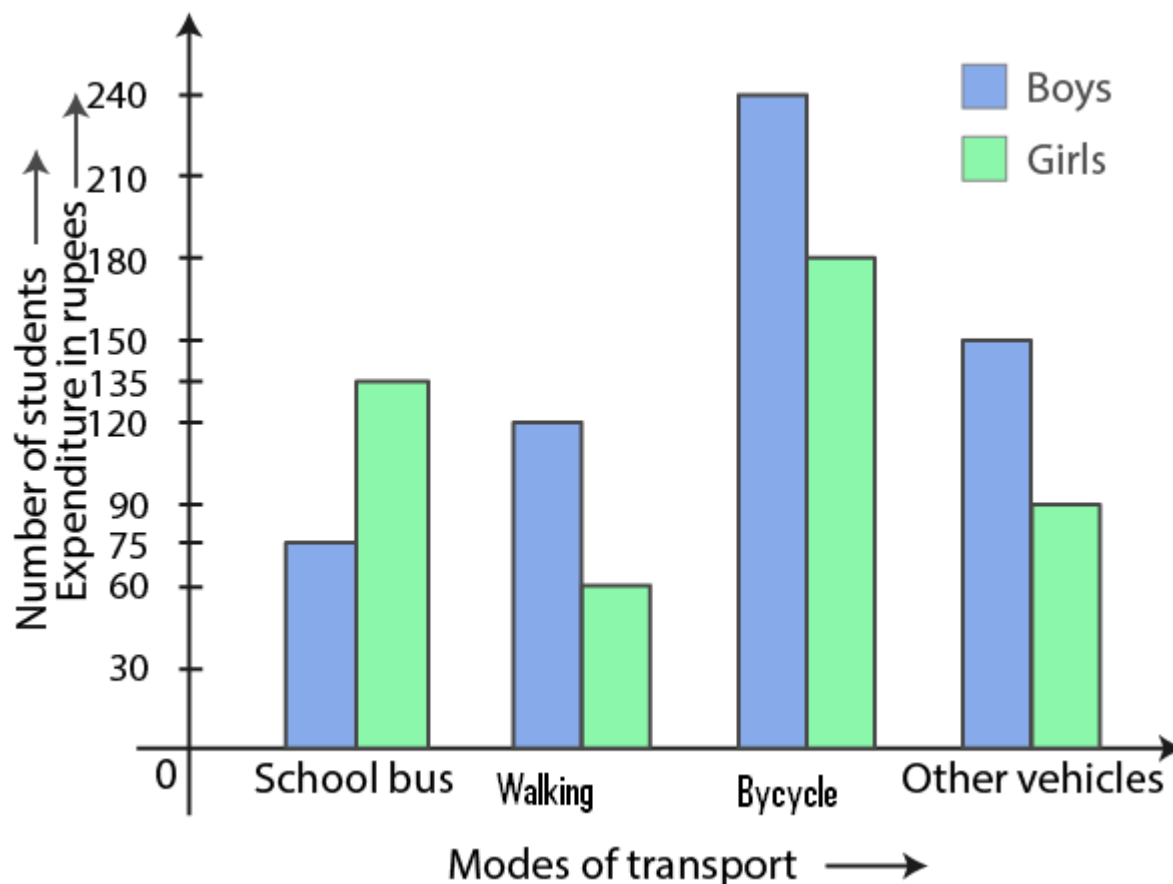
(i) What is the information given by the bar graph?

(ii) On which item is the expenditure maximum?

(iii) On which item is the expenditure minimum?

(iv) State whether true or false:

Expenditure on education is twice the expenditure on clothing

Solution:

(i) Representation of the expenditure of monthly salary on different heads is the information given in the bar graph

(ii) The expenditure on food is maximum

(iii) The expenditure on clothing is minimum

(iv) Yes, the expenditure on education is twice the expenditure on clothing

5. Given below a double bar graph

Read the double bar graph carefully and answer the following questions:

(i) What is the information given by the double graph?

(ii) Which mode of transport do girls use more than boys?

(iii) Which mode of transport are boys use the most?

(iv) In which mode of transport number of girls is half the number of boys?

Solution:

From the double bar graph:

(i) The bar graph represents the number of boys and girls going to school using different modes of transport

(ii) The mode of transport girls using more than boys is the school bus

(iii) The mode of transport boys use the most is the bicycle

(iv) The mode of transport, the number of girls is half the number of boys is walking

6. Using class intervals 0-5 and 5-10, construct the frequency distribution table for the following data:

13, 6, 12, 9, 11, 14, 2, 8, 18, 16, 9, 13, 17, 11, 19, 6, 7, 12, 22, 21, 18, 1, 8, 12, 18

Solution:

The frequency table is as follows:

Class Intervals	Tally Marks	Frequency
0-5 5-10 10-15 15-20 20-25	‖ ʕʜʅ II ʕʜʅ III ʕʜʅ I ‖	2 7 8 6 2
Total		25

7. Given below are the marks secured by 35 students in a surprise test:

41, 32, 35, 21, 11, 47, 42, 00, 05, 18, 25, 24, 29, 38, 30, 04, 14, 24, 34, 44, 48, 33, 36, 38, 41, 48, 08, 34, 39, 11, 13, 27, 26, 43, 03.

Taking class intervals 0-10, 10-20 ……. Construct a frequency distribution table. Find the number of students obtaining below 20 marks.

Solution:

The frequency table of the given data is shown below:

Class	Tally Marks	Frequency
0-10 10-20 20-30 30-40 40-50	ʕʜʅ ʕʜʅ ʕʜʅ II ʕʜʅ ʕʜʅ ʕʜʅ III	5 5 7 10 8
Total		35

Number of students obtaining below 20 marks = 5 + 5

= 10

Hence, 10 students are getting below 20 marks

8. The electricity bills (in ?) of 40 houses in a locality are given below:

78, 87, 81, 52, 59, 65, 101, 108, 115, 95, 98, 65, 62, 121, 128, 63, 76, 84, 89, 91, 65, 101, 95, 81, 87, 105, 129, 92, 75, 105, 78, 72, 107, 116, 127, 100, 80, 82, 61, 118. Construct a grouped frequency distribution table of class size 10.

Solution:

The frequency distribution table for the given data is as follows:

Class Intervals (Electricity bill in Rs)	Tally Marks	Frequency (Number of houses)
50-60	||	2
60-70	꒞꒞꒞ I	6
70-80	꒞꒞꒞	5
80-90	꒞꒞꒞ III	8
90-100	꒞꒞꒞	5
100-110	꒞꒞꒞ II	7
110-120	|||	3
120-130	||||	4
Total		40

9. Draw a histogram for the frequency table made for data in Question 8, and answer the following questions:

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

(ii) How many houses pay less than Rs 100?

(iii) How many houses pay Rs 100 or more?

Solution:

The histogram of the given data in Question 8 is as follows:
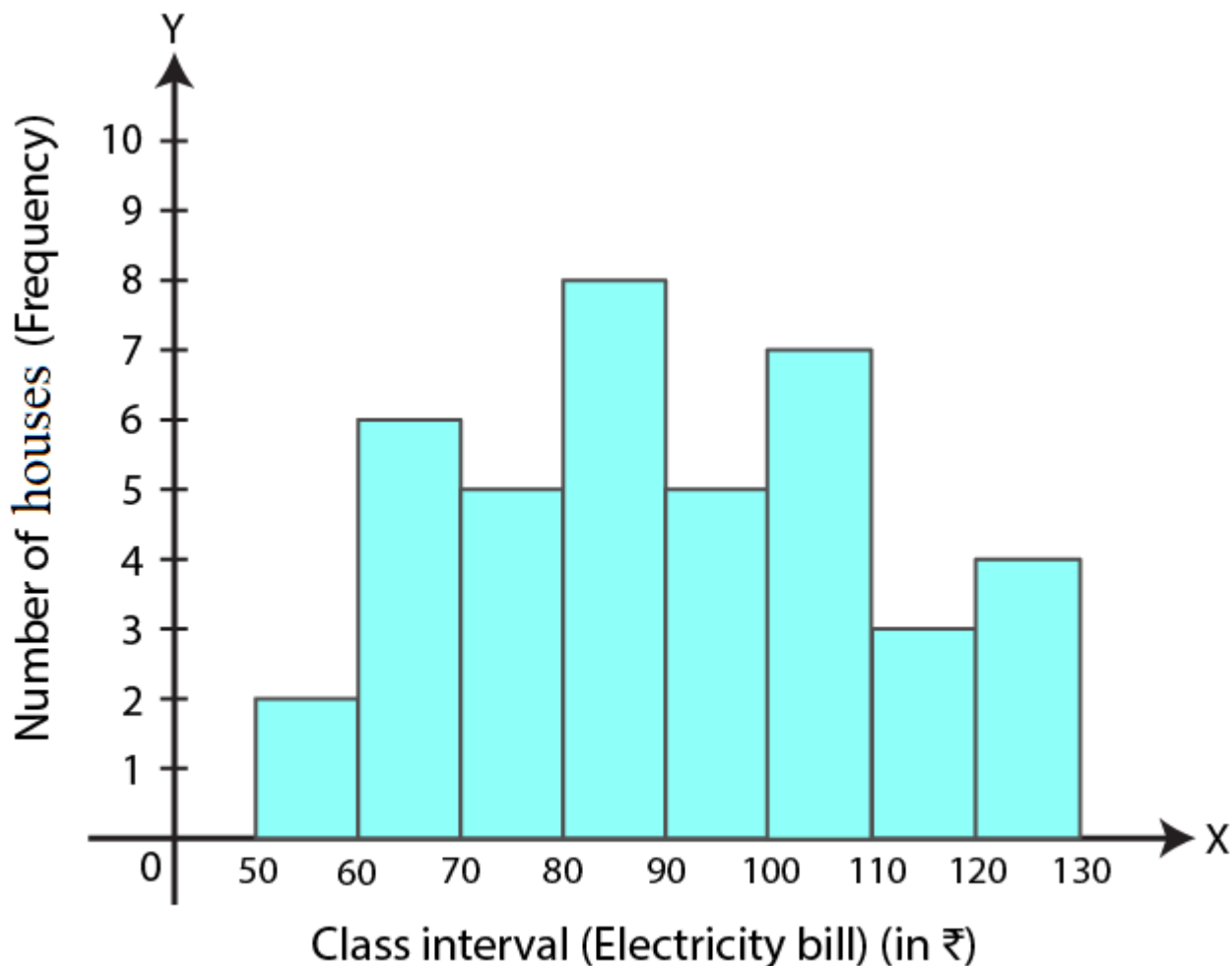
(i) Group 80-90 has the maximum number of house

(ii) Number of houses that pay less than Rs 100 = 2 + 6 + 5 + 8 + 5

= 26

Hence, 26 houses pay less than Rs 100

(iii) Number of houses that pay Rs 100 or more = 7 + 3 + 4

= 14

Hence, 14 houses pay Rs 100 or more

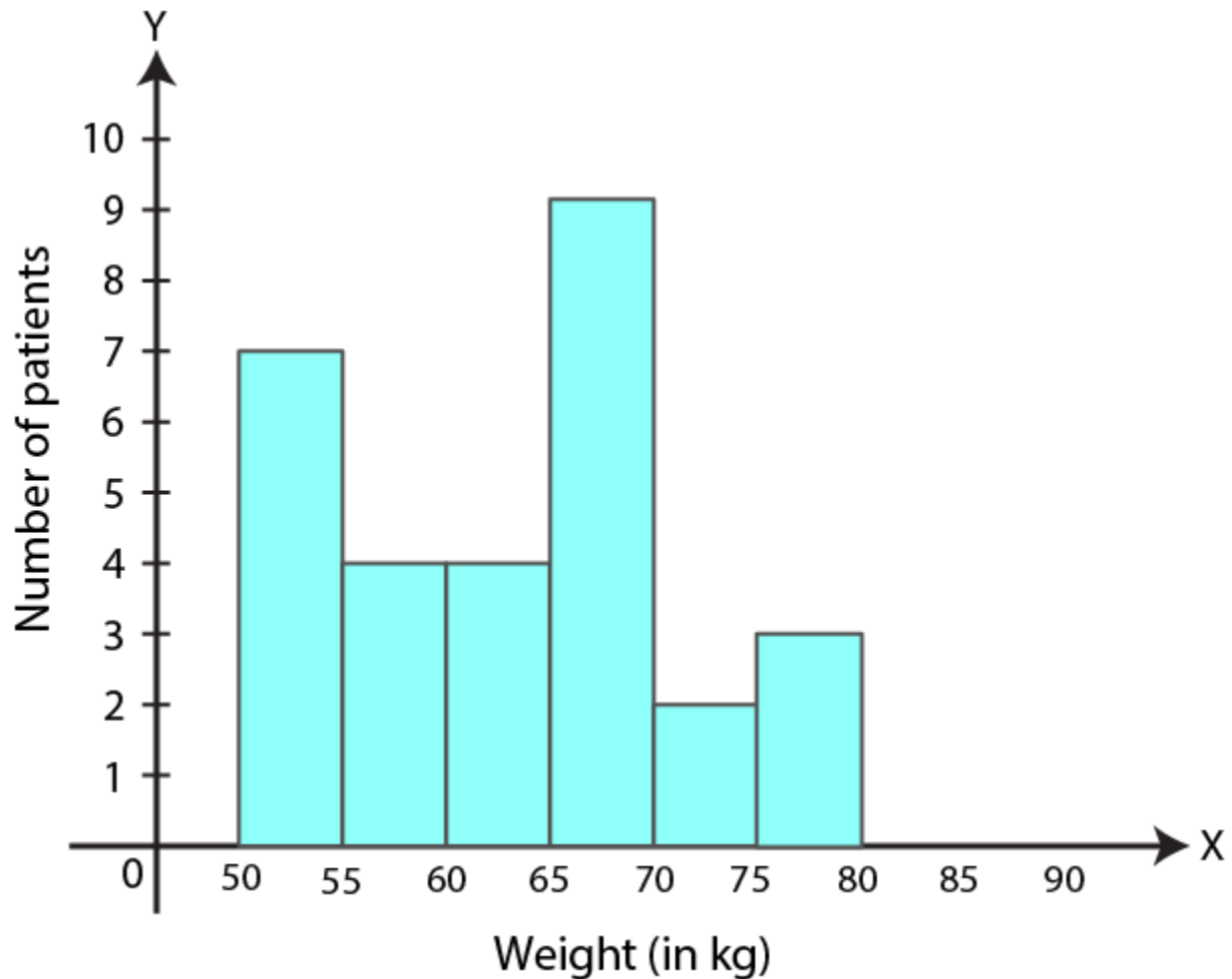**10. The weights of 29 patients in a hospital were recorded as follows:**

Weight (in kg)	50-55	55-60	60-65	65-70	70-75	75-80
Number of patients	7	4	4	9	2	3

Draw a histogram to represent this data visually

Solution:

Weight (in kg)	50-55	55-60	60-65	65-70	70-75	75-80
Number of patients	7	4	4	9	2	3

The histogram for the given data is shown below:

11. In a study of diabetic patients, the following data was obtained:
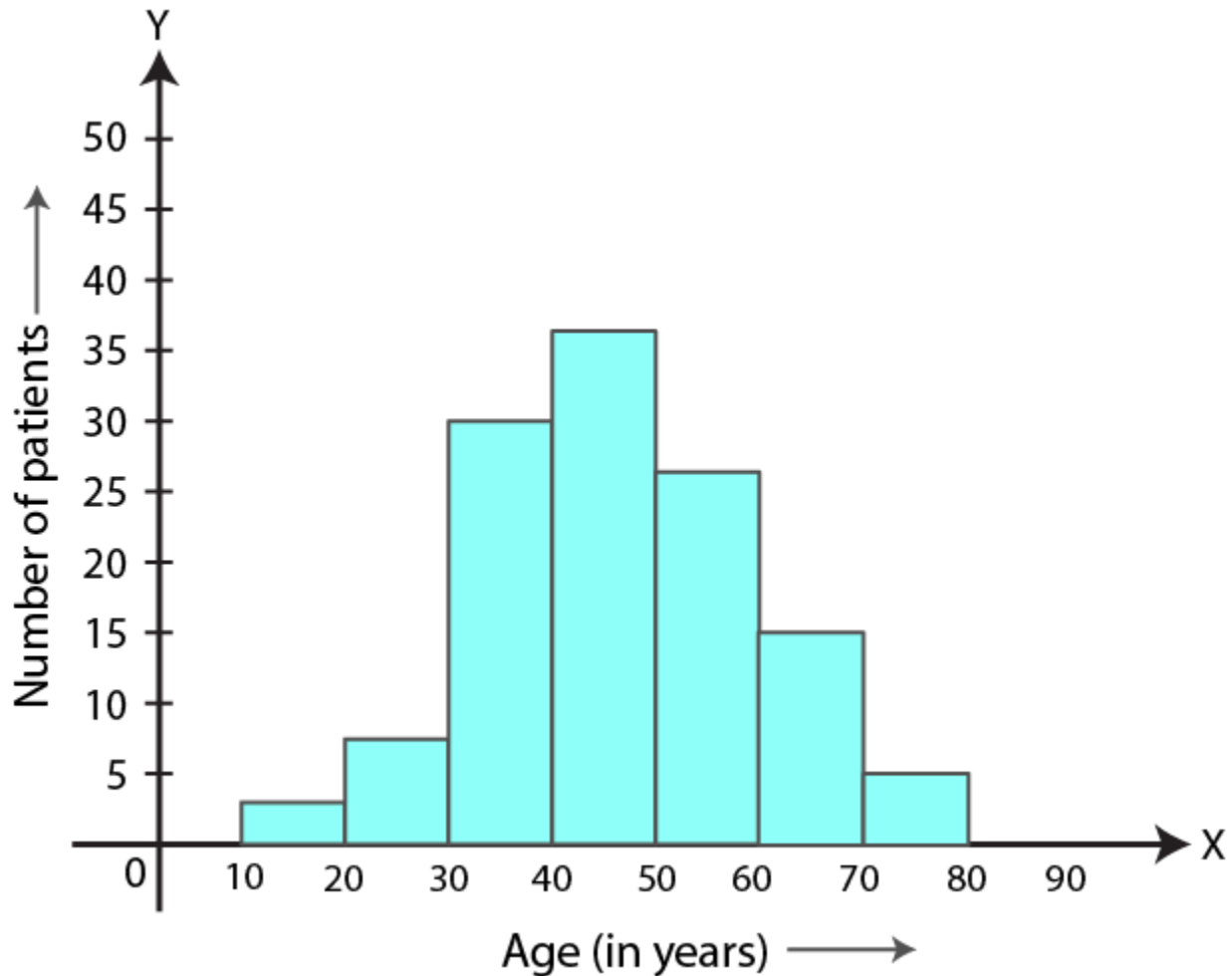
Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of patients	3	8	30	36	27	15	6

Represent the above data in a histogram

Solution:

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of patients	3	8	30	36	27	15	6

The histogram representing the above-given data is as follows:

12. The histogram showing the weekly wages (in Rs) of workers in a factory is given alongside:
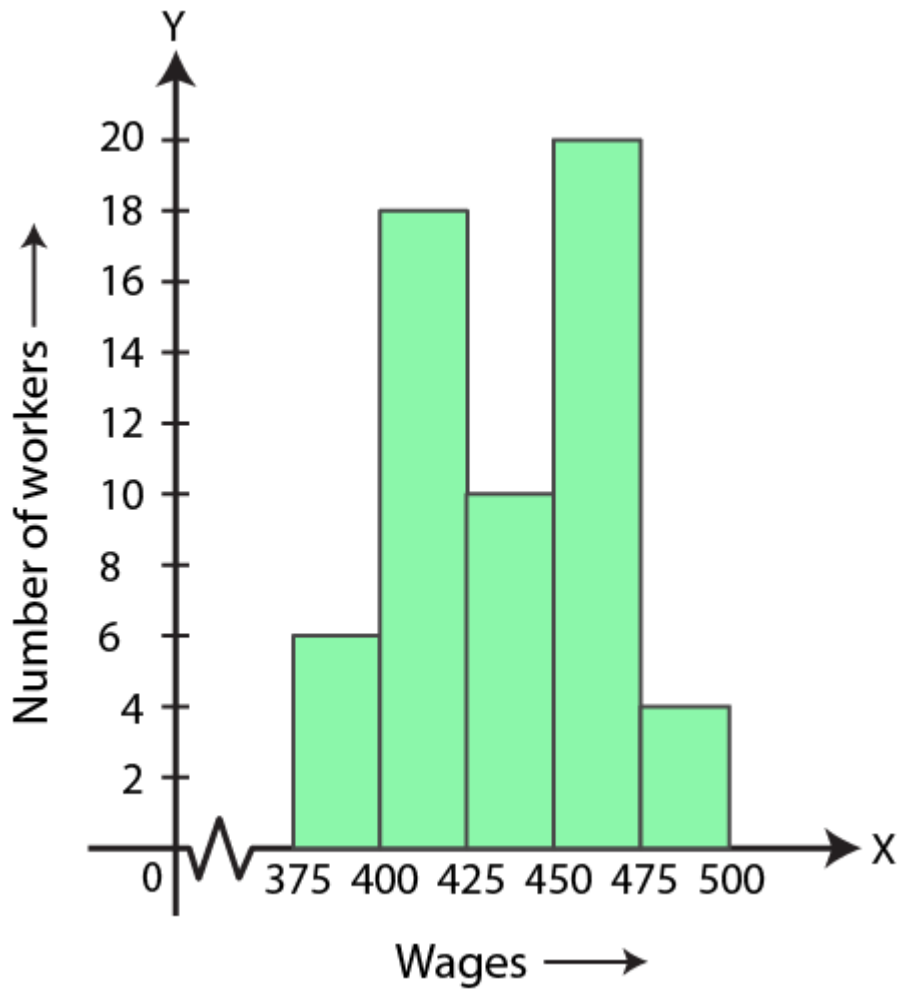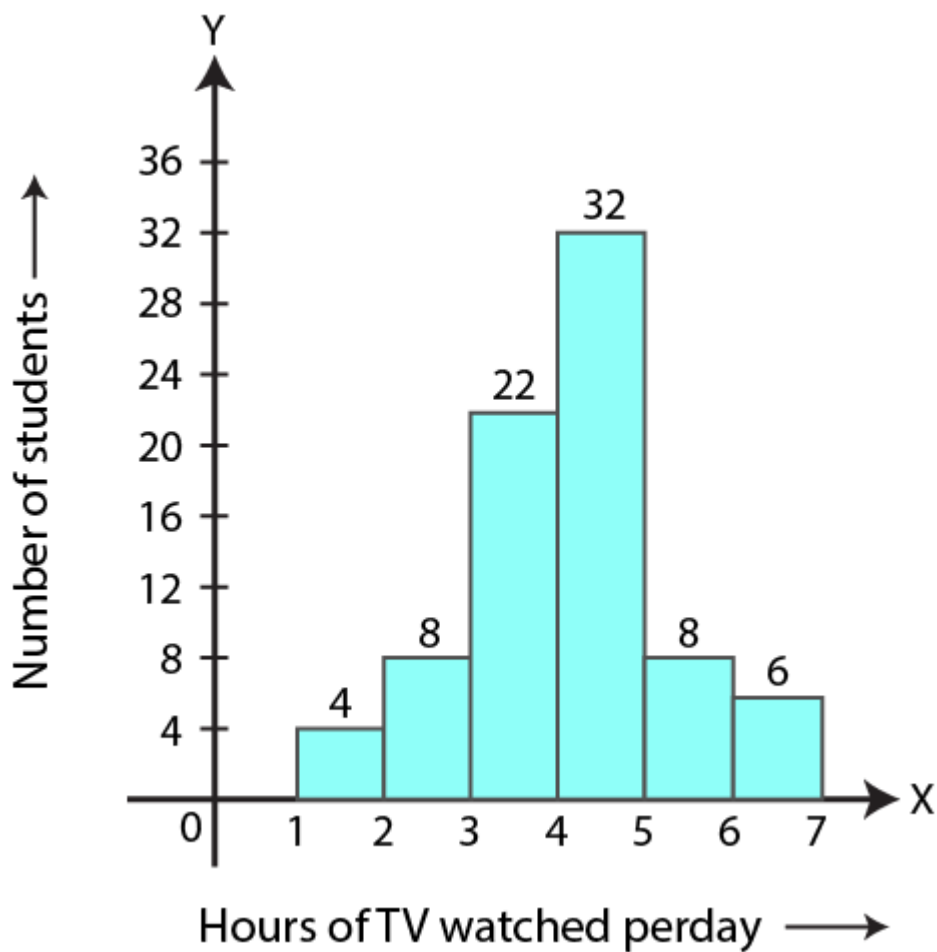
Answer the following:

(i) What is the frequency of class 400-425?

(ii) What is the class having a minimum frequency?

(iii) How many workers get more than Rs 425?

(iv) How many workers get less than Rs 475?

(v) Number of workers whose weekly wages are more than or equal to Rs 400 but less than Rs 450

Solution:

The weekly wages of workers in a factory are shown in the given histogram:

(i) The frequency of class 400-425 is 18

(ii) The class which has a minimum frequency is 475-500

(iii) 34 workers are getting more than Rs 425

(iv) 54 workers are getting less than Rs 475

(v) Number of workers whose weekly wages are more than or equal to Rs 400 but less than Rs 450 is 28

13. The number of hours for which students of a particular class watched television during holidays is shown in the histogram below.


Hours of TV watched perday ⟶

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?

(iv) How many students spent more than 2 hours but less than 4 hours in watching TV?

Solution:

From the given histogram,

(i) Maximum number of students watch TV for 4-5 hours

(ii) 34 students watch TV for less than 4 hours

(iii) 14 students spent more than 5 hours watching TV.

(iv) 30 students spent more than 2 hours but less than 4 hours in watching TV.

14. The number of literate females in the age group of 10 to 40 years in a town is shown in the histogram below.
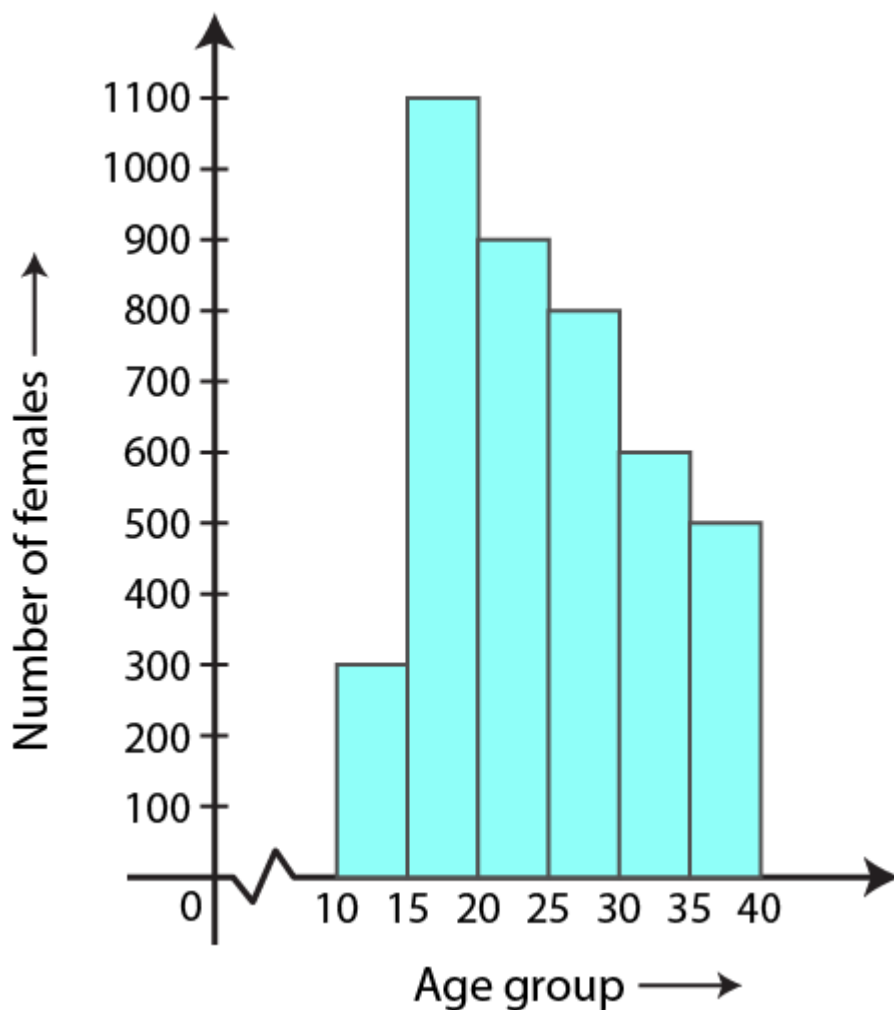
Answer the following questions:

(i) Write the classes assuming all the classes are of equal width.

(ii) What is the class size?

(iii) In which age group are the literate females the least?

(iv) In which age group is the number of literate females the highest?

Solution:

(i) From the given histogram, the classes having equal widths are 10-15, 15-20, 20-25, 25-30, 30-35, 35-40

(ii) In the given histogram, the class size is 5

(iii) In the 10-15 age group, literate females are the least

(iv) In the 15-20 age group, literate females are the highest

EXERCISE 19.2

1. The following data represents the different numbers of animals in a zoo. Prepare a pie chart for the given data.
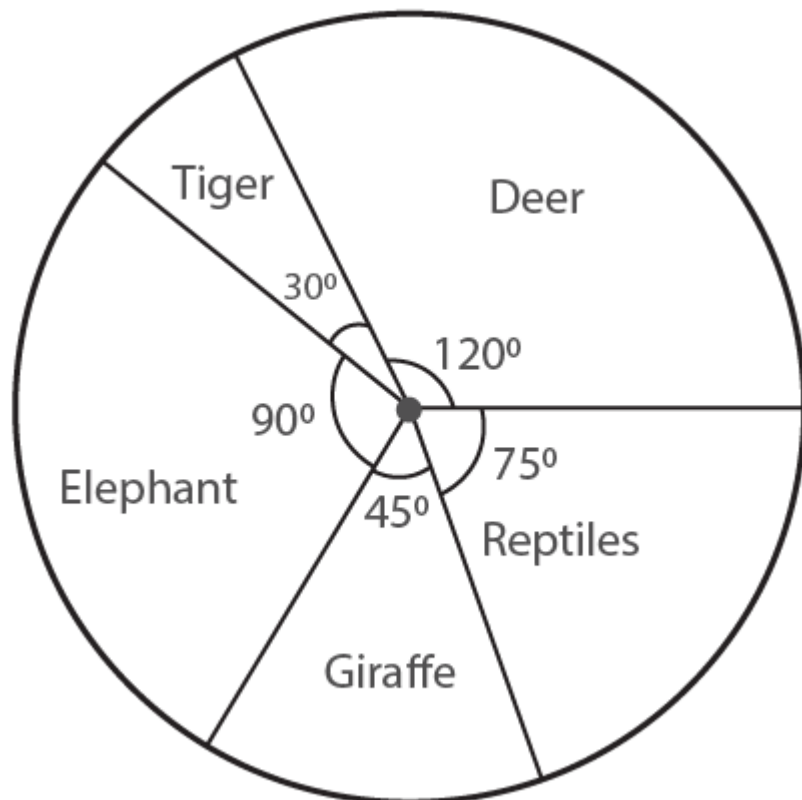
Animals	Deer	Tiger	Elephant	Giraffe	Reptiles
Number of animals	40	10	30	15	25

Solution:

Animals	Number of animals	Central degree
Deer	40	$(360^\circ \times 40) / 120 = 120^\circ$
Tiger	10	$(360^\circ \times 10) / 120 = 30^\circ$
Elephant	30	$(360^\circ \times 30) / 120 = 90^\circ$
Giraffe	15	$(360^\circ \times 15) / 120 = 45^\circ$
Reptiles	25	$(360^\circ \times 25) / 120 = 75^\circ$
Total	120	360°

The pie chart for the given data is shown below:

2. The following data represents the monthly expenditure of a family (in T) on various items. Draw a pie chart to represent this data.

Items	Food	House rent	Education	Savings	Health	Others
Expenditure (in Rs)	12500	5000	7500	10000	5000	10000

Solution:

Items	Expenditure (in Rs)	Central angles
Food	12500	$(12500 \times 360^\circ) / 50000 = 90^\circ$
House rent	5000	$(5000 \times 360^\circ) / 50000 = 36^\circ$
Education	7500	$(7500 \times 360^\circ) / 50000 = 54^\circ$
Savings	10000	$(10000 \times 360^\circ) / 50000 = 72^\circ$

Health	5000	$(5000 \times 360^o) / 50000 = 36^o$
Others	10000	$(10000 \times 360^o) / 50000 = 72^o$
Total	50000	360°

Pie chart for the given data is shown below
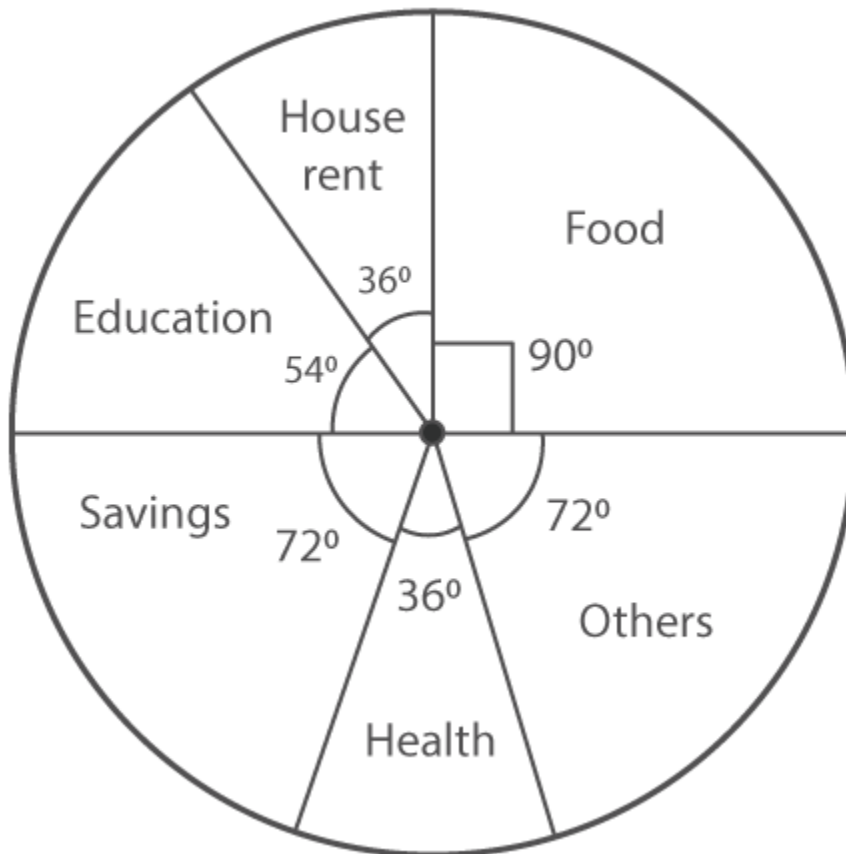
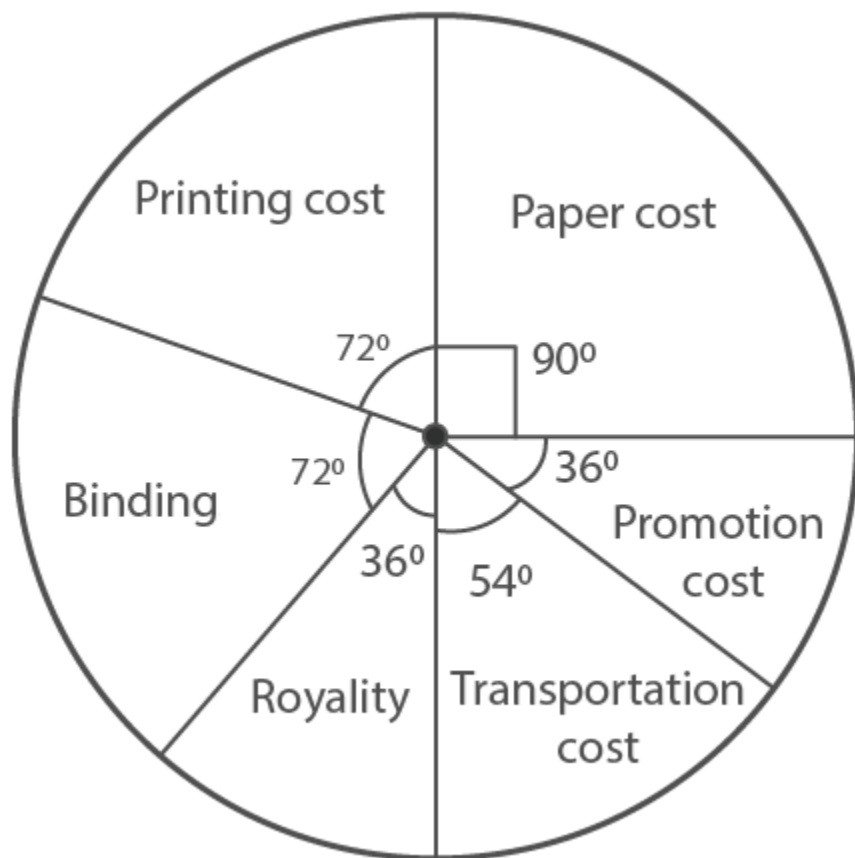**3. The following data represents the percentage distribution of the expenditure incurred in publishing a book.**

Items	Paper cost	Printing cost	Binding	Royalty	Transportation cost	Promotion cost
Expenditure (in %)	25%	20%	20%	10%	15%	10%

Solution:

Items	Expenditure	Central angles

Paper cost	25%	$(360^0 \times 25) / 100 = 90^0$
	20%	$(360^0 \times 20) / 100 = 72^0$
Printing cost	20%	$(360^0 \times 20) / 100 = 72^0$
Binding	10%	$(360^0 \times 10) / 100 = 36^0$
Royalty	15%	$(360^0 \times 15) / 100 = 54^0$
Transportation cost	10%	$(360^0 \times 10) / 100 = 36^0$
Promotion cost		
Total	100%	360^0

Pie chart representing the given data is as follows:

4. The following data represents the number of students who got admission to different streams of a college:

Stream	Science	Arts	Commerce	Law	Management
Number of students	**400**	**300**	**500**	**250**	**350**

Draw a pie chart to represent this data

Solution:

Stream	Number of students	Central angle
Science Arts Commerce Law Management	400 300 500 250 350	$(400 \times 360°) / 1800 = 80°$ $(300 \times 360°) / 1800 = 60°$ $(500 \times 360°) / 1800 = 100°$ $(250 \times 360°) / 1800 = 50°$ $(350 \times 360°) / 1800 = 70°$
Total	1800	360°

The pie chart representing the above-given data is shown below:
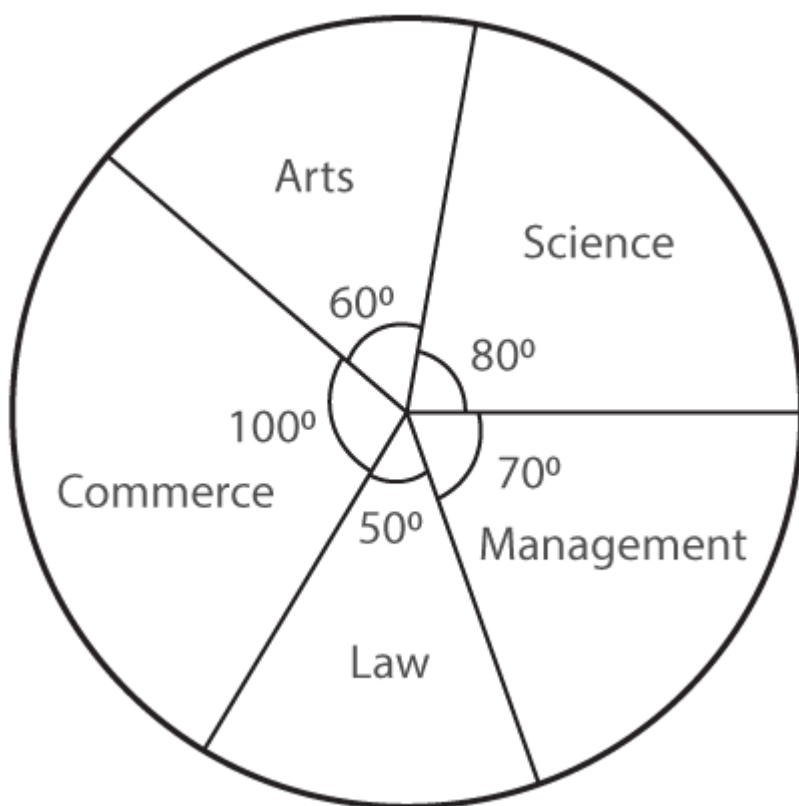
5. The adjoining pie chart shows the expenditure of a country on various sports during the year 2012. Study the pie chart carefully and answer the following questions:
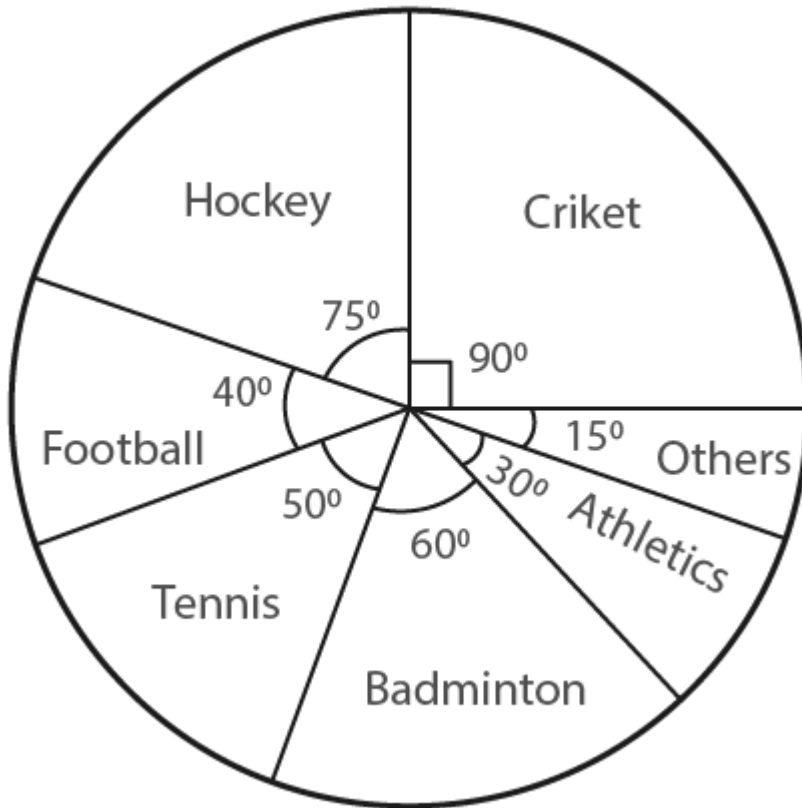
(i) What per cent of total expenditure is spent on cricket?

(ii) How much per cent more is spent on hockey than that on tennis?

(iii) If the total amount spent on sports in 2012 is Rs 1,80,00, 000 then find the amount spent on Badminton

(iv) If the total amount spent on sports in 2012 is Rs 2,40,00,000 then find the amount spent on cricket and hockey together.

Solution:

The given pie chart represents the expenditure of a country on various sports during the year 2012.

(i) Given that expenditure on a cricket = 90⁰

So,

(90 / 360⁰) × 100% = 25%

Therefore, 25% of expenditure is spent on cricket

(ii) Given that expenditure on a hockey = 75⁰

So,

(70 / 360⁰) × 100% = (125 / 6)% =
$20\dfrac{5}{6}$%

Expenditure on tennis = 50⁰

Hence, (50 / 360⁰) × 100% = (125 / 9)% = 13.9%

So,

(125 / 6) – (125 / 9) = 125 / 18

= (375 – 250) / 18

= 125 / 18

= 6.95% more

Therefore, 6.95% more is spent on hockey than that on tennis

(iii) Total amount spent on sports = Rs 1,80,00,000

Total amount spent on Badminton = Rs 1,80,00,000 × (60 / 360⁰)

= Rs 30,00,000
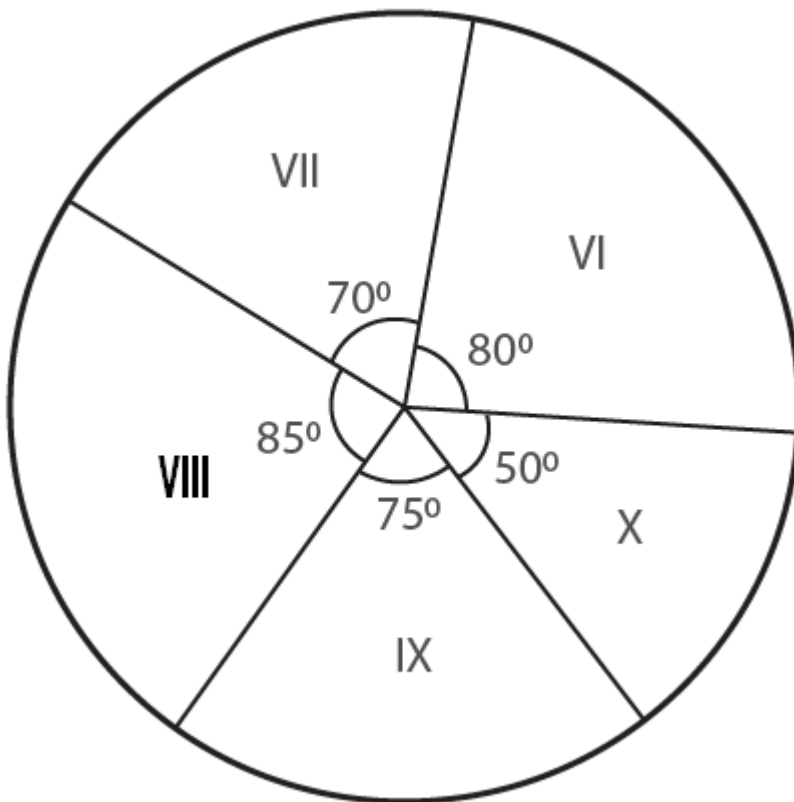
(iv) If the total amount spent on sports = 2,40,00,000

Total amount spent on cricket and hockey together = 90⁰ + 75⁰

= 165⁰

= (165⁰ / 360⁰) × 2, 40, 00,000

= 1, 10, 00, 000

6. The adjoining pie chart shows the number of students enrolled in Class VI to Class X of a school.

If 1440 students are enrolled from VI to X, then answer the following questions:

(i) How many students are enrolled in Class VIII?

(ii) How many students are more in Class IX than in Class X?

(iii) What is the sum of students enrolled in VII and VIII?

(iv) Find the ratio of students enrolled in VI to students enrolled in X

Solution:

The given pie chart represents the enrolment of students from class VI to class X in a school.

Total number of students enrolled from VI to X = 1440 students

(i) Enrolment of class VIII = $(85 / 360^0) \times 1440 = 340$ students

(ii) Difference in X and IX class enrolment = $75^0 - 50^0$

$= 25^0$

$(25 / 360^0) \times 1440 = 100$ students

Therefore, 100 students are more in class IX than in class X

(iii) Sum of students enrolled in VII and VIII classes = $70^0 + 85^0$

$= 155^0$

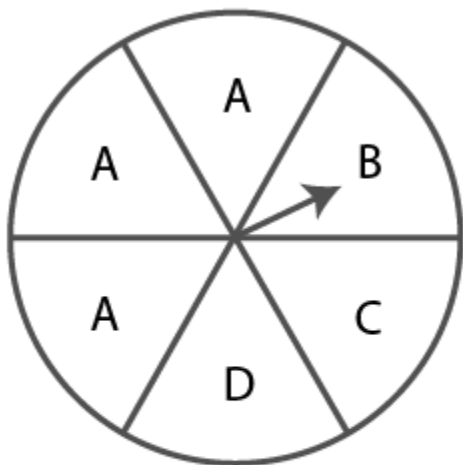$(155 / 360^0) \times 1440 = 620$ students

Therefore, the sum of students enrolled in Classes VI and VIII = 620 students

(iv) Ratio between the students enrolled in VI to students enrolled in X classes = $80^0 : 50^0$
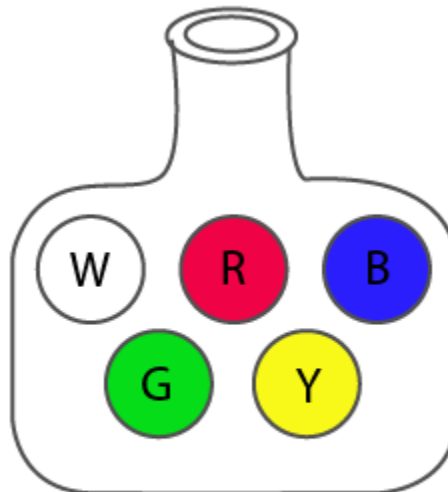
$= 8 : 5$

Therefore, the ratio between the students enrolled in VI to students enrolled in X classes is 8: 5

EXERCISE 19.3

1. List the outcomes you can see in these experiments

(i) Spinning a wheel

(ii) Drawing a ball from the containing 5 identical ball of different colours

Solution:

(i) The outcomes in the spinning wheel = A, A, A, B, C, D

(ii) The outcomes in drawing a ball from a bag containing 5 identical balls of different colours = White, Red, Blue, Green, Yellow

2. A die is rolled once. Find the probability of getting

(i) an even number

(ii) a multiple of 3

(iii) not a multiple of 3

Solution:

Total outcomes of a die when rolled once:

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

(i) An even number: 2, 4, 6

i.e, Favourable outcomes = 3

Therefore,

Probability P(E) = 3 / 6

= 1 / 2

(ii) Multiple of 3 = 3, 6

i.e, Favourable outcomes = 2

Therefore,

Probability P(E) = 2 / 6

= 1 / 3

(iii) Not a multiple of 3 = 1, 2, 4, 5

i.e Favourable outcomes = 4

Therefore,

Probability P(E) = 4 / 6

= 2 / 3

3. Two coins are tossed together. Find the probability of getting

(i) two tails

(ii) atleast one tail

(iii) no tail

Solution:

The total outcomes, when two coins are tossed together = 2 × 2

= 4

Therefore, the outcomes are,

HH, HT, TH, TT

(i) Favourable outcomes of getting two tails = 1

Hence,

Probability P(E) = 1 / 4

(ii) Favourable outcomes of getting atleast one tail = TH, HT, TT

= 3

Hence,

Probability P(E) = 3 / 4

(iii) Favourable outcomes of getting no tail = HH

= 1

Hence,

Probability P(E) = 1 / 4

4. Three coins are tossed together. Find the probability of getting

(i) atleast two heads

(ii) atleast one tail

(iii) atmost one tail

Solution:

Three coins are tossed together

Hence,

Total outcomes = 8

= HHH, HHT, HTH, THH, HTT, TTH, TTT, THT

(i) Favourable outcomes of getting atleast two heads = HHH, HHT, HTH, THH

= 4 in numbers

Therefore,

Probability P(E) = (Number of favourable outcomes) / (Number of possible outcomes)

= 4 / 8

= 1 / 2

(ii) Favourable outcomes of getting atleast one tail = HHT, HTH, HTT, TTT, THH, THT, TTH

= 7 in numbers

Therefore,

Probability P(E) = (Number of favourable outcomes) / (Number of possible outcomes)

= 7 / 8

(iii) Favorable outcomes of getting atmost one tail = HHH, HHT, HTH, THH

= 4 in numbers

Therefore,

Probability P(E) = (Number of favourable outcomes) / (Number of possible outcomes)

= 4 / 8

= 1 / 2

5. Two dice are rolled simultaneously. Find the probability of getting

(i) the sum as 7

(ii) the sum as 3 or 4

(iii) prime numbers on both dice.

Solution:

Two dice are rolled simultaneously, then

Total outcomes = 6 × 6

= 36

(i) Sum as 7 = (1, 6), (2, 5), (3, 4), (4, 3), (5, 2), (6, 1)

= 6

Therefore,

Probability P(E) = (Favourable outcome) / (Total outcome)

= 6 / 36

= 1 / 6

(ii) The sum as 3 or 4 = (1, 2), (1, 3), (2, 1), (2, 2), (3, 1)

= 5

Therefore,

Probability P(E) = (Favourable outcome) / (Total outcome)

= 5 / 36

(iii) Prime numbers on both the side = (2, 2), (2, 3), (2, 5), (3, 2), (3, 3), (3, 5), (5, 2), (5, 3), (5, 5)

= 9

Therefore,

Probability P(E) = (Favourable outcome) / (Total outcome)

= 9 / 36

= 1 / 4

6. A box contains 600 screws, one tenth is rusted. One screw is taken out at random from the box. Find the probability that it is

(i) a rusted screw

(ii) not a rusted screw

Solution:

Given

Rusted screw = (1 / 10) of 600

= (1 / 10) × 600

= 60 seconds

(i) Favourable outcomes of picking rusted screw = 60

Therefore,

Probability P(E) = 60 / 600

= 1 / 10

(ii) Probability (of not rusted screw) = 1 – Probability (of rusted screw)

= 1 – 1 / 10

= (10 – 1) / 10

= 9 / 10

7. A letter is chosen from the word 'TRIANGLE'. What is the probability that it is a vowel?

Solution:

Given the word,

'TRIANGLE'

Total number of outcomes = 8

Vowels = I, A, E = 3

Therefore,

Probability P(E) = 3 / 8

Hence, the probability of a vowel in 'TRIANGLE' is 3 / 8

8. A bag contains 5 red, 6 black and 4 white balls. A ball is drawn at random from the bag, find the probability the ball drawn is

(i) white

(ii) not black

(iii) red or black

(iv) neither red nor black

Solution:

Given

In a bag, there are 5 red, 6 black and 4 white balls.

Then, total number of outcomes = 5 + 6 + 4

= 15

(i) Probability of white ball = 4 / 15

(ii) Probability of not black = 5 + 4

= 9 balls

Therefore,

Probability of not black = 9 / 15 = 3 / 5

(iii) Probability of red or black = 5 + 6

= 11

Therefore,

Probability of red or black = 11 / 15

(iv) Probability of ball which is neither red nor black, i.e, white ball = 4

Therefore,

Probability of ball, which is neither red nor black = 4 / 15

9. A box contains 17 cards numbered 1, 2, 3…….., 17 and are mixed thoroughly. A card is drawn at random from the box. Find the probability that the number on that card is

(i) odd

(ii) even

(iii) prime

(iv) divisible by 3

(v) divisible by 2 and 3 both

Solution:

Given

A box contains 17 cards numbered 1 to 17

So, the total number of outcomes = 17

(i) Card bearing an odd number

(1, 3, 5, 7, 9, 11, 13, 15, 17) = 9

Therefore,

Probability P(E) = 9 / 17

(ii) Even number

(2, 4, 6, 8, 10, 12, 14, 16) = 8

Therefore,

Probability P(E) = 8 / 17

(iii) Prime numbers

(2, 3, 5, 7, 11, 13, 17) = 7

Therefore,

Probability P(E) = 7 / 17

(iv) Numbers divisible by 3

3, 6, 9, 12, 15 = 5

Therefore,

Probability P(E) = 5 / 17

(v) Numbers divisible by 2 and 3 both

6, 12 = 2

Therefore,

Probability P(E) = 2 / 17

10. A card is drawn from a well-shuffled pack of 52 cards. Find the probability that the card drawn is:

(i) an ace

(ii) a red card

(iii) neither a king nor a queen

(iv) a red face card or an ace

(v) a card of spade

(vi) non-face card of red colour

Solution:

Total number of playing cards = 52

One card is drawn

(i) An ace = 4

Therefore,

Probability P(E) = 4 / 52

= 1 / 13

(ii) A red card = 13 + 13 = 26

Therefore,

Probability P(E) = 26 / 52

= 1 / 2

(iii) Neither a king nor a queen

Number of cards = 52 – (4 + 4)

= 52 – 8

= 44

Therefore,

Probability P(E) = 44 / 52

= 11 / 13

(iv) A red face card = 6

Therefore,

Probability P(E) = 6 / 52

= 3 / 26

(v) A card of spade or an ace = 13 + 3

= 16

Therefore,

Probability P(E) = 16 / 52

= 4 / 13

(vi) Non-face card of red colour = 26 – 6

= 20

Therefore,

Probability P(E) = 20 / 52

= 5 / 13

11. In a lottery, there are 5 prized tickets and 995 blank tickets. A person buys a lottery ticket. Find the probability of his winning a prize.

Solution:

Given

Number of prized tickets = 5

Number of blank tickets = 995

So, the total number of tickets = 5 + 995

= 1000

Probability of prized ticket P(E) = (Number of favourable outcomes) / (Number of possible outcomes)

= 5 / 1000

= 1 / 200

Therefore, the probability of his winning the prize is 1 / 200.