

CHAPTER

4

VIII CLASS-NCERT (2024-25)

DATA HANDLING (Notes)






PREPARED BY : BALABHADRA SURESH

<https://sureshmathsmaterial.com/>

1. **Primary data:** The data collected directly through personal experiences, interviews, direct observations, physical testing etc.
2. **Secondary data :** Secondary data is the information which has been collected in the past by someone else but used by the investigator for his own purpose
3. Measures of Central Tendencies :
 - (i) Average (or) Arithmetic Mean
 - (ii) Mode
 - (iii) Median
4. **Arithmetic Mean** = $\frac{\text{Sum of observations}}{\text{Number of observations}}$
5. Arithmetic Mean' of given data always lies between the highest and lowest observations of the data.
6. **Range** = Maximum value - Minimum value
7. The observation which occurs most frequently in the given data is called 'Mode' of the data.
8. Data having only one mode is known as 'Unimodal Data'
9. Data having two modes is known as 'Bimodal Data'.
10. The middle most value of the data, when the observations are arranged in either ascending or descending order is called 'Median'
11. If the number of observations (n) is odd then median = $\left(\frac{n+1}{2}\right)^{th}$ observation.
12. If number of observations(n) is even then the median

$$= \frac{\left(\frac{n}{2}\right)^{th} \text{ observation} + \left(\frac{n}{2} + 1\right)^{th} \text{ observation}}{2}$$
13. A bar graph: A display of information using bars of uniform width, their heights being proportional to the respective values.
14. Double Bar Graph: A bar graph showing two sets of data simultaneously. It is useful for the comparison of the data
15. 'Pie chart' is the visual representation of the numerical data by sectors of the circle such that angle of each sector (area of sector) is proportional to value of the data that it represents.
16. Frequency gives the number of times that a particular entry occurs.
17. Angle of sector = $\frac{\text{Value of the item}}{\text{Sum of the values of all items}} \times 360^{\circ}$

1.A Pictograph: Pictorial representation of data using symbols

 = 100 cars ← One symbol stands for 100 cars	
July	 = 250  denotes $\frac{1}{2}$ of 100
August	 = 300
September	 = ?

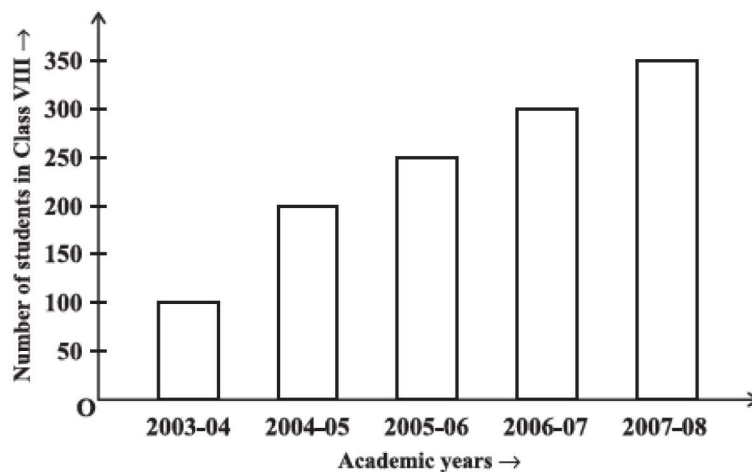
(i) **How many cars were produced in the month of July?**

Sol: 250

(ii) **In which month was maximum number of cars produced?**

Sol: September (400 cars)

2. A bar graph: A display of information using bars of uniform width, their heights being proportional to the respective values.



(i) **What is the information given by the bar graph?**

Sol: The information given by the bar graph is the number of students in class VIII in various academic years .

(ii) **In which year is the increase in the number of students maximum?**

Sol: 2004-05

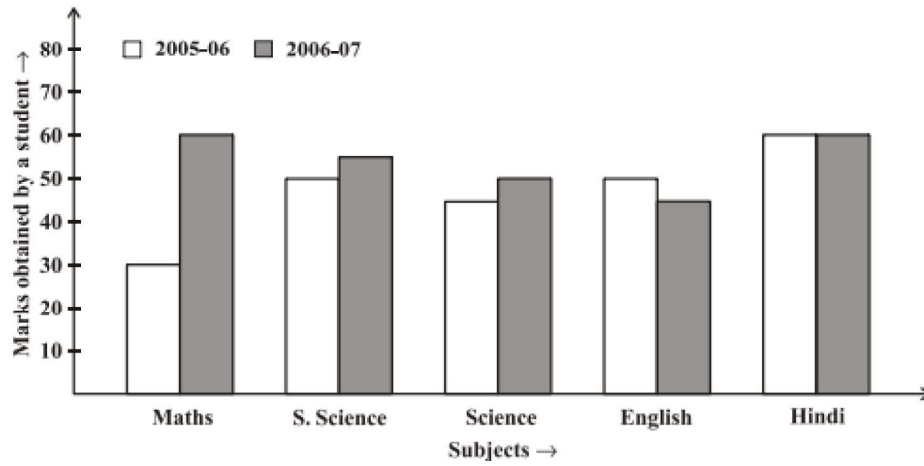
(iii) **In which year is the number of students maximum?**

Sol: 2007-08

(iv) State whether true or false: ‘The number of students during 2005-06 is twice that of 2003-04’.

Sol: False. The number of students during 2005-06=250 and during 2003-04=100

3. Double Bar Graph: A bar graph showing two sets of data simultaneously. It is useful for the comparison of the data.



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

Sol: The graph gives the information of comparison of marks obtained by a student in the academic years 2005-06 and 2006-07 in varies subjects.

(ii) **In which subject has the performance improved the most?**

Sol: In Maths.

(iii) **In which subject has the performance deteriorated?**

Sol: In English.

(iv) **In which subject is the performance at par?**

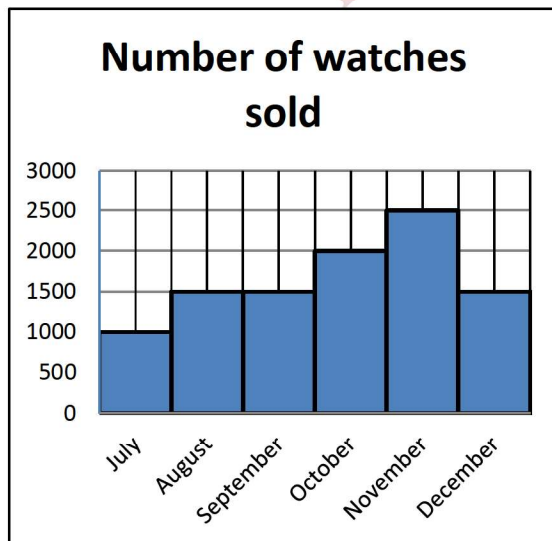
Sol: In Hindi.

TRY THESE

Draw an appropriate graph to represent the given information.

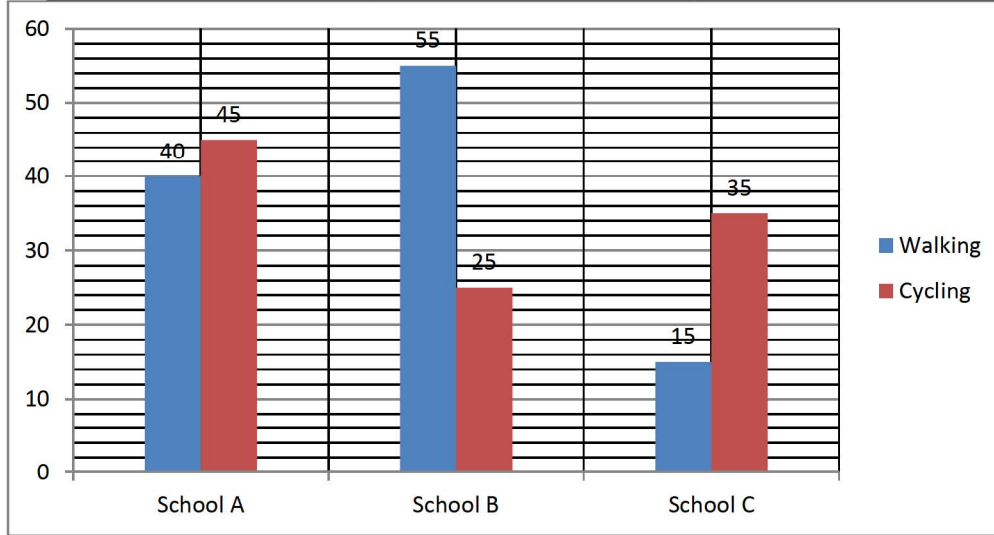
Month	July	August	September	October	November	December
Number of watches sold	1000	1500	1500	2000	2500	1500

Bar Graph



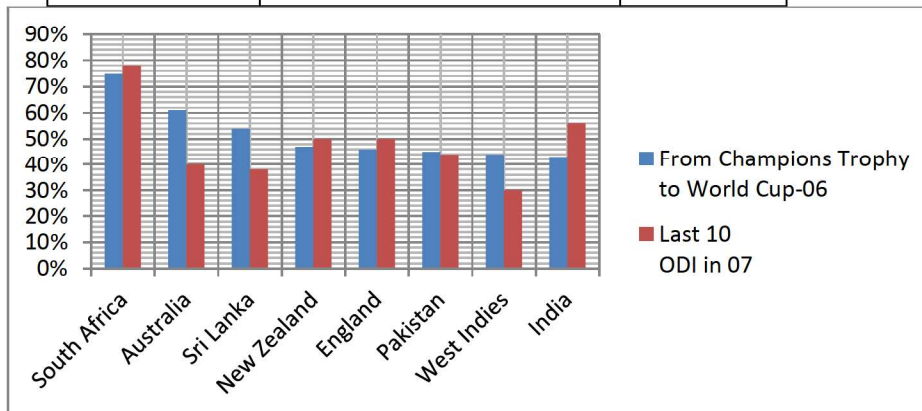
2.

Children who prefer	School A	School B	School C
Walking	40	55	15
Cycling	45	25	35



3. Percentage wins in ODI by 8 top cricket teams.

Teams	From Champions Trophy to World Cup-06	Last 10 ODI in 07
South Africa	75%	78%
Australia	61%	40%
Sri Lanka	54%	38%
New Zealand	47%	50%
England	46%	50%
Pakistan	45%	44%
West Indies	44%	30%
India	43%	56%



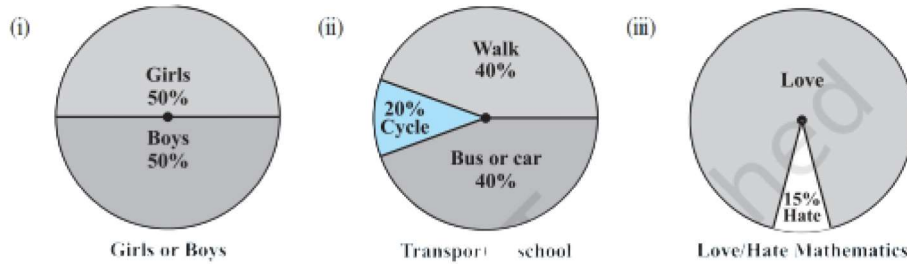
Circle Graph or Pie Chart:

A circle graph shows the relationship between a whole and its parts. Here, the whole circle is divided

into sectors. The size of each sector is proportional to the activity or information it represents. A circle graph is also called a pie chart.

TRY THESE

1. Each of the following pie charts (Fig 5.5) gives you a different piece of information about your class. Find the fraction of the circle representing each of these information.



Sol:

(i) Girls = 50% = $\frac{50}{100} = \frac{1}{2}$

Boys = 50% = $\frac{50}{100} = \frac{1}{2}$

(ii) Walk = 40% = $\frac{40}{100} = \frac{2}{5}$

Cycle = 20% = $\frac{20}{100} = \frac{1}{5}$

Bus or car = 40% = $\frac{40}{100} = \frac{2}{5}$

(iii) Love mathematics = 85% = $\frac{85}{100} = \frac{17}{20}$

Hate mathematics = 15% = $\frac{15}{100} = \frac{3}{20}$

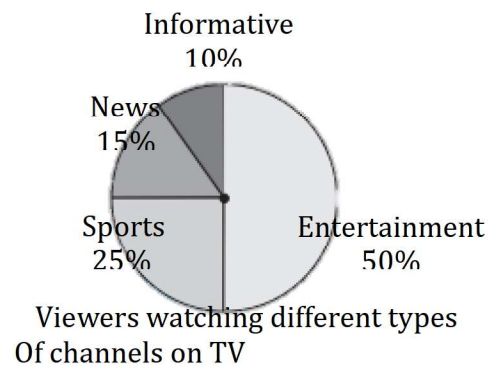
2. Answer the following questions based on the pie chart given (Fig 5.6).

(i) Which type of programmes are viewed the most?

Sol: Entertainment

(ii) Which two types of programmes have number of viewers equal to those watching sports channels?

Sol: Informative and News



4.2.1 Drawing pie charts

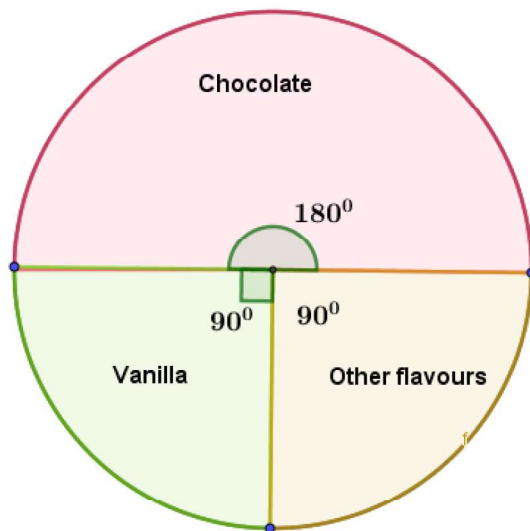
Represent the following data in pie chart.

Flavours	Percentage of students Preferring the flavours
Chocolate	50%
Vanilla	25%

Other flavours	25%
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Sol:

Flavours	Percentage of students Preferring the flavours	In fractions	Fraction of 360°
Chocolate	50%	$\frac{50}{100} = \frac{1}{2}$	$\frac{1}{2} \times 360^\circ = 180^\circ$
Vanilla	25%	$\frac{25}{100} = \frac{1}{4}$	$\frac{1}{4} \times 360^\circ = 90^\circ$
Other flavours	25%	$\frac{25}{100} = \frac{1}{4}$	$\frac{1}{4} \times 360^\circ = 90^\circ$



Example 1: Adjoining pie chart (Fig 4.4) gives the expenditure (in percentage) on various items and savings of a family during a month.

(i) On which item, the expenditure was maximum?

Sol: On food

(ii) Expenditure on which item is equal to the total savings of the family?

Sol: On Education (15%)

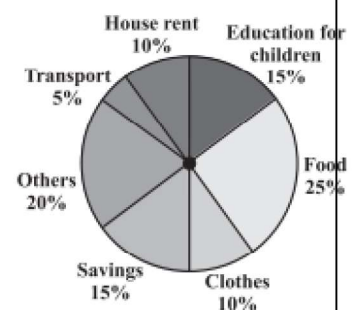
(iii) If the monthly savings of the family is ₹ 3000, what is the monthly expenditure on clothes?

Sol: 15% represents ₹3000

10% represents $\frac{₹3000}{15} \times 10 = ₹2000$

The monthly expenditure on clothes = ₹2000

Example 2: On a particular day, the sales (in rupees) of different items of a baker's shop are given below. Draw a pie chart for this data.

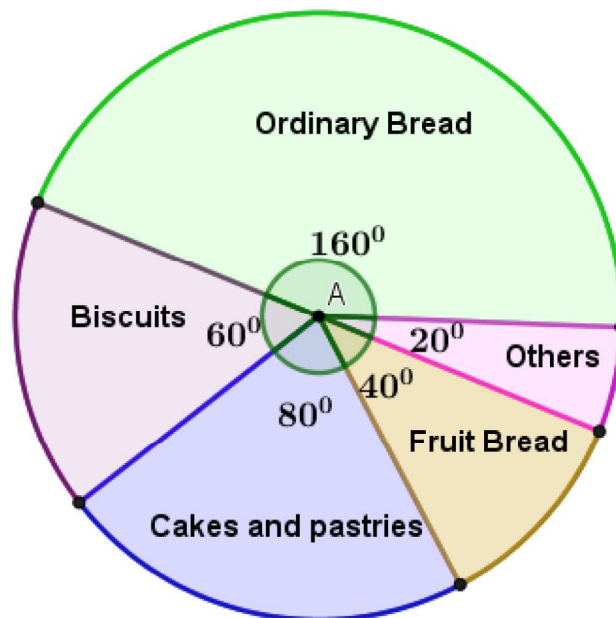


ordinary bread	: 320
fruit bread	: 80
cakes and pastries	: 160
biscuits	: 120
others	: 40
Total	: 720

Sol:

Item	Sales (in ₹)	Central Angle
Ordinary Bread	320	$\frac{320}{720} \times 360 = 160^\circ$
Biscuits	120	$\frac{120}{720} \times 360 = 60^\circ$
Cakes and pastries	160	$\frac{160}{720} \times 360 = 80^\circ$
Fruit Bread	80	$\frac{80}{720} \times 360 = 40^\circ$
Others	40	$\frac{40}{720} \times 360 = 20^\circ$
Total	720	

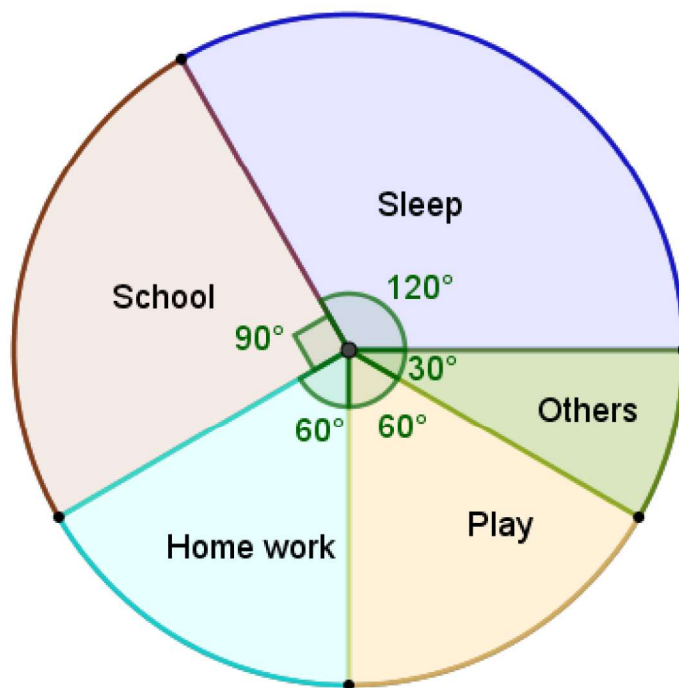
Draw a pie chart of the data given below. The time spent by a child during a day.



Draw a pie chart of the data given below. The time spent by a child during a day

Sleep — 8 hours; School — 6 hours ; Home work — 4 hours ;Play — 4 hours ;Others — 2 hours

Type of spent	Time spent by a child	In Fraction	Central Angle
Sleep	8	$\frac{8}{24}$	$\frac{8}{24} \times 360^\circ = 8 \times 15^\circ = 120^\circ$
School	6	$\frac{6}{24}$	$\frac{6}{24} \times 360^\circ = 6 \times 15^\circ = 90^\circ$
Home work	4	$\frac{4}{24}$	$\frac{4}{24} \times 360^\circ = 4 \times 15^\circ = 60^\circ$
Play	4	$\frac{4}{24}$	$\frac{4}{24} \times 360^\circ = 4 \times 15^\circ = 60^\circ$
Others	2	$\frac{2}{24}$	$\frac{2}{24} \times 360^\circ = 2 \times 15^\circ = 30^\circ$
Total	24		



THINK, DISCUSS AND WRITE

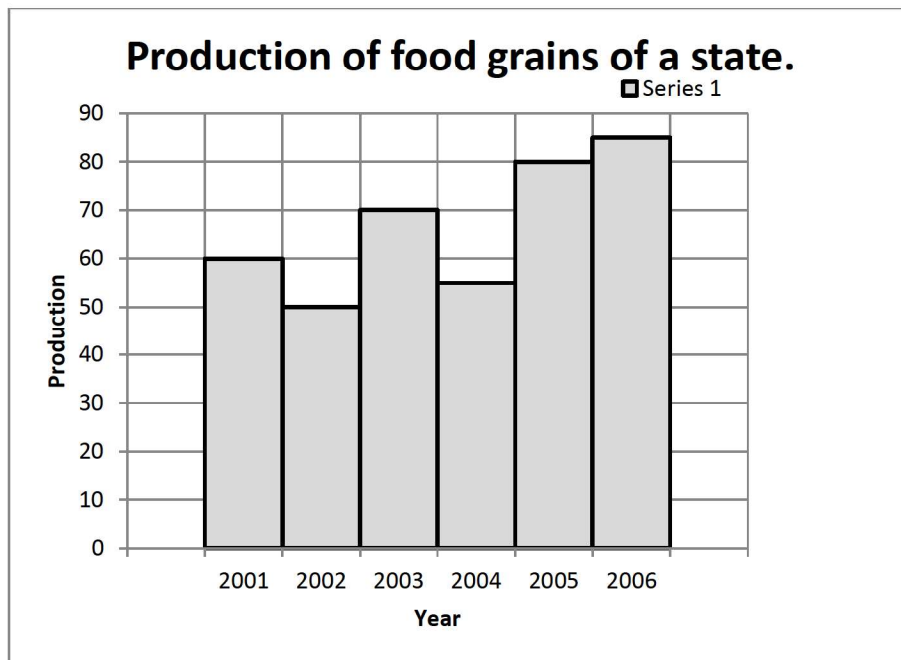
Which form of graph would be appropriate to display the following data.

1. Production of food grains of a state

Year	2001	2002	2003	2004	2005	2006
Production (in lakh tons)	60	50	70	55	80	85

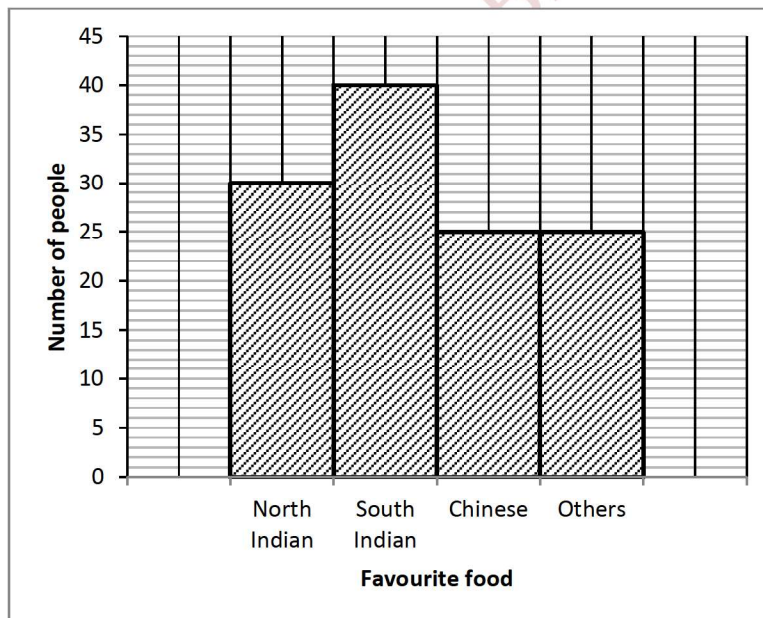
Sol:

Bar graph is appropriate to display the given data



2. Choice of food for a group of people

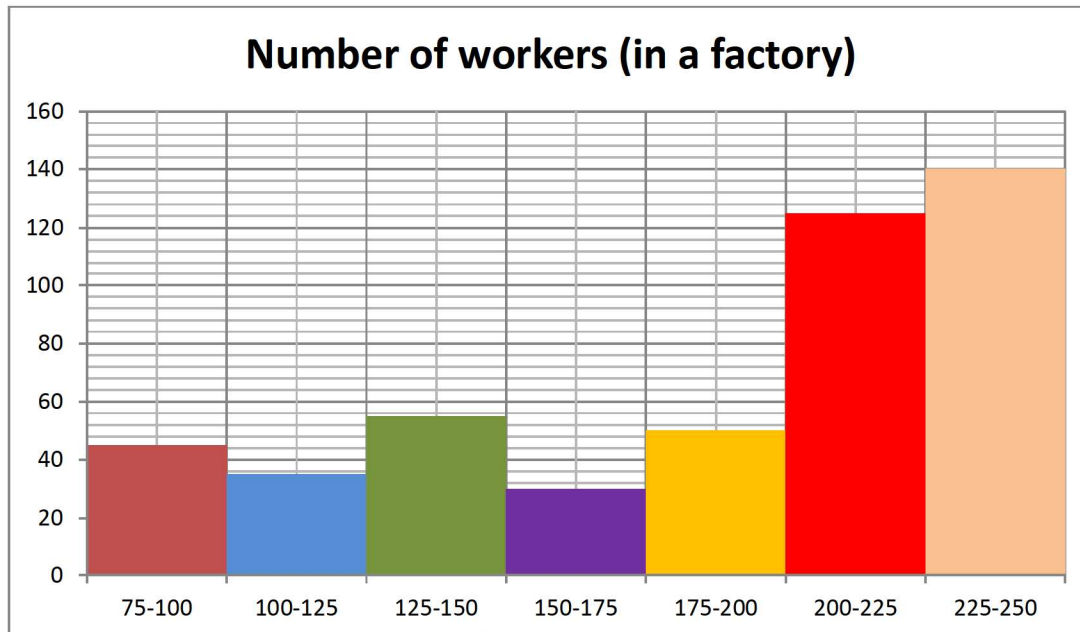
Favourite food	Number of people
North Indian	30
South Indian	40
Chinese	25
Others	25
Total	120



3. The daily income of a group of factory workers.

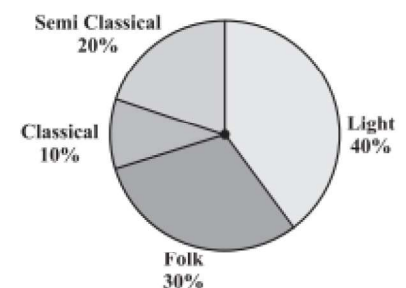
Daily Income (in Rupees)	Number of workers (in a factory)
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75-100	45
100-125	35
125-150	55
150-175	30
175-200	50
200-225	125
225-250	140
Total	480



EXERCISE 4.1

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?

Sol: Number young people were surveyed = $20 \times \frac{100}{10} = 200$

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

Sol: The maximum number of people liked the Light music (40%)

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

Sol: Total number of CD's = 1000

Number of classical music CD's = 10% of 1000 = $\frac{10}{100} \times 1000 = 100$

Number of semi classical music CD's = 20% of 1000 = $\frac{20}{100} \times 1000 = 200$

Number of folk music CD's = 30% of 1000 = $\frac{30}{100} \times 1000 = 300$

Number of light music CD's = 40% of 1000 = $\frac{40}{100} \times 1000 = 400$

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?

Sol: Rainy (120)

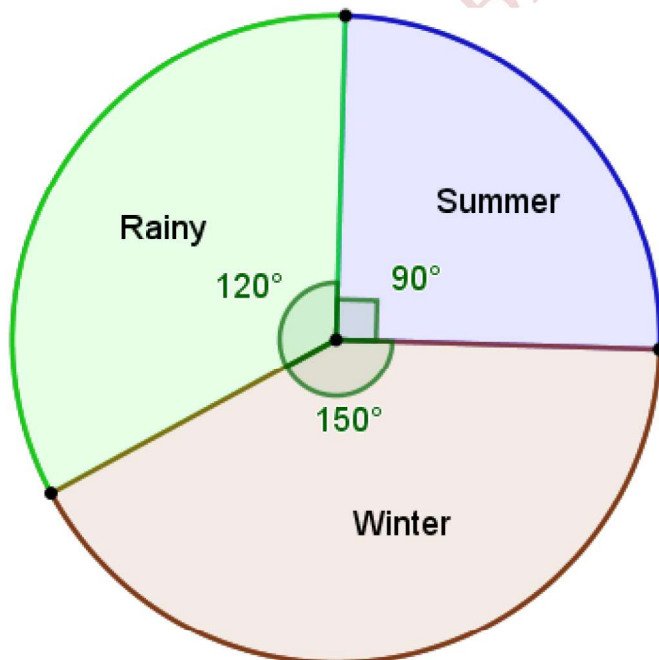
(ii) Find the central angle of each sector.

Sol:

Season	No. of votes	Central angle
Summer	90	$\frac{90}{360} \times 360^\circ = 90^\circ$
Rainy	120	$\frac{120}{360} \times 360^\circ$ $= 120^\circ$
Winter	150	$\frac{150}{360} \times 360^\circ$ $= 150^\circ$
Total	360	

Season	No. of votes
Summer 	90
Rainy 	120
Winter 	150

(iii) Draw a pie chart to show this information.



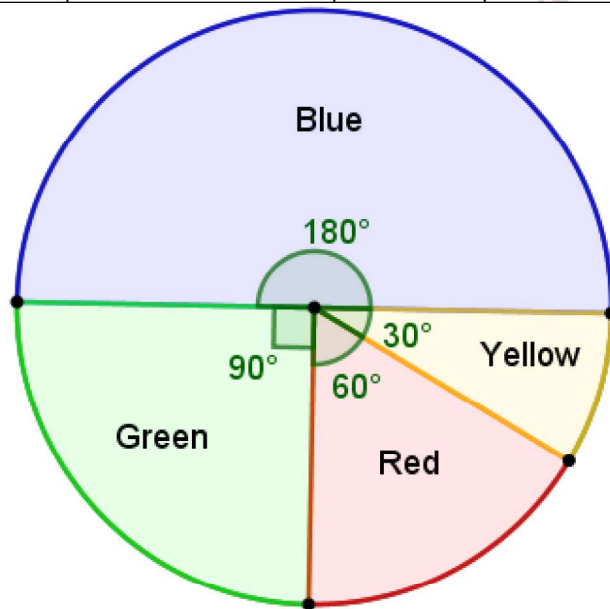
3. Draw a pie chart showing the following information. The table shows the colours preferred by a group

of people.

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

Sol:

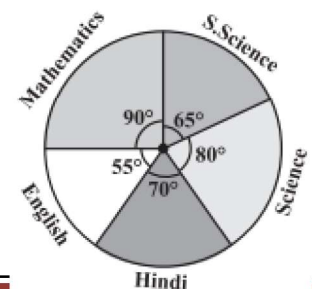
Colours	Number of people	Fraction	Central angle
Blue	18	$\frac{18}{36}$	$\frac{18}{36} \times 360^\circ = 18 \times 10^\circ = 180^\circ$
Green	9	$\frac{9}{36}$	$\frac{9}{36} \times 360^\circ = 9 \times 10^\circ = 90^\circ$
Red	6	$\frac{6}{36}$	$\frac{6}{36} \times 360^\circ = 6 \times 10^\circ = 60^\circ$
Yellow	3	$\frac{3}{36}$	$\frac{3}{36} \times 360^\circ = 3 \times 10^\circ = 30^\circ$
Total	36		



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?)

Sol: For 105 marks the central angle = $\frac{105}{540} \times 360^\circ = 70^\circ$

Marks obtained in Hindi = 105

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

Sol: Marks obtained in Mathematics = $\frac{90}{360} \times 540 = 135$

Marks obtained in Mathematics more than Hindi = $135 - 105 = 30$

(iii) **Examine whether the sum of the marks obtained in Social Science and Mathematics is more than that in Science and Hindi.**

Sol: Central angle of Social Science and Mathematics = $65^\circ + 90^\circ = 155^\circ$

Central angle of Science and Hindi = $80^\circ + 70^\circ = 150^\circ$

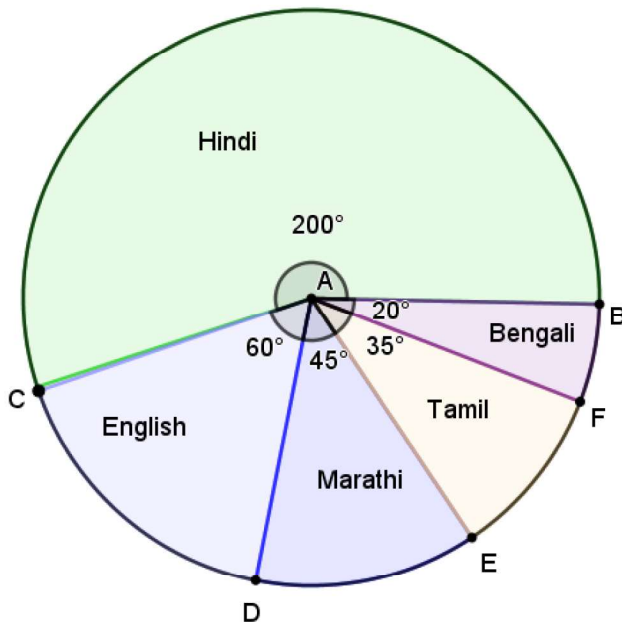
So, Sum of the marks obtained in Social Science and Mathematics is more than that in Science and Hindi.

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 student	40	12	9	7	4	72

Sol:

Language	Number of student	Fraction	Central angle
Hindi	40	$\frac{40}{72}$	$\frac{40}{72} \times 360^\circ = 200^\circ$
English	12	$\frac{12}{72}$	$\frac{12}{72} \times 360^\circ = 60^\circ$
Marathi	9	$\frac{9}{72}$	$\frac{9}{72} \times 360^\circ = 45^\circ$
Tamil	7	$\frac{7}{72}$	$\frac{7}{72} \times 360^\circ = 35^\circ$
Bengali	4	$\frac{4}{72}$	$\frac{4}{72} \times 360^\circ = 20^\circ$
Total	72		



Chance and Probability

1. There are certain experiments whose outcomes have an equal chance of occurring.
2. A random experiment is one whose outcome cannot be predicted exactly in advance.
3. When a coin is tossed Head or Tail are the two outcomes of this experiment.
4. One or more outcomes of an experiment make an event.
5. Probability of an event = Number of outcomes that make an event/Total number of outcomes of the experiment, when the outcomes are equally likely

TRY THESE

1. If you try to start a scooter, what are the possible outcomes?

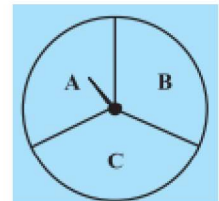
Sol: The scooter starts or does not start.

2. When a die is thrown, what are the six possible outcomes?

Sol: 1,2,3,4,5 and 6.

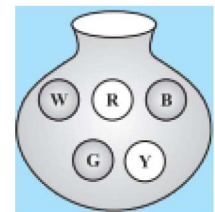
3. When you spin the wheel shown, what are the possible outcomes? List them.

Sol: When you spin the wheel the possible outcomes are A,B and C



4. You have a bag with five identical balls of different colours and you are to pull out (draw) a ball without looking at it; list the outcomes you would get.

Sol: The required outcomes are R,B,G,W and Y



THINK, DISCUSS AND WRITE

In throwing a die:

1. Does the first player have a greater chance of getting a six?

Sol: No, the first player does not have a greater chance of getting a six.

2. Would the player who played after him have a lesser chance of getting a six?

Sol: No, the player who played after him does not have a lesser chance of getting a six

3. Suppose the second player got a six. Does it mean that the third player would not have a chance of getting a six?

Sol: No,

Equally likely outcomes:

Equally likely implies that the all of the outcomes of a random experiment are the same chance of occurring.

1. When a coin is tossed Head and Tail are equally likely out comes.

2. When a die is tossed 1,2,3,4,5 and 6 are equally likely outcomes.

Event

Each outcome of an experiment or a collection of outcomes make an event.

Ex: In the experiment of tossing a coin, getting a Head is an event and getting a Tail is also an event.

Example 3: A bag has 4 red balls and 2 yellow balls. (The balls are identical in all respects other than colour). A ball is drawn from the bag without looking into the bag. What is probability of getting a red ball? Is it more or less than getting a yellow ball?

Sol: Red balls=4, Yellow balls=2

Total outcomes=4+2=6

The probability of getting a red ball = $\frac{\text{Favourable}}{\text{Total possible}} = \frac{4}{6} = \frac{2}{3}$

The probability of getting a yellow ball = $\frac{\text{Favourable}}{\text{Total possible}} = \frac{2}{6} = \frac{1}{3}$

The probability of getting a red ball is more than that of getting a yellow ball.

TRY THESE

Suppose you spin the wheel

(i) **List the number of outcomes of getting a green sector and not getting a green sector on this wheel**

Sol: Number of outcomes getting a green sector=5

Number of outcomes not getting a green sector=3

(ii) **Find the probability of getting a green sector.**

Sol: Probability of getting a green sector = $\frac{\text{Favourable outcomes}}{\text{Total number of outcomes of the experiment}} = \frac{5}{8}$

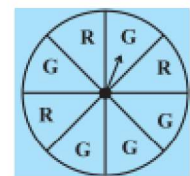
(iii) **Find the probability of not getting a green sector**

Sol: The probability of not getting a green sector = $\frac{3}{8}$

Chance and probability related to real life

1. To find characteristics of a large group by using a small part of the group.

2. Metrological Department predicts weather by observing trends from the data over many years in

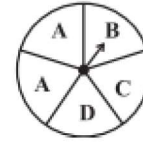


the past.

EXERCISE 4.2

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

(a) Spinning a wheel



Sol: On spinning the wheel the outcomes are A,B,C and D

(b) Find the Probability of the pointer stopping on D.

Sol: The Probability of the pointer stopping on D = $\frac{1}{5}$

(c) Tossing two coins together

Sol: When two coins are tossed together, the outcomes are HH,HT,TH and TT (Where H- Head and T- Tail)

2. When a die is thrown, list the outcomes of an event of getting

(i) (a) a prime number

Sol: Outcomes for prime number are 2,3 and 5

(b) not a prime number.

Sol: Outcomes for not a prime number are 1,4 and 6

(ii) (a) a number greater than 5

Sol: Outcomes for a number greater than 5 is 6

(b) a number not greater than 5.

Sol: outcomes for a number not greater than 5 are 1,2,3,4 and 5.

3. Find

(b) Probability of getting an ace from a well shuffled deck of 52 playing cards?

Sol: Number ace cards in deck = 4

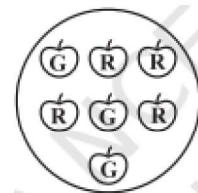
Probability of getting an ace = $\frac{4}{52} = \frac{1}{13}$

(c) Probability of getting a red apple

Sol: Total number of apples = 7

Number of red apples = 4

Probability of getting a red apple = $\frac{\text{Number of red apples}}{\text{Total number of apples}} = \frac{4}{7}$



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?

Sample space = {1,2,3,4,5,6,7,8,9,10} , Total all possible outcomes = 10

Probability of getting a number 6 = $\frac{1}{10}$

(ii) Getting a number less than 6?

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

(iii) Getting a number greater than 6?

Probability of getting a number greater than 6 = $\frac{4}{10} = \frac{2}{5}$

(iv) Getting a 1-digit number?

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?

Sol: Green sectors=3, blue sectors=1, red sectors=1

Total number of sectors=3+1+1=5

Probability of getting a green sector = $\frac{\text{Number of green sectors}}{\text{Total number of sectors}} = \frac{3}{5}$

Probability of getting a non blue sector = $\frac{\text{Number of non blue sectors}}{\text{Total number of sectors}} = \frac{4}{5}$

6. When a die is thrown find the probabilities of the events of getting

Sol: When a die is thrown sample space={1,2,3,4,5,6}

i) (a) a prime number

Sol: Outcomes for prime number are 2,3 and 5

Probability of getting a prime number = $\frac{\text{Number of primenumbers}}{\text{Total number of outcomes}} = \frac{3}{6} = \frac{1}{2}$

(b) Not a prime number.

Sol: Outcomes for not a prime number are 1,4 and 6

Probability of getting not a prime number = $\frac{\text{Number of non primenumbers}}{\text{Total number of outcomes}} = \frac{3}{6} = \frac{1}{2}$

(ii) (a) a number greater than 5

Sol: Outcomes for a number greater than 5 is 6

Probability of getting a number greater than 5 = $\frac{1}{6}$

(b) a number not greater than 5.

Sol: outcomes for a number not greater than 5 are 1,2,3,4 and 5.

Probability of getting a number not greater than 5 = $\frac{5}{6}$