Chapter 15

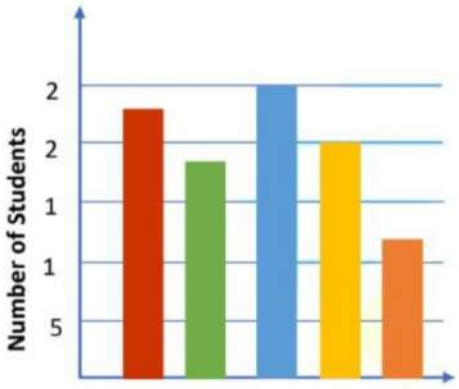
Introduction to Graphs

Bar Graphs, Pie Graphs

Graphs

Graphs are visual representations of data collected. The purpose of the graph is to show the numerical facts in visual form so that they can be understood clearly and easily

Favorite color of 100 students of Class VIII



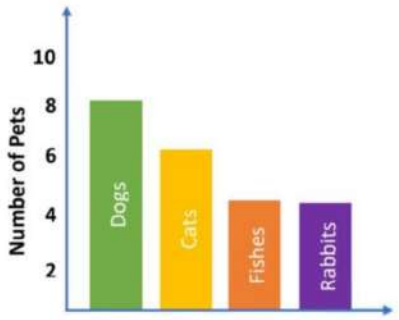
Scale : 1 unit = 5 students along Y axis

Favorite Color	Number of Students
	23
	19
	25
	20
	13

Bar Graphs

A bar graph is used to show a comparison among categories. It may consist of two or more parallel vertical (or horizontal) bars.

The following graph shows the kind of pets owned by students of class VIII.



Pets	Number of Students
	8
	6
	4
	4

i) Which is the most popular pet?

The dog is the most popular pet.

ii) How many students have a cat as a pet?

6 students have a cat as a pet.

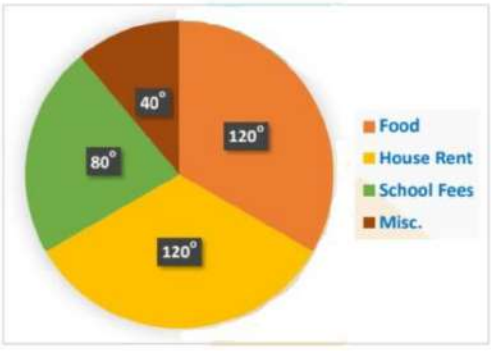
Pie Graph

A circle graph shows the relationship between a whole and its parts.
The whole circle is divided into sectors. The size of each sector is proportional to the information it represents.

The monthly expenditure of various items of a family is given below:

Item	Amount Spent	In Fraction	Central Angle
Food	₹ 3000	$\frac{3000}{9000} = \frac{1}{3}$	$\frac{1}{3} \times 360^0 = 120^0$
House Rent	₹ 3000	$\frac{3000}{9000} = \frac{1}{3}$	$\frac{1}{3} \times 360^0 = 120^0$
School Fees	₹ 2000	$\frac{2000}{9000} = \frac{2}{9}$	$\frac{2}{9} \times 360^0 = 80^0$
Miscellaneous	₹ 1000	$\frac{1000}{9000} = \frac{1}{9}$	$\frac{1}{9} \times 360^0 = 40^0$

Total Expenditure = 3000 + 3000 + 2000 + 1000 = ₹ 9000



Histogram

What is Histogram?

The graphical representation of data in a manner, such that the height of bars shows the frequency of class interval and also there is no gap between the bars as there is

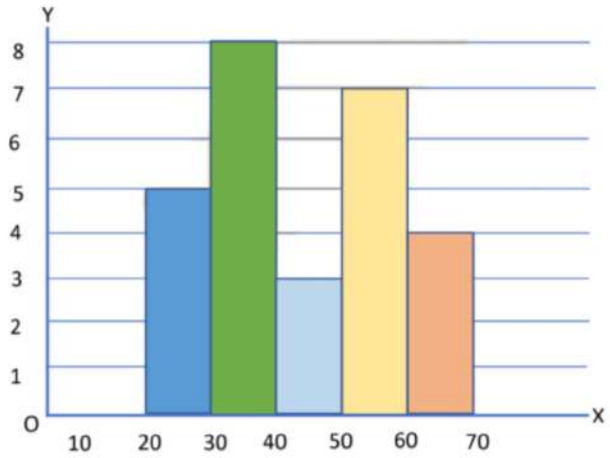
no gap between the class-intervals is called a histogram.

1) X-Axis in the histogram represents the Class Intervals.

2) Y-Axis in the histogram represents the frequencies.

Construct a histogram for the frequency distribution table below:

Class interval	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	5	8	3	7	4

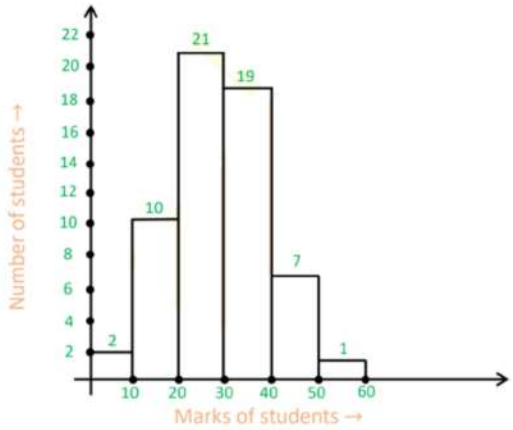


Bars with a difference

For example,

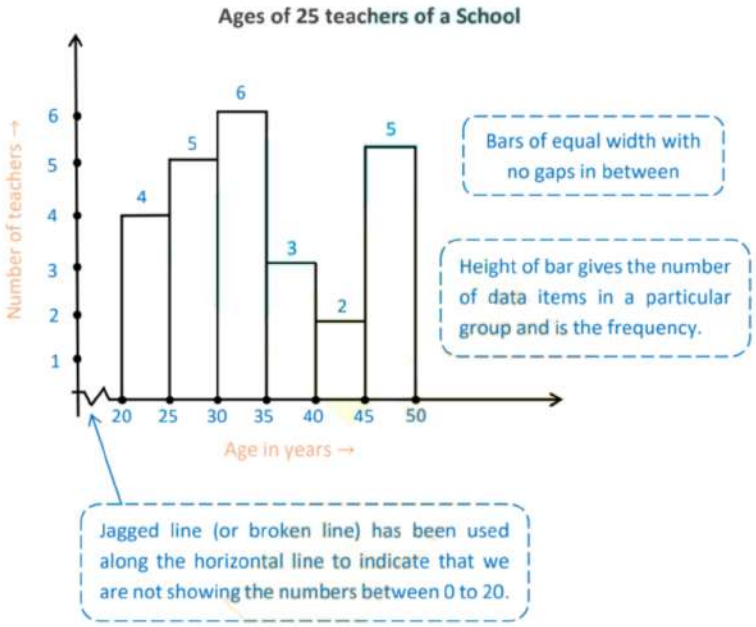
Let us consider the grouped frequency distribution of the marks obtained by 60 students in the English Unit test.

Groups	Frequency
0 – 10	2
10 – 20	10
20 – 30	21
30 – 40	19
40 – 50	7
50 – 60	1
Total	60



The height of the bars shows the frequency of the class – interval. Also, there is no gap between the bars as there is no gap between the class intervals.

The graphical representation of data in this manner is called a histogram.



Line Graphs

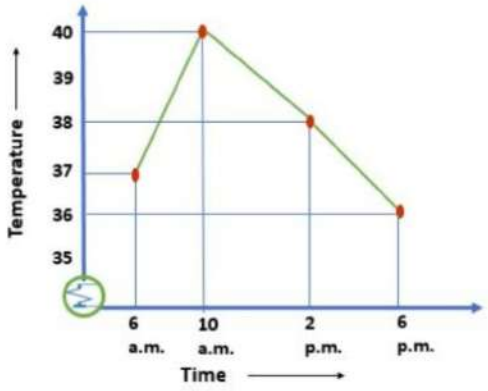
Line Graphs

A line graph displays the data that changes continuously over a period **of time.**

A graph that uses lines that has been connected using points to show **how something changes its value as time passes. It displays data that has changed continuously over a period of time.**

The following table shows the temperature of a patient taken every **four hours**.

Time	6 a.m.	10 a.m.	2 p.m.	6 p.m.
Temperature (in ^{0}C)	37	40	38	36



A jagged line indicates that we are not showing the numbers between 0^{o}C and 35^{o}C

The following table gives the growth of a child. Draw a Line Graph for the table.

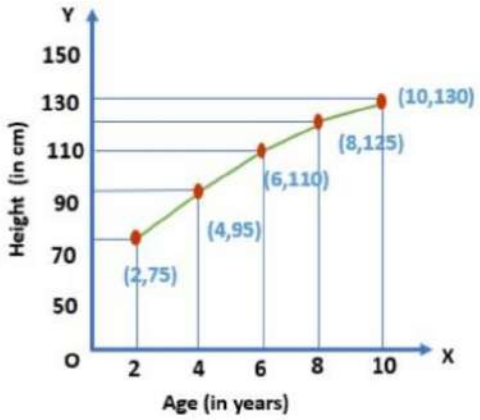
Height (in cm)	75	95	110	125	130
Age (in years)	2	4	6	8	10

i) Draw a horizontal line OX and a vertical line OY **representing X-axis and Y- axis.**

ii) Along OX, take the age (in years) and along OY, take the height (in cm).

iii) On the graph paper plot the point (2,75), (4,95), (6,110), (8,125), (10,130)

iv) Join these points consecutively to obtain the required graph.



Linear Graphs

Linear Graphs

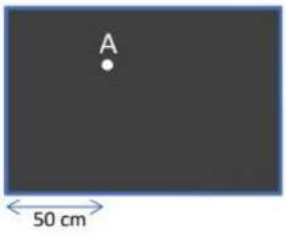
A linear graph is a graph that is a whole unbroken line. In order to draw such graphs, we have to locate some points on the graph sheet. So, first of all, we will learn how to locate points on a graph paper.

Location of a Point

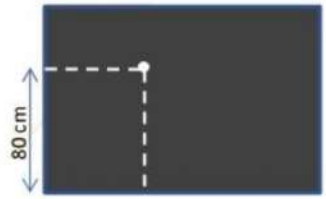
To locate any point, we need a reference point (the point from where the required point can be seen).

For example,

If a teacher put a dot on a blackboard. Then, the best way to describe that point is to measure that point from two edges i.e., from the left edge and the bottom edge. This can be clearly understood from the following figure:



Point A is 50 cm from the left edge



Point A is 80 cm from the bottom edge

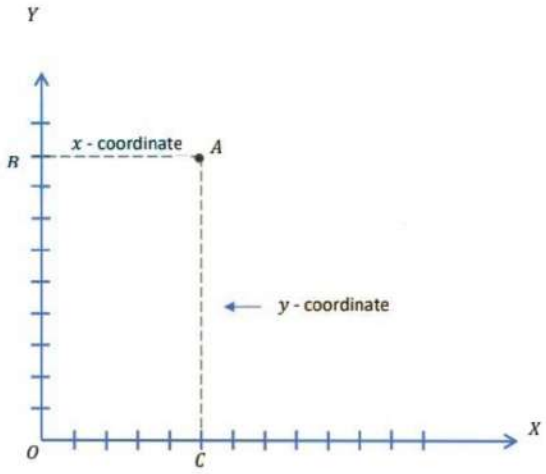
Coordinates

Let a point A lie on the plane.

To locate the position of A, let us draw two perpendiculars AB and AC on Y-axis and X-axis. Then, AB is the distance of A from the Y-axis and AC is the distance of A from the X-axis.

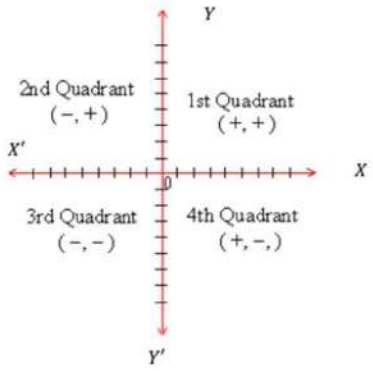
We called AB as the x-coordinate or abscissa and AC as the y-coordinate or ordinate respectively of A. The two values taken together constitute a pair (BA, CA) or (OC, OB) called the

coordinates of the point A. the coordinates are always written in the form (x, y) which are called ordered pair.



The x-axis and y-axis divide the plane into four parts. These parts are called quadrants and these are shown in the figure given below:

Region	Quadrant	Sign of Coordinate
XOY	1st	(+,+)
YOX'	2nd	(-,+)
X'OY'	3rd	(-,-)
Y'OX	4th	(+,-)



A bank gives 20% Simple Interest (SI) on deposits. Draw a graph to show the relationship between the sum deposited and the interest earned.

Sum deposited (in ₹)	SI for a year
₹100	$\frac{100\times20\times1}{100}$ = ₹ 20
₹200	$\frac{200\times20\times1}{100}$ = ₹ 40
₹300	$\frac{300\times20\times1}{100}$ = ₹ 60
₹400	$\frac{400\times20\times1}{100}$ = ₹ 80

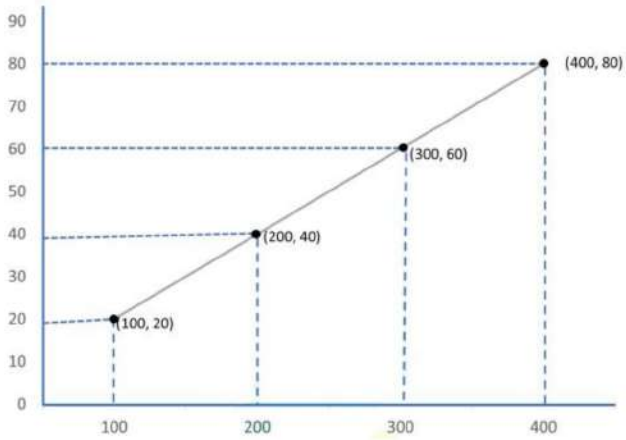
i) Choose a suitable scale for both the axes.

ii) Mark Sum deposited on X-axis.

iii) Mark the interest earned on Y - axis.

iv) Plot the points (100,20), (200,40), (300,60), (400,80)

v) Join the points.



Rohan can drive a scooter at a constant speed of 20 km/hr. Draw a time – distance graph for this situation.

Hours of ride	Distance covered (D = S x T)
1	20 x 1 = 20 km
2	20 x 2 = 40 km
3	20 x 3 = 60 km
4	20 x 4 = 80 km

i) Choose a suitable scale for both the axes.

ii) Mark time (in hours) on X-axis.

iii) Mark the distance covered on Y - axis.

iv) Plot the points (1,20), (2,40), (3,60), (4,80)

v) Join the points.