Introduction to Graphs

Introduction

A **graph** is an abstract representation of a set of objects where some pairs of the objects are connected by links.

It is a visual display of some data and data exists in the form of a table.

It makes easier to understand or interpret the data that is being presented.

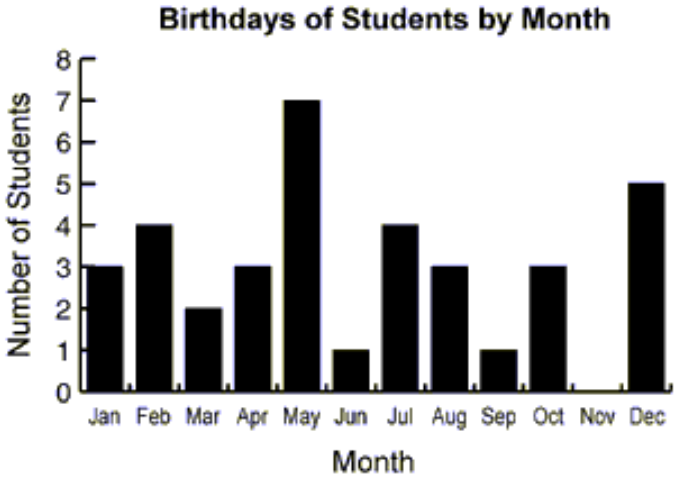
There are many different types of graphs.

A Bar graph

A bar graph is a graph drawn using rectangular bars to show how large each value is.

The bars can be vertical or horizontal.

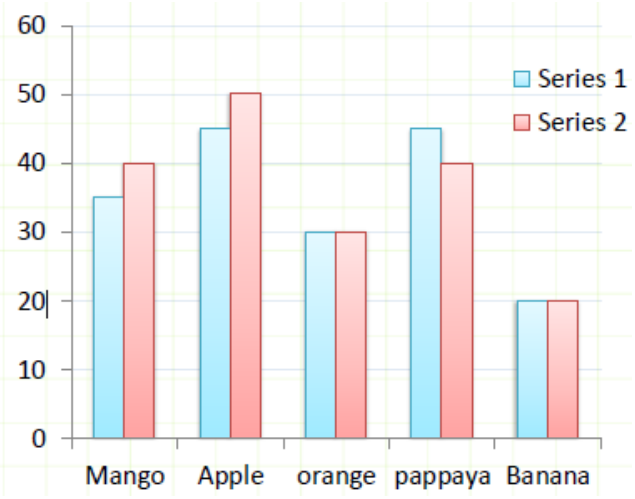
For example:



DOUBLE BAR GRAPH

A bar graph is also useful for comparing values between groups of items. Such a graph is called a **double bar graph**. These types of bar graphs are known as **clustered bar graphs**.

Fruits	Sales (in kg)	
	Monday	Tuesday
Mango	35	40
Apple	45	50
Orange	30	30
Papaya	45	40
Banana	20	20



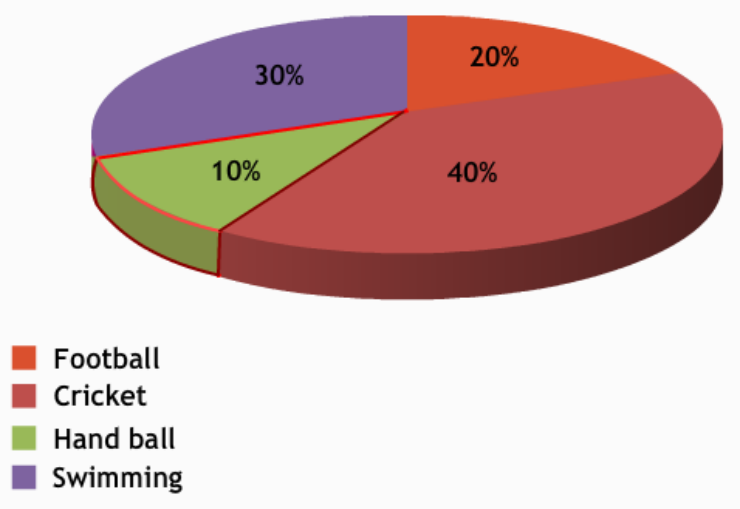
Graphs are visual representation of data collected. A bar graph is used to show comparison among categories.

A Pie graph (or a circle-graph)

A **pie graph** is a type of graph that is circular and is cut into sections, like a pie.

Each section often represents some percentage. Sum of all the mentioned percentages in a pie graph is equal to 100%.

For example: The given pie graph represents percentage of students of a school involve in different sports like-Football, cricket, Handball and Swimming.

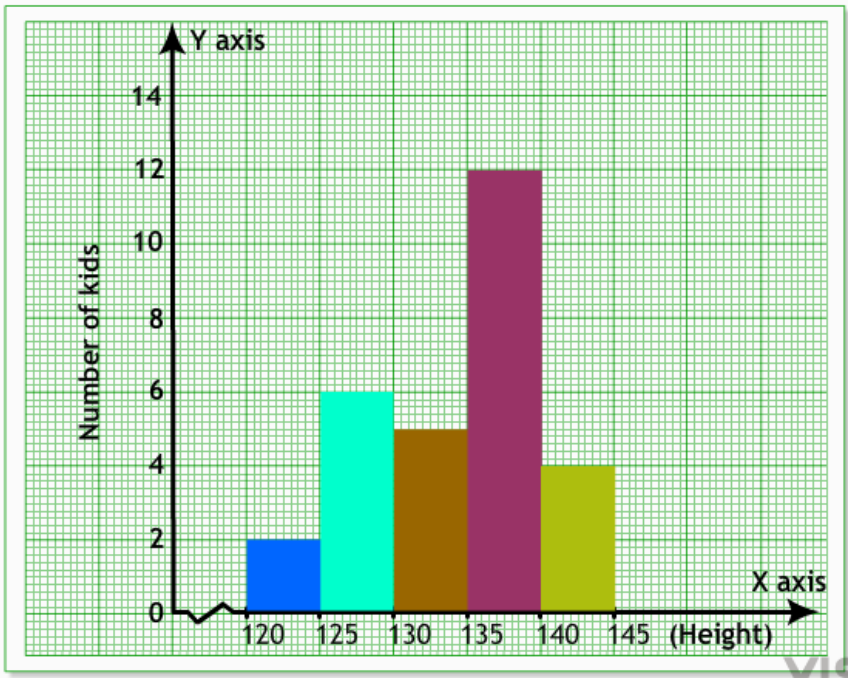


According to this, 20% of the total students play football, 40% plays Cricket, 10% of the total students play handball and 30% are involved in swimming.

A histogram

A histogram is a kind of bar graph that shows data in intervals. It has adjacent bars over the intervals.

For example: This histogram represents number of students having marks between 0-20, 20-40, 40-60, 60-80 and 80-100.

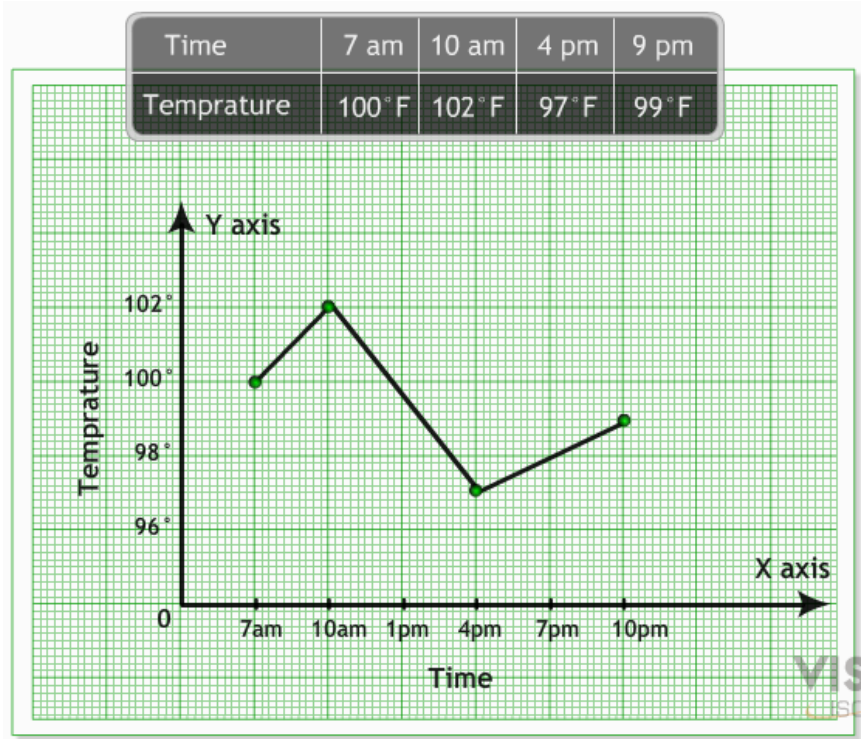


A jagged line () has been used along horizontal line to indicate that we are not showing numbers between 0 and 120.

A line graph

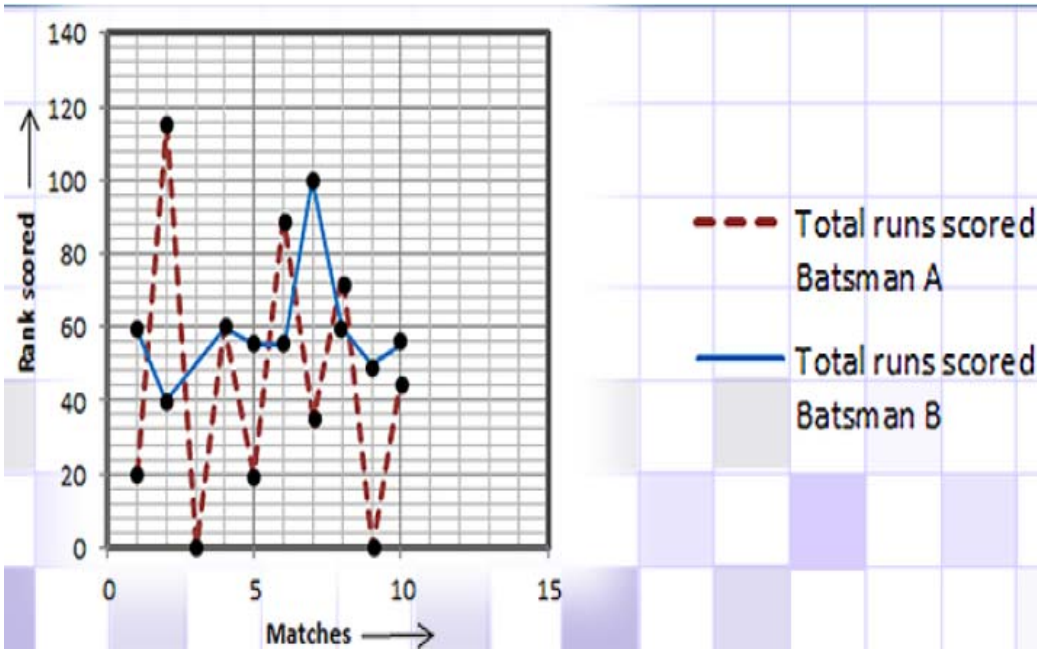
A line graph is a graph that uses points connected by lines to show data changes as time goes by or as something else happens.

A time-temperature graph is representing variation of temperature of a sick child with time.



In the graph notice that on y axis, there is a gap of 1 square between two consecutive temperatures. So, the scale of y axis is 1 square or 1 unit= 2 °F.

Example: The given graph represents the total runs scored by two batsmen A and B, during each of the ten different matches in the year 2010. Study the graph and answer the following questions.



1. What information is given on the two axes?

2. Which line shows the runs scored by batsman A?

3. Were the run scored by them same in any match in 2010? If so, in which match?

4. Among the two batsmen, who is steadier? How do you judge it?

Solution:

1. The horizontal axis (or the *x*-axis) indicates the matches played during the year 2010. The vertical axis (or the *y*-axis) shows the total runs scored in each match.

2. The dotted line shows the runs scored by Batsman A. (This is already indicated at the top of the graph).

3. During the 4th match, both have scored the same number of 60 runs. (This is indicated by the point at which both graphs meet).

4. Batsman A has one great "peak" but many deep "valleys". He does not appear to be consistent. B, on the other hand has never scored below a total of 40 runs, even though his highest score is only 100 in comparison to 115 of A. Also A has scored a zero in two matches and in a total of 5 matches he has scored less than 40 runs. Since A has a lot of ups and downs, B is a more consistent and reliable batsman.

Linear Graphs

Location of a point

A linear graph is different from a line graph.

In a linear graph, the set of points on the graph are in an orderly manner.

A linear graph is a graph that consists of a single straight line segment. The Cartesian system was introduced by Rene Descartes.

CARTESIAN SYSTEM

Rene Descartes (1596-1650) introduces Cartesian system.

Rene Descartes (1596-1650)

When we draw a graph we start with two straight lines at right angles to each other.

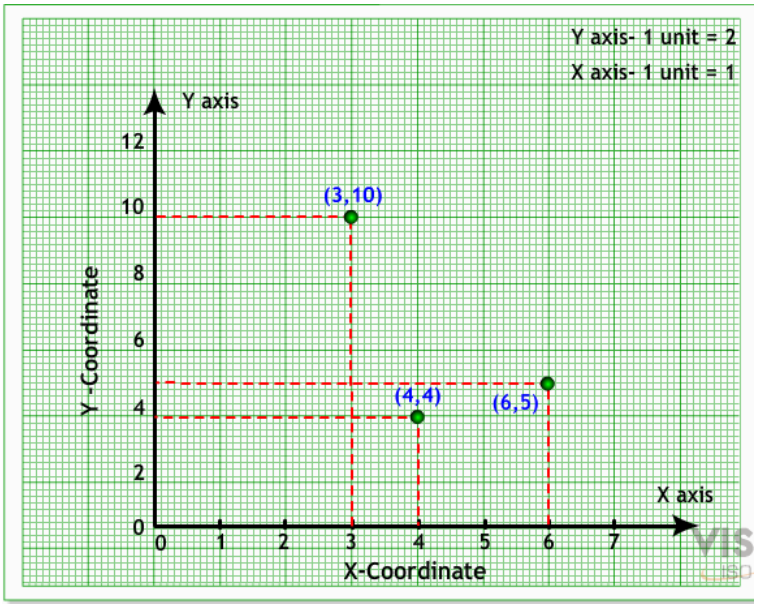
The horizontal line in graph is called the **X-axis of the graph**. The vertical line is called the **Y-axis of the graph**.

Coordinates

Every point is represented by 2 coordinates as (x, y) where x represents the x coordinate and y represents the y coordinate.

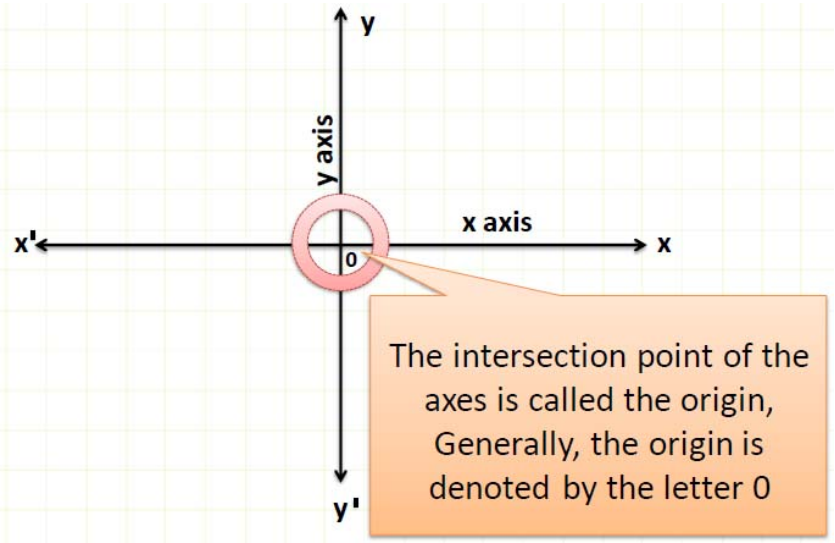
For Example: (4, 4) (3, 10) (6, 5)

Here 4, 3, 6 are the x-coordinate and 4, 10, 5 are the y- coordinate. Points are plotted on a graph sheet as shown.



A graph sheet consists of a square grid. The horizontal axis is called x-axis and the vertical axis is called y-axis.

Point (0, 0) is called as **Origin**.



Some Applications

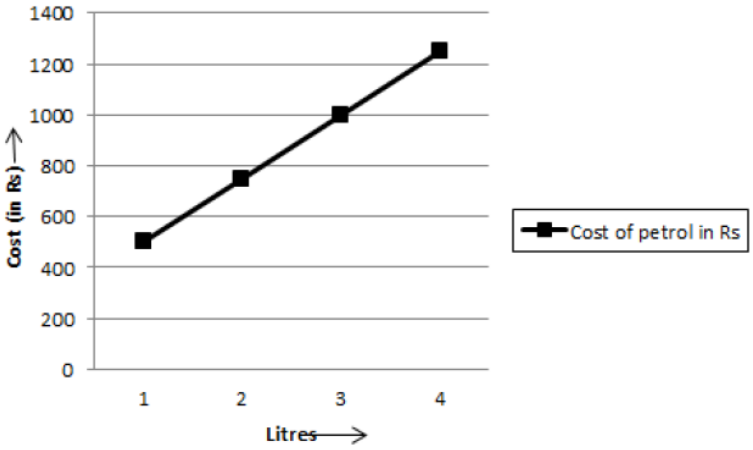
The graph of a proportional relationship results in a linear graph.

A proportional relationship is expressed as an equation containing two variables.

An independent variable can have any value.

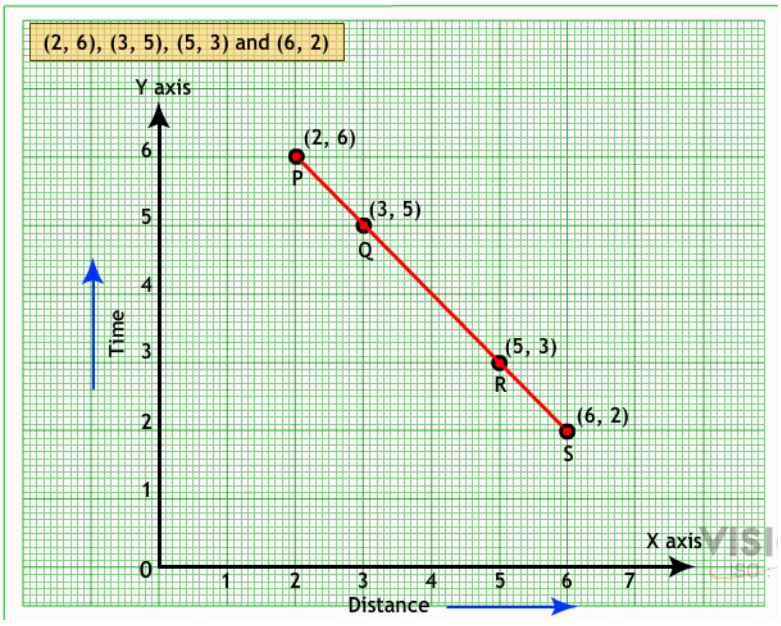
A dependent variable's value is determined by the independent variable.

No.of Litres of petrol	10	15	20	25
Cost of petrol in Rs	500	750	1000	1250



If after joining two or more points on a graph a single straight line is drawn then the graph is a **'Linear graph'**.

For Example:
In the graph after joining points (2, 6), (3, 5), (5, 3) and (6, 2) we got a straight line.



Hence this represents a Linear Graph.