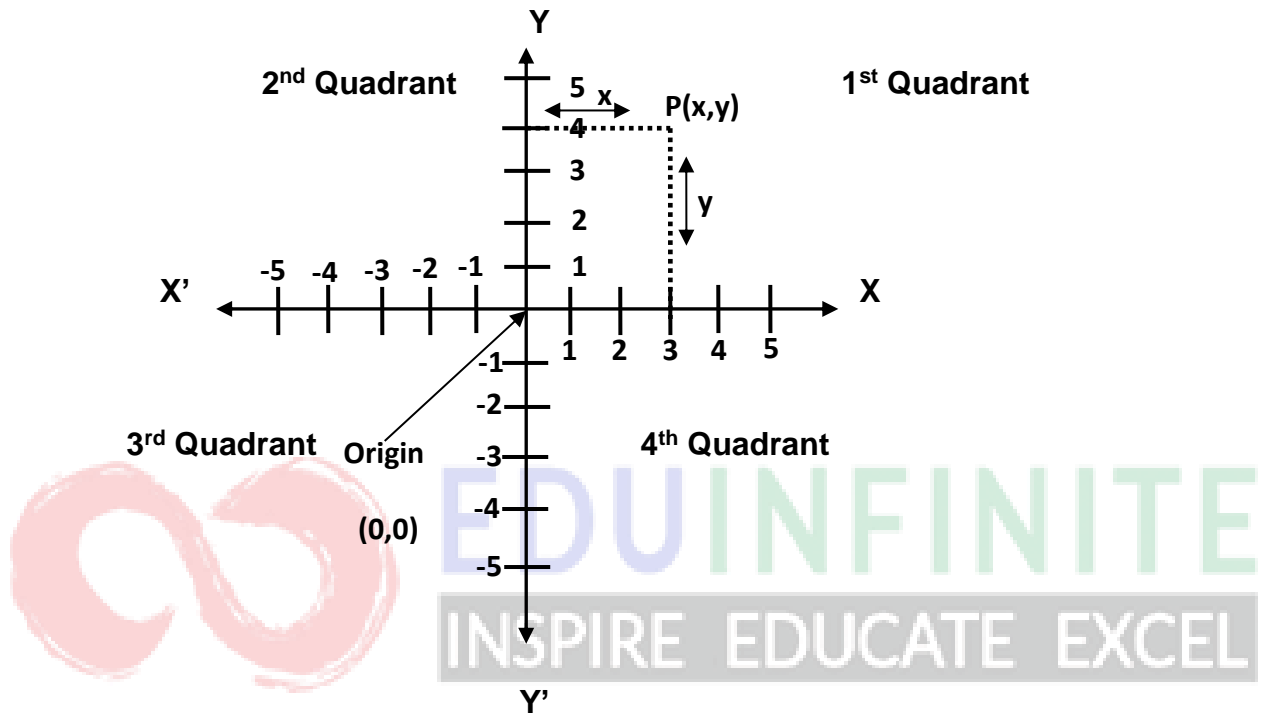


Chapter No: 12 : Graphs of linear and quadratic functions

Two mutually perpendicular number lines intersecting each other form a System of Co-ordinates. The horizontal number line is called **X-axis** and the vertical number line is called **Y-axis**. We will indicate a point on a two dimensional plane with two numbers written together and separated by a comma (,) known as an ordered pair. The first one indicates the **X-coordinate or abscissa** and the 2nd one indicates **Y-coordinate or ordinate**. The mutually perpendicular axes divide the plane in **4 parts** and each part is known as **Quadrant**.



Note :- This system is also known as **Rectangular Cartesian Coordinate System**. In future we will come to know about the **Polar Co-ordinate System**.

How to plot different points on a two dimensional plane having conventional signs:-

If we separate the planes in four quadrants then we will get **1st quadrant** where **x** is **positive** and **y** is **positive (+,+)**.

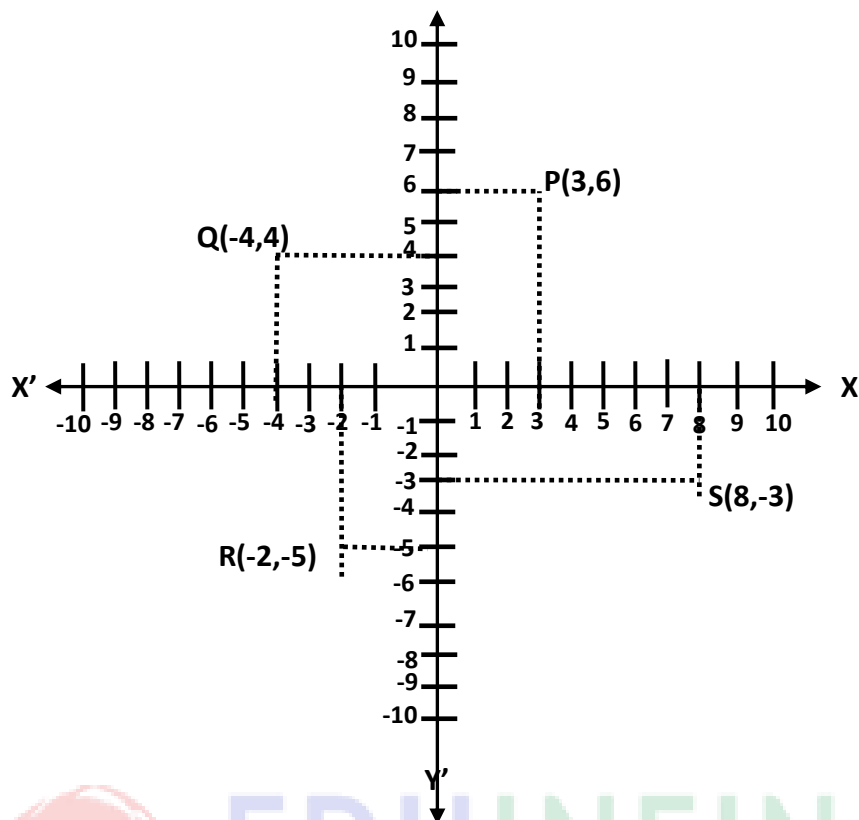
In the **2nd quadrant**, **x** is **negative** and **y** is **positive(-,+)**.

In the **3rd quadrant**, **x** is **negative** and **y** is **negative(-,-)**.

In the **4th quadrant**, **x** is **positive** and **y** is **negative(+,-)**.

Let us see with an example below:

Grade 8 y



Graphical Solution of a linear equation in two variables:-

Step-1:- Linear equation written with **any one of the variable** as the subject.

Step-2:- Now an integral value of the chosen variable put on the new expression.

Step-3:- For each and every value of one variable will give corresponding value of other variable.

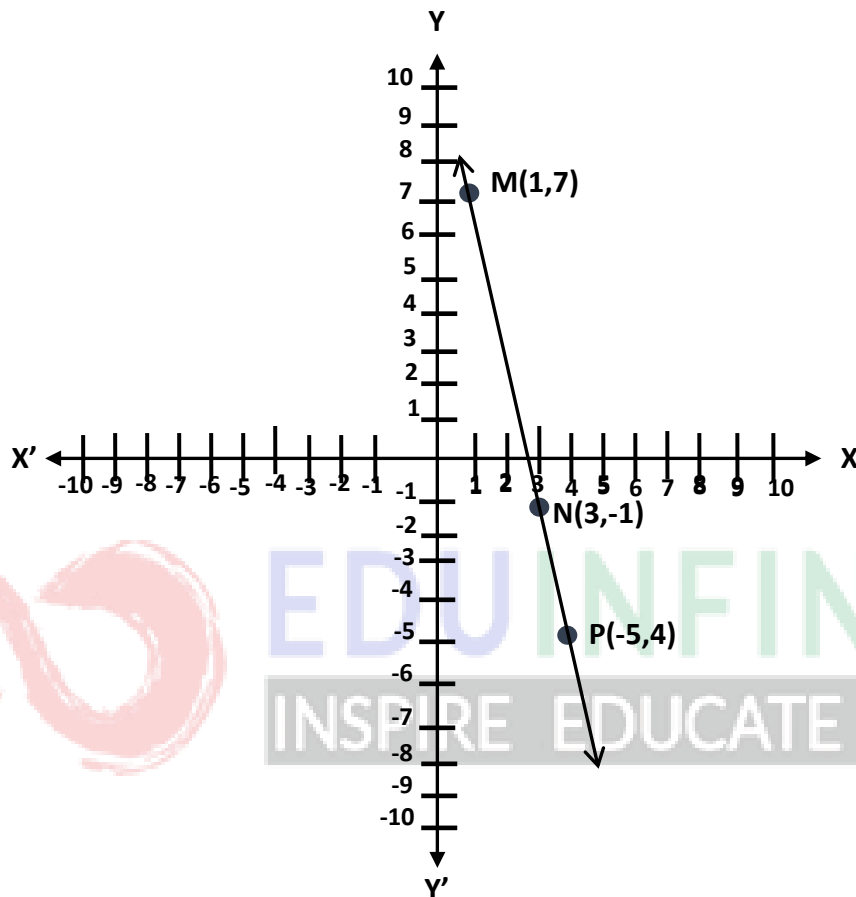
Step-4:- Now we have got points from the values of x and y.

Now, let's discuss with an example:-

$$4x + y = 11$$

$$\Rightarrow y = 11 - 4x$$

x	1	3	4
y	7	-1	-5



Note:- Sometimes it is very difficult to get the number of integral ordered pairs from the equation of the form $ax + by = c$.

Let us consider a numerical example to understand the technique:-

$$9x + 8y = 10$$

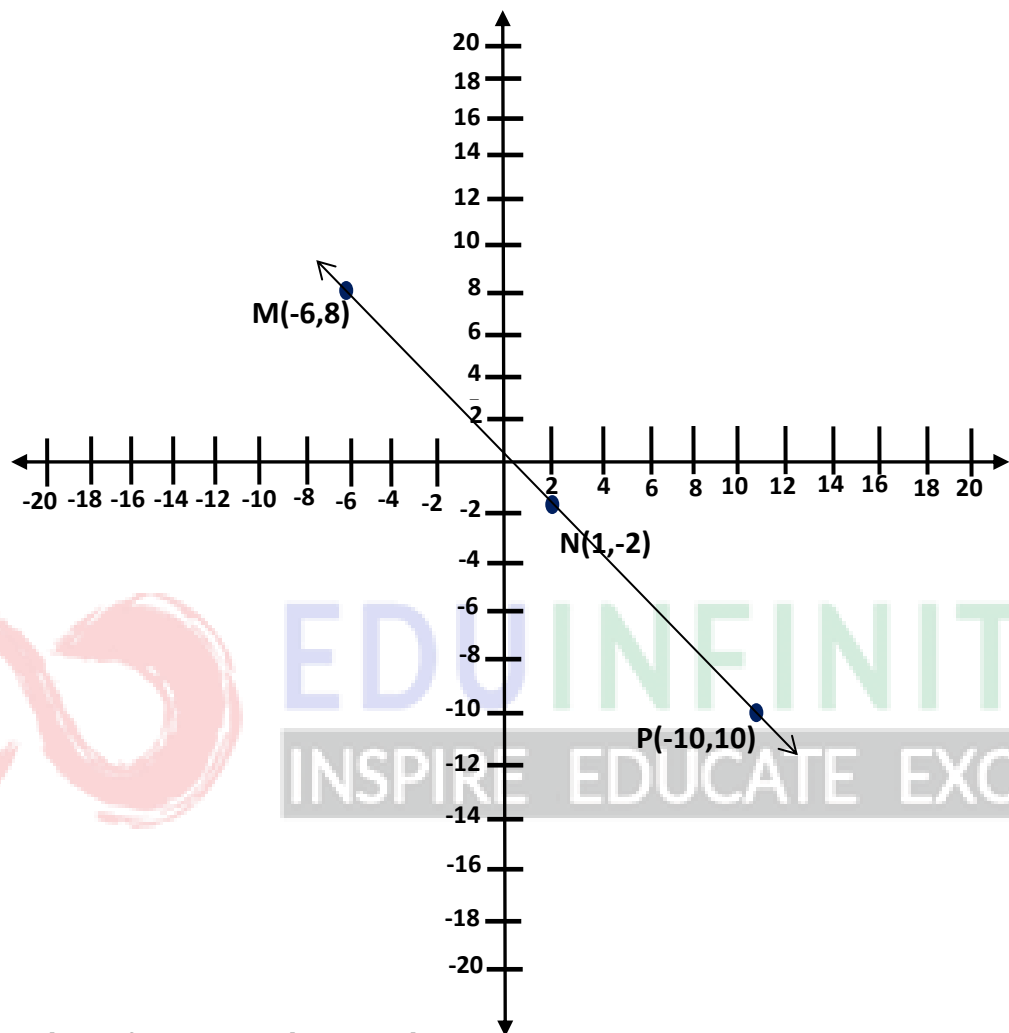
$$\Rightarrow y = \frac{10-9x}{8}$$

Somehow, by trial method we will be able to find the 1st ordered pair as (2,-1). To get the other ordered pair is suggest the following method.

With **2(X-coordinate)** we add or subtract any integral multiple of the denominator i.e. **8**.viz. Put $x = 2 + 8 \times 1 = 10$ and the corresponding value of $y = -10$.

Next we try with $x = 2 + 8 \times 2 = 18$ and the corresponding value of $y = -19$.

Again we may try with $x = 2 - 8 \times 1 = -6$ and the corresponding value of $y = 8$ and so on.



Graphical Solution of a quadratic equation:-

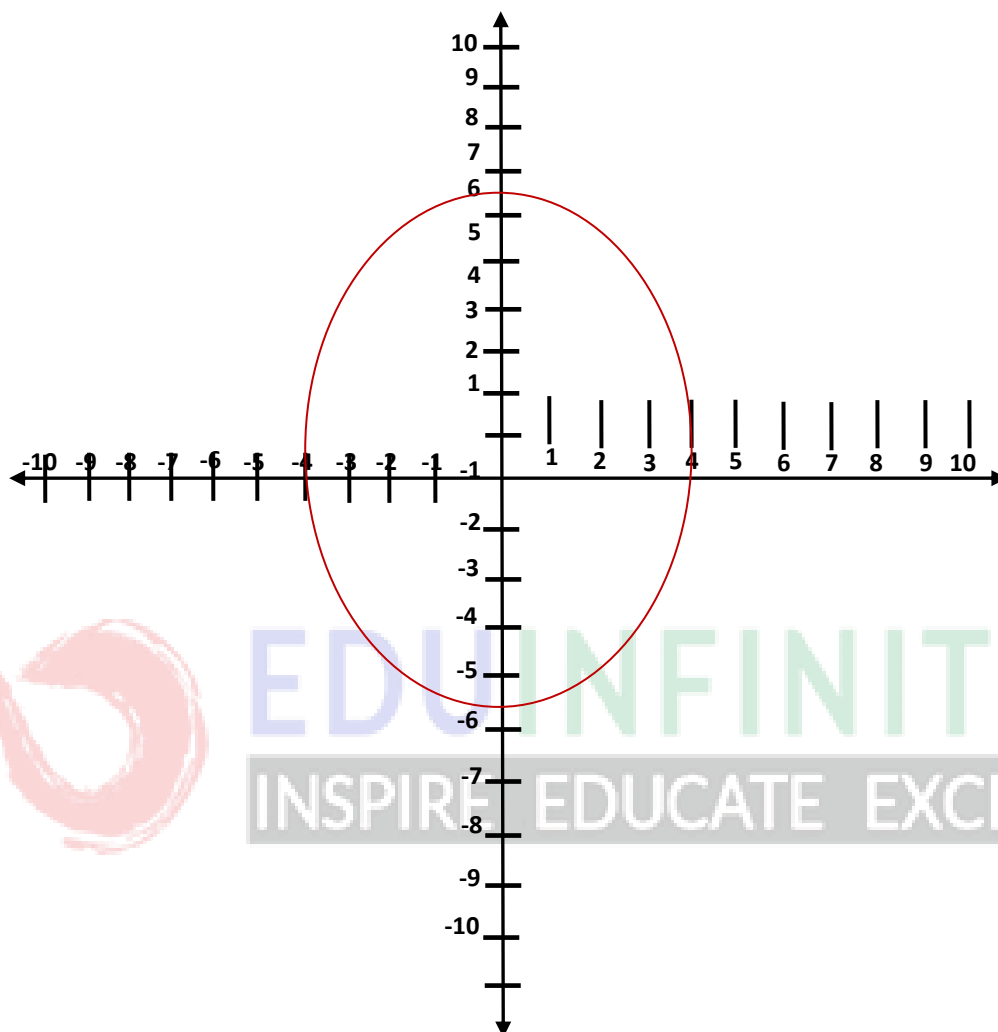
To draw a graph using quadratic equation there must be at least **13** points.

Let us consider an equation -:

1. $x^2 + y^2 = 25$

$\Rightarrow y = \pm\sqrt{25 - x^2}$

x	3	-3	4	-4	0	5	-5	2	-2
y	±4	±4	±3	±3	±5	0	0	±4.6	±4.6



Graphical Solution of a Simultaneous linear equation:-

To get solution of the simultaneous linear equations in two variables graphically, we plot the graph of each linear equation on the same graph paper. The point where two lines representing the given linear equations meet gives the solution of system of linear equations.

Let us take an example:-

$2x + y - 6 = 0$ (1)

$2x - y - 2 = 0$ (2)

From equation (1)

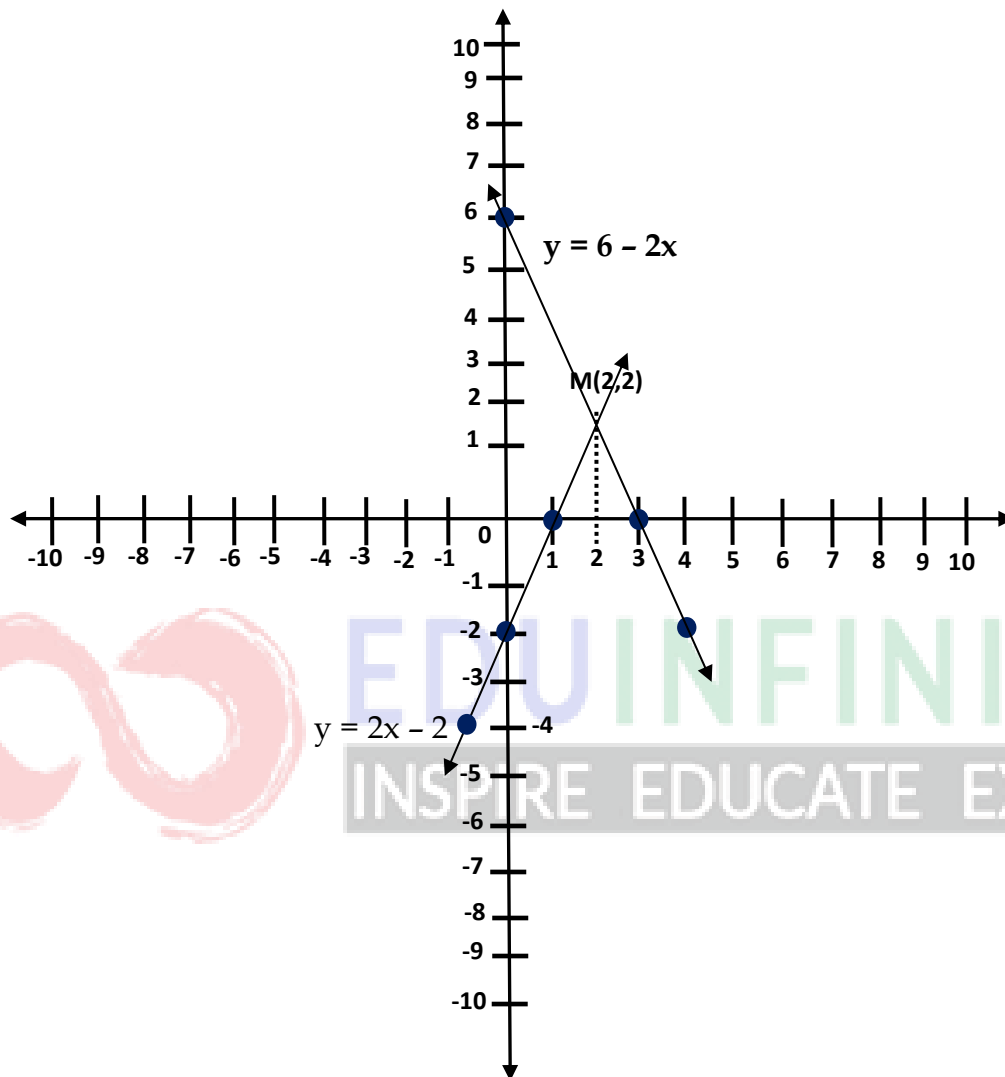
$y = 6 - 2x$

x	0	4	3
y	6	-2	0

From equation (2)

$$y = 2x - 2$$

x	0	1	-1
y	-2	0	-4



To know more, register for EDUINFINITE Classes