

Coordinate Geometry

Cartesian System

Cartesian plane & Coordinate Axes

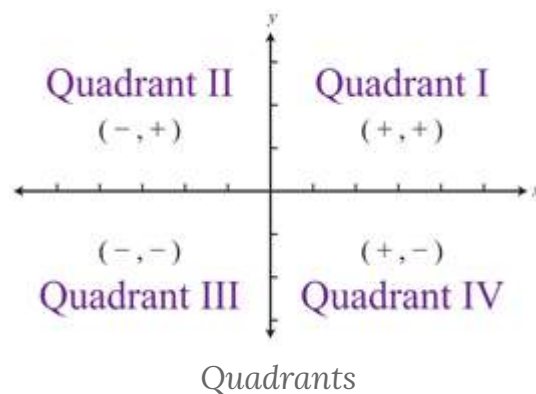
Cartesian Plane: A cartesian plane is defined by **two perpendicular number lines**, A horizontal line ($x - axis$) and a vertical line ($y - axis$).

These lines are called coordinate axes. (Cartesian plane is named after French mathematician **Rene Descartes**, who formalized its use in mathematics) The Cartesian plane extends infinitely in all directions.

Origin: The coordinate axes intersect each other at right angles, **The point of intersection** of these two axes is called Origin.

Quadrants

The cartesian plane is divided into four equal parts, called **quadrants**. These are named in order as I,II,III and IV starting with the upper right and going around in anticlockwise direction.



Points in different Quadrants.

Signs of coordinates of points in different quadrants:

I Quadrant: '+' x - coordinate and '+' y - coordinate. E.g. (2,3)

II Quadrant: '-' x - coordinate and '+' y - coordinate. E.g. (-1,4)

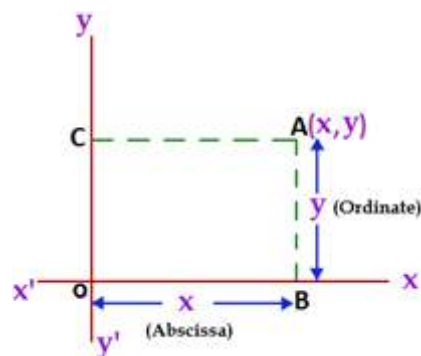
III Quadrant: '-' x - coordinate and '-' y - coordinate. E.g. (-3,-5)

IV Quadrant: '+' x - coordinate and '-' y - coordinate. E.g. (6,-1)

Plotting on a Graph

Representation of a point on Cartesian plane

Using the co-ordinate axes, we can describe any point in the plane using an ordered pair of numbers. A point **A** is represented by an ordered pair (x, y) where, x is the **abscissa** and y is the **ordinate** of the point.

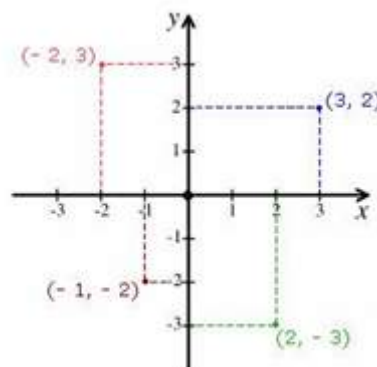


Position of a point in a plane

Plotting a point

The location of a point in the plane is given by its coordinates, the first number x gives the point's horizontal position and the second number y gives its vertical position.

For example, Point $(3, 2)$ is 3 units away from positive y -axis and 2 units away from positive x -axis. Therefore, point $(3, 2)$ can be plotted as shown below. Similarly, $(-2, 3)$, $(-1, -2)$ and $(2, -3)$ are plotted.



Plotting a point in the plane