

CLASS NOTES

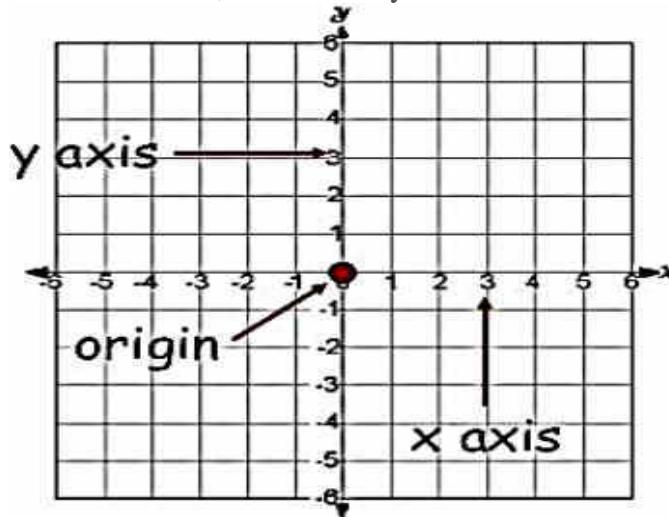
Class: IX

Topic: COORDINATE GEOMETRY

Subject: MATHEMATICS

Cartesian System

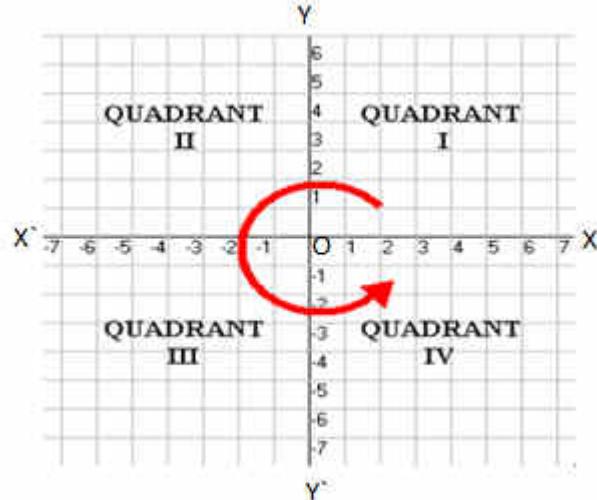
If we take two number lines, one horizontal and one vertical, and then combine them in such a way that they intersect each other at their zeroes, and then they form a **Cartesian Plane**.



- The horizontal line is known as **the x-axis** and the vertical line is known as the **y-axis**.
- The point where these two lines intersects each other is called the **origin**. It is represented as 'O'.
- OX and OY are the positive directions as the positive numbers lie in the right and upward direction.
- Similarly, the left and the downward directions are the negative directions as all the negative numbers lie there

Quadrants of the Cartesian Plane

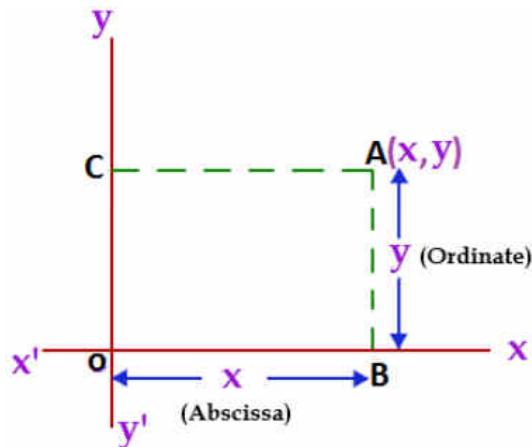
The Cartesian plane is dividing into four quadrants named as **Quadrant I, II, III, and IV** anticlockwise from OX.



Coordinates of a Point

To write the coordinates of a point we need to follow these rules-

- The **x - coordinate** of a point is marked by drawing perpendicular from the y-axis measured a length of the x-axis. It is also called the **Abscissa**.
- The **y - coordinate** of a point is marked by drawing a perpendicular from the x-axis measured a length of the y-axis. It is also called the **Ordinate**.
- While writing the coordinates of a point in the coordinate plane, the x - coordinate comes first, and then the y - coordinate. We write the coordinates in brackets

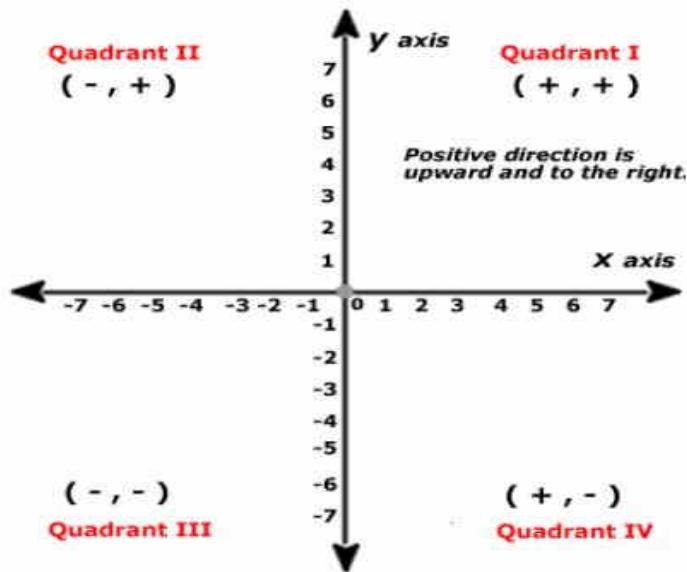


In the above figure, $OB = CA = x$ coordinate (Abscissa), and $CO = AB = y$ coordinate (Ordinate).

We write the coordinate as (x, y) .

Remark: As the origin O has zero distance from the x-axis and the y-axis so its abscissa and ordinate are zero. Hence the coordinate of the origin is $(0, 0)$.

The relationship between the signs of the coordinates of a point and the quadrant of a point in which it lies.

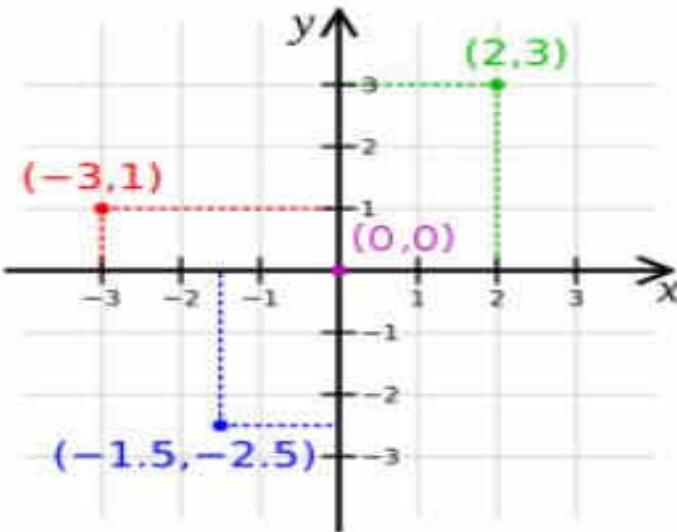


Quadrant	Coordinate	Sign in the quadrant
I	(+, +)	1st quadrant is enclosed by the positive x-axis and the positive y-axis.
II	(-, +)	2nd quadrant is enclosed by the negative x-axis and the positive y-axis.
III	(-, -)	3rd quadrant is enclosed by the negative x-axis and the negative y-axis.
IV	(+, -)	4th quadrant is enclosed by the positive x-axis and the negative y-axis

Plotting a Point in the Plane if its Coordinates are Given

Steps to plot the point (2, 3) on the Cartesian plane -

- First of all, we need to draw the Cartesian plane by drawing the coordinate axes with 1 unit = 1 cm.
- To mark the x coordinates, starting from 0 moves towards the positive x-axis and count to 2.
- To mark the y coordinate, starting from 2 moves upwards in the positive direction and count to 3.
- Now this point is the coordinate (2, 3)



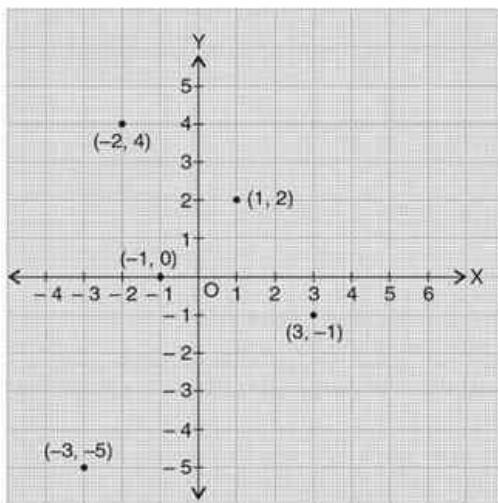
Likewise, we can plot all the other points, like $(-3, 1)$ and $(-1.5, -2.5)$

Exercise 3.3

1. In which quadrant or on which axis do each of the points $(-2, 4)$, $(3, -1)$, $(-1, 0)$, $(1, 2)$ and $(-3, -5)$ lie? Verify your answer by locating them on the Cartesian plane.

- Sol.** $(-2, 4)$, i.e., $(-, +)$ \Rightarrow The point lies in 2nd quadrant.
 $(3, -1)$, i.e., $(+, -)$ \Rightarrow The point lies in 4th quadrant.
 $(-1, 0)$, i.e., $(-, 0)$ \Rightarrow The point lies on the $-ve$ x -axis.
 $(1, 2)$, i.e., $(+, +)$ \Rightarrow The point lies in 1st quadrant.
 $(-3, -5)$, i.e., $(-, -)$ \Rightarrow The point lies in 3rd quadrant.

The points are shown in the cartesian plane given below:



Extra questions for practice.

- Q.1** Plot the following points and check whether they are collinear or not:

(i) (1, 3), (-1, -1), (-2, -3)

(ii) (1, 1), (2, -3), (-1, -2)

Q.2 Points A (5, 3), B (-2, 3) and D (5, -4) are three vertices of a square ABCD. Plot these points on a graph paper and hence find the coordinates of the vertex C.

Q.3 Plot the following points and write the name of the figure obtained by joining them in order:

P(-3, 2), Q(-7, -3), R(6, -3), S(2, 2)

Q.4 Locate the points (5, 0), (0, 5), (2, 5), (5, 2), (-3, 5), (-3, -5), (5, -3) and (6, 1) in the Cartesian plane.