CHAPTER 3 – COORDINATE GEOMETRY

MODULE-1

INTRODUCTION

We all know how to locate a point on a number line. Now we will learn how to describe the position of a point in a plane.

CARTESIAN PLANE

1. The position of the point is located on a plane by drawing two lines perpendicular to each other.

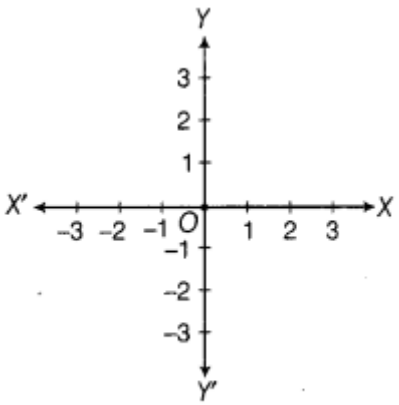
2. The horizontal line is called the x-axis and the vertical line is called the y-axis

3. The plane is called the cartesian or coordinate plane and the mutually perpendicular lines are called axes.

4. The x- coordinate of a point is called abscissa.

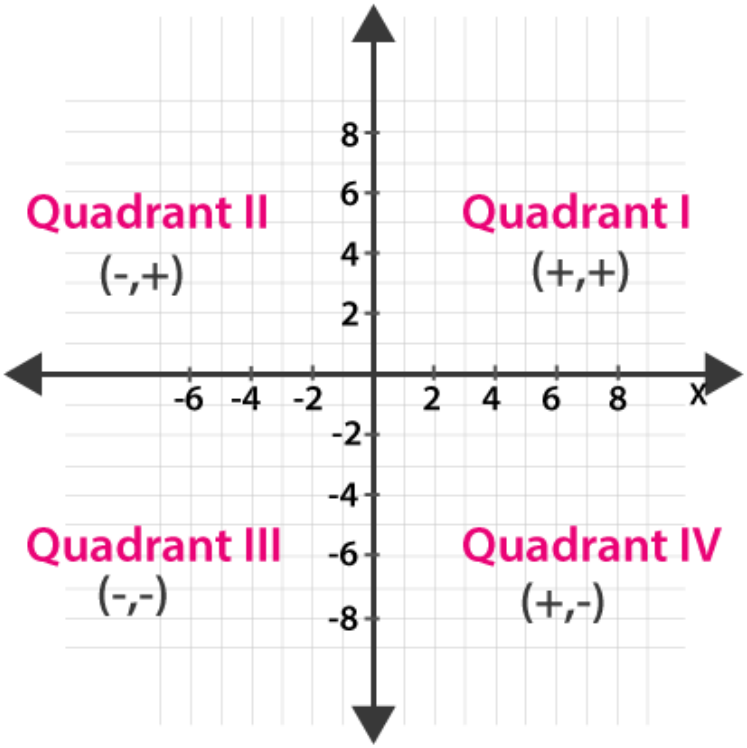
5. The y-coordinate of a point is called the ordinate.

6. The coordinates of a point where the axes intersect each other is (0,0) and is known as origin.



QUADRANTS

The two axes divide the plane into four parts. These four parts are called the quadrants numbered I, II, III and IV anticlockwise from OX.



So the points of the type lies in:

(+,+) Quadrant I, (-, +) Quadrant II , (-,-) Quadrant III, (+,-) Quadrant IV

COORDINATES OF A POINT

1. The x- coordinate of a point is its perpendicular distance from the y-axis measured along the x-axis which is also called as abscissa.

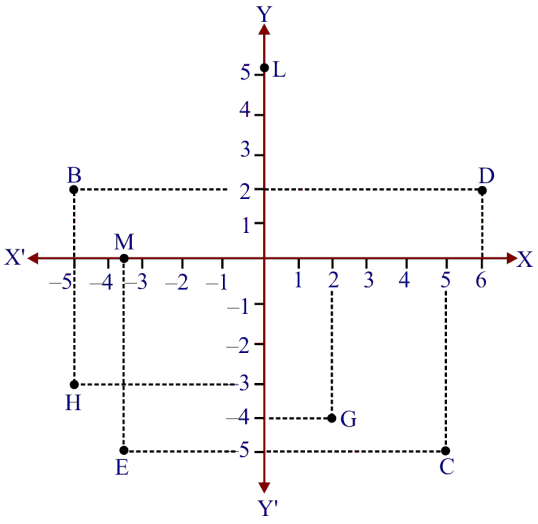
2. The y- coordinate of a point is its perpendicular distance from the x-axis measured along the y-axis which is also called as ordinate.

3. In stating the coordinates of a point in the Cartesian plane, the x -coordinate comes first and then the y-coordinate. We place the coordinates in brackets.

4. If a point lies on x-axis its coordinates are represented by (x,0) and that of a point lying on y-axis is represented by (0,y).

5. The coordinates of each point in a Cartesian plane is unique.

EXAMPLE 1



1.The abscissa and the ordinate of the point B are -5 and 2 respectively. So the coordinates of B are

(-5,2).

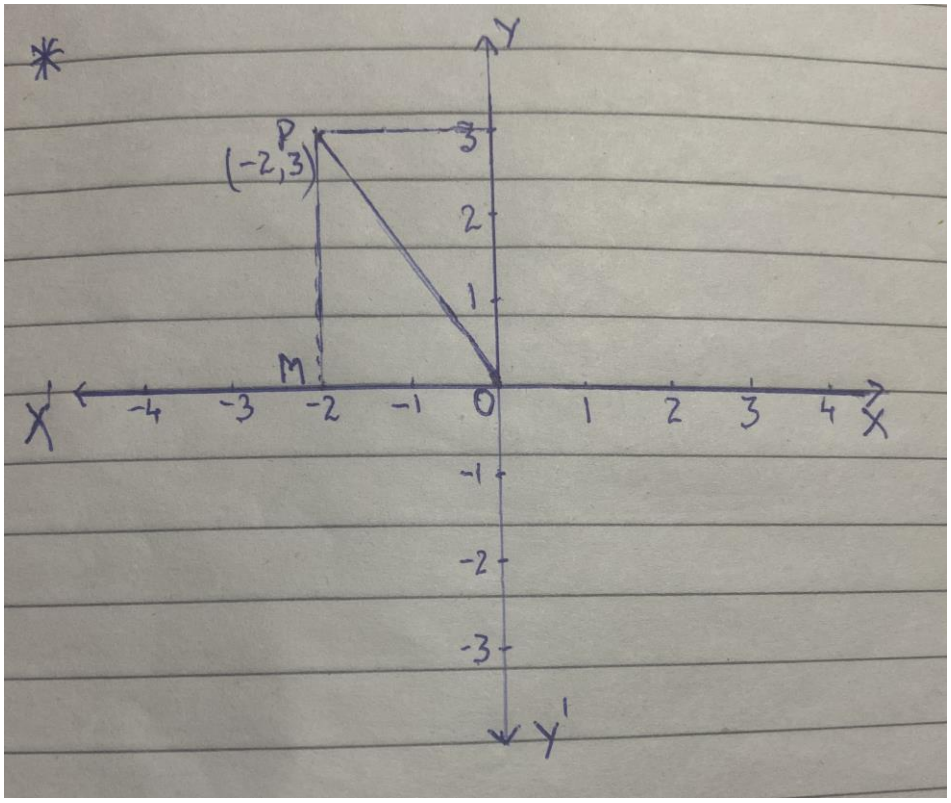
2. The abscissa of the point M is -3.5 and its ordinate is 0. So the coordinates of point M are (-3.5,0).

3. The abscissa and the ordinate of the point G are 2 and -4 respectively. So its coordinates are (2,-4).

4. Similarly the coordinates of point D , H , E and C are (6,2) , (-5,-3) , (-3.5,-5) and (5,-5) respectively.

Finding distance of a point P from origin

EXAMPLE 2



In triangle PMO

<PMO=90^o , OM=2units & MP=3units.

So $(PM)^2+(MO)^2=(PO)^2$ [using Pythagoras theorem]

$(-2)^2+(3)^2=(PO)^2$

$4+9=(PO)^2$

$(PO)^2=13$

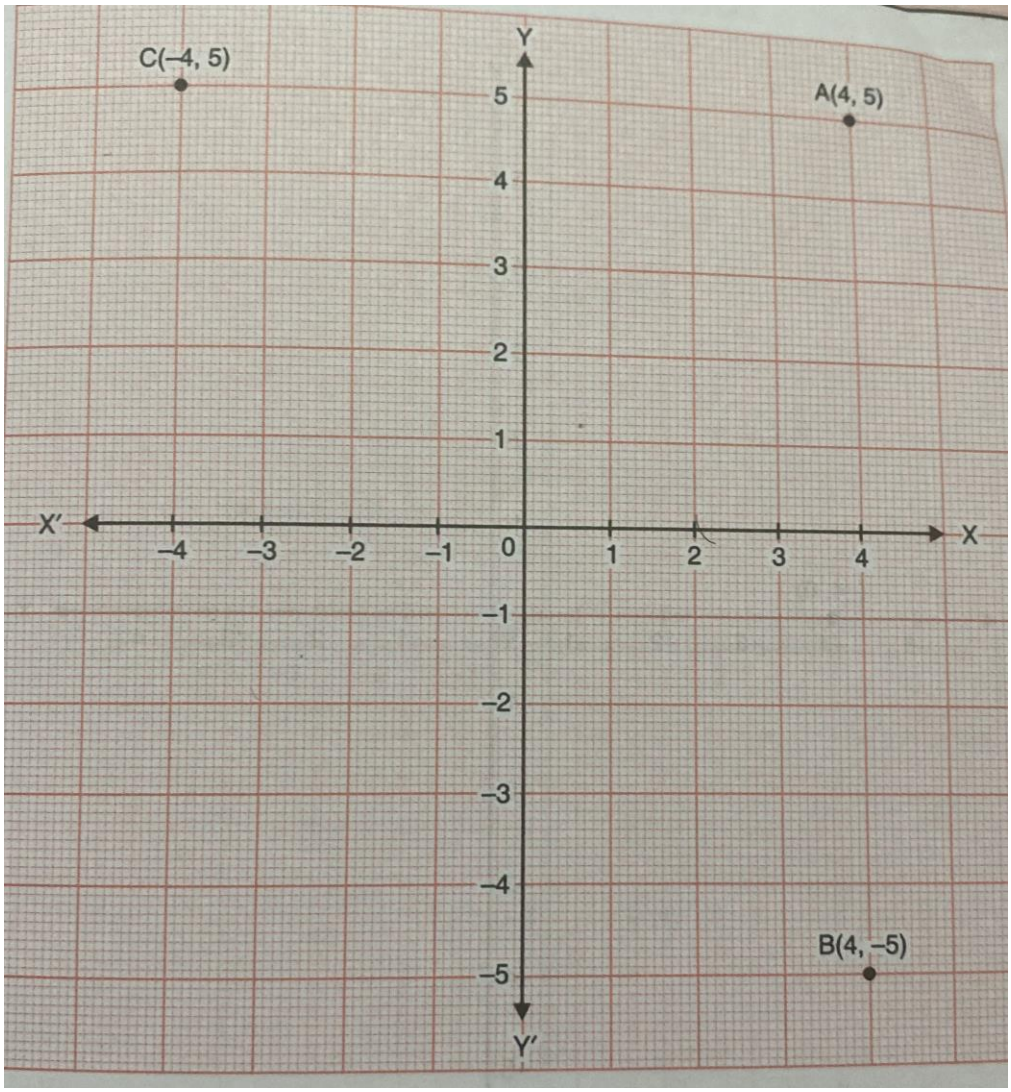
$PO=\sqrt{13}$

Or we can say,distance of a point(x,y) from origin is $\sqrt{x^2+y^2}$.

MIRROR IMAGES (Reflection) OF A POINT

The distance of the point along the given axes remains the same,

EXAMPLE 3



The mirror image of point A(4,5) in x-axis is a point B in 4th quadrant and its coordinates are (4,-5) & the mirror image of point A(4,5) when taken along y-axis is a point C in 2nd quadrant and its coordinates are (-4,5).

ASSIGNMENT

Exercise 3.1

Exercise 3.2

Q. In the given figure write the coordinates of the points where circle meets the axis.