Find the Values Of Abscissae

OBJECTIVE

To find the values of abscissae and ordinates of various! Points given in a cartesian plane.

Materials Required

1. Cardboard
2. White paper
3. Graph paper with various given points
4. Geometry box
5. Scissors
6. Glue

Prerequisite Knowledge

1. Knowledge of Cartesian coordinate system.
2. To locate/plot a point in Cartesian plane.

Theory

1. Cartesian Coordinate System

The system used to describe the position of a point in a plane, is called cartesian system.

In cartesian system, there are two perpendicular directed straight lines XX' and YY' which intersect at point 0, then line XX' will be horizontal line and YY' will be vertical line, shown x' as alongside figure.

The point of intersection of these lines is called origin and it is denoted by O. In other words, the point from which distances are marked is called origin. The horizontal line XOX' is called X-axis and the vertical line YOY' is called Y-axis. Directions OX Fig. 16.1

Fig. 16.1
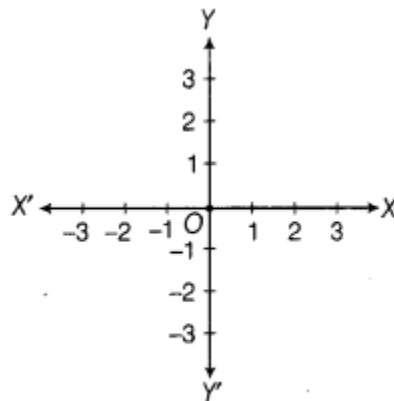
and OY are called the positive directions of X-axis and Y-axis, respectively and

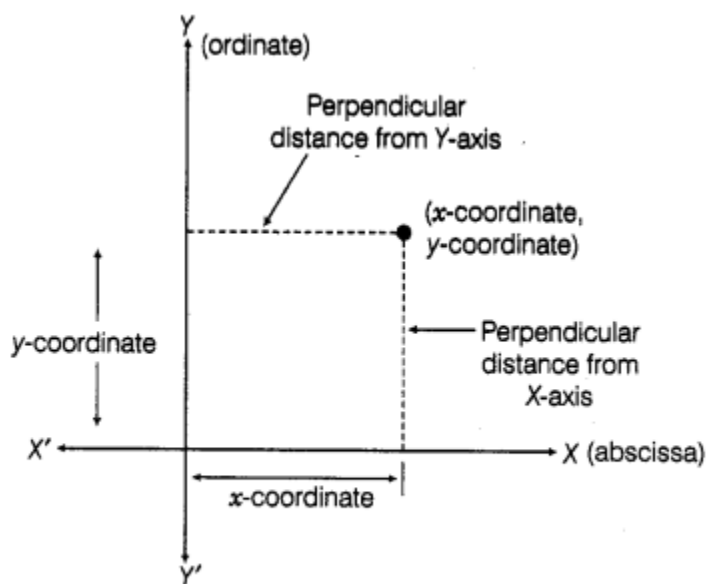directions OX' and OY' are called the negative directions of X-axis and Y-axis, respectively.

Note:

1. The angle between the horizontal and vertical axes is 90°.
2. Any line perpendicular to the X-axis is parallel to the Y-axis.
3. Any line perpendicular to the Y-axis is parallel to the X-axis.

2. Coordinates of a Point in Cartesian Plane

To locate a point in the cartesian plane, its perpendicular distances from X-axis and Y-axis are required, these distances are called coordinates of the point. Each point in cartesian plane has two coordinates; x-coordinate and y-coordinate.

(i) The x-coordinate of a point is the perpendicular distance from the Y-axis measured along the X-axis (positive, along the positive direction of the X-axis and negative, along the negative direction of X-axis). The x-coordinate is also called the abscissa.

Fig. 16.2

(ii) The y-coordinate of a point is the perpendicular distance from the X-axis measured along the Y-axis (positive, along the positive direction of the Y-axis and negative, along the negative direction of Y-axis). The y-coordinate is also called the ordinate.

x-coordinate and y-coordinate taken together are called cartesian coordinates or coordinates of a point and denoted by (x, y). Here, the x-coordinate comes first and after this y-coordinate comes. (x, y) is called an order pair.
The order of x and y is important in (x, y). Position of (y, x) will be different from (x, y).

Procedure

1. Take a cardboard of suitable size and paste a white paper on it.
2. Now, paste the graph paper with various points drawn on it in the' middle of white paper.
3. Now, look at the graph paper and the points whose abscissae and ordinates are to be found.
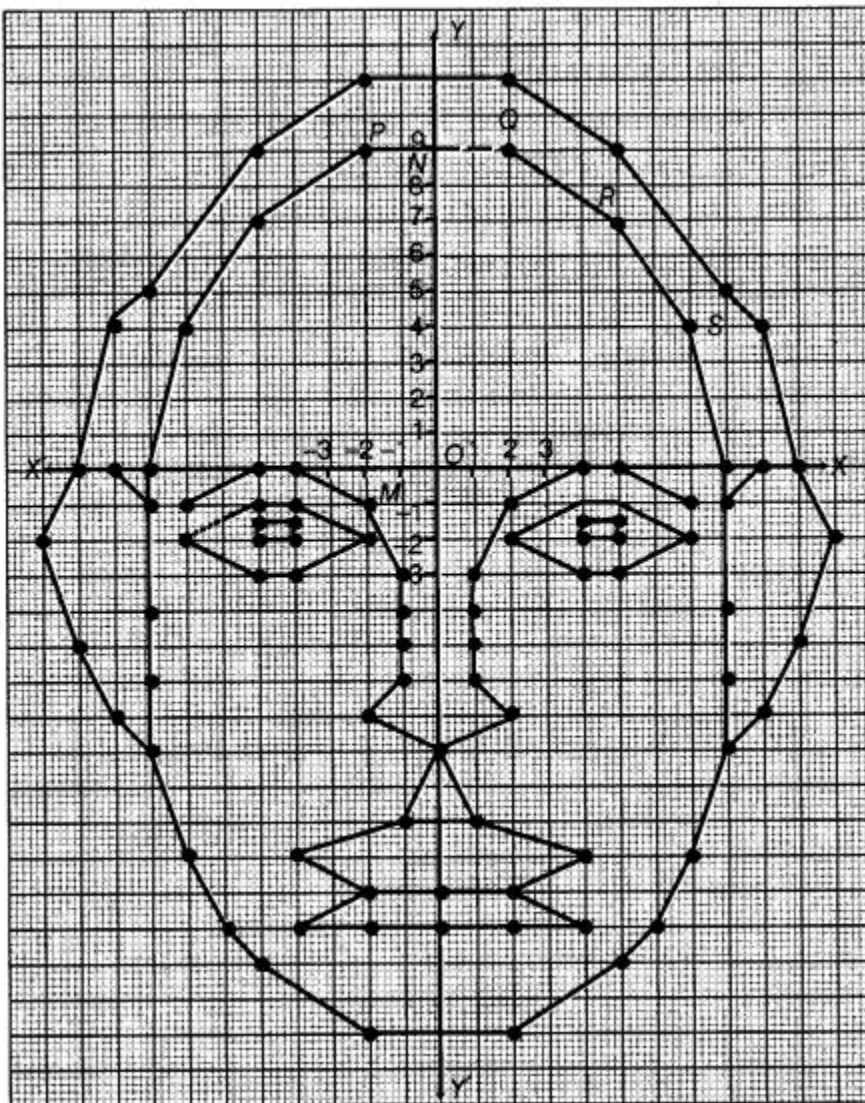
Demonstration

If P is a point plotted on graph paper and we have to find the abscissa and ordinate of point P. Draw perpendiculars PM and PN from P to X-axis and Y-axis, respectively.
PN = -2 units (distance from X-axis, i.e. x-coordinate or abscissa)
PM = 9 units (distance from Y-axis, i.e. y-coordinate or ordinate)
As, point P lies in second quadrant.
So, the coordinates of P are (- 2,9).

Note:
Care should be taken while reading the coordinates, otherwise the location of the object will differ.

Observation

Points	Abscissa	Ordinate	Quadrant	Coordinates
Q				
R				
S				
⋮				

Fill the above table for different points on the given graph.

Result
The coordinates of the points plotted on the graph paper have been found.

Application
This activity is very useful in locating the position of a particular country/city or a place on map.

Viva Voce
Question 1:
What do you mean by a cartesian system?
Answer:
The system used to describe the position of a point in a plane, is called cartesian system.

Question 2:
What is the ordinate of point lying in third quadrant at a distance of 2 units from X-axis and 5 units from Y-axis?
Answer:
– 2, because is third quadrant y-coordinate is negative.

Question 3:
What type of graph do you get for y = – 2?
Answer:
A straight line parallel to X-axis at a distance of 2 units from origin below the X-axis.

Question 4:
What is the image of (- 3, -1) in 2nd quadrant?
Answer:
(-3,1)

Question 5:
What is the image of (- 1, 4) in 3rd quadrant?
Answer:
(-1,-4)

Question 6:
What type of graph do you get forx = – 2?
Answer:
A straight line parallel to Y-axis at a distance of 2 units from origin lying in the left side of Y-axis.

Question 7:
A point (- 2,- 6) lies in which quadrant?
Answer:
Third quadrant

Question 8:
In cartesian system, X-axis and Y-axis divide the graph paper in how many quadrants?
Answer:
Four quadrants

Question 9:
Is the point (-7,2), same as point (2,-7)?
Answer:
No, in coordinates of a point, their order matters, so (-7,2) is not same as (2, – 7).

Question 10:
Find the new coordinates of a point (2, 3), when we rotate the axes at 180° in anti-clockwise direction.
Answer:
When we rotate the axes, the positive X and Y-axes will become negative. So, the new coordinates will be (-2, -3).

Question 11:
In cartesian plane, the angle between two axes is not always!-90°.
Answer:
False, the angle between two axes is always 90°.

Question 12:

What is the condition that linear equation ax + by = c, c ≠ 0 perpendicular to any one of the axis?

Answer:

The linear equation ax + by = c is perpendicular to any one of the axis, if either a = 0 or b = 0.

Question 13:

Is it correct that if any point on the X-axis, then the y-coordinate will be zero?

Answer:

Yes, because the distance from X-axis is zero.

Suggested Activity

Draw a star shaped figure on the graph paper and find the coordinates of corner points after naming them.