

Co-ordinate Geometry

Key Points

- Let XOX' and YOY' are two mutually perpendicular lines. These lines are called co-ordinate axis. XOX' is called x -axis and YOY' is called y -axis.
- Point of intersection of x -axis and y -axis i.e. O is called the origin whose coordinates are $(0,0)$.
- x -coordinate of a point is called abscissa & y -coordinate is called the ordinate.
- A plane is divided by the axis in four quadrants.
 - In first quadrant, both x and y coordinates of a point are +ve.
 - In second quadrant, x -coordinate is -ve and y -coordinates is +ve.
 - In third quadrant, both x and y coordinates of a point are negative.
 - In fourth quadrant, x -coordinate is +ve and y -coordinate is -ve.

5. Distance formula

Distance between two points $P(x_1, y_1)$ and $Q(x_2, y_2)$ is $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ units.

- Point A , B , and C are collinear if they lie on the same straight line.
- Midpoint of a line segment joining the points (x_1, y_1) and (x_2, y_2) is given by $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.

8. Section formula

The coordinates of a point which divides the line segment joining the points (x_1, y_1) and (x_2, y_2) in the ratio $l:m$ internally are given by $\left(\frac{lx_2 + mx_1}{l+m}, \frac{ly_2 + my_1}{l+m}\right)$.

- The area of the triangle with vertices (x_1, y_1) , (x_2, y_2) and (x_3, y_3) is given by $\frac{1}{2} [x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)]$ sq. units. If the area of triangle is zero then points are collinear.
- Centroid of the triangle with vertices (x_1, y_1) , (x_2, y_2) and (x_3, y_3) is given by $\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$.