

Section and Mid-Point Formula

Co-ordinate geometry is that branch of mathematics which creates geometry algebraically.

The Section Formula

Section formula is used to find the co-ordinates of a point which divides the line segment joining two given points in a given ratio.

If point P divides the line segment joining the points $A(x_1, y_1)$ and $B(x_2, y_2)$, then the coordinates of point P are given by $\left(\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n} \right)$

Mid-Point Formula

Mid-Point formula is used to find the co-ordinates of the mid-point of the line segment joining two given points.

Let $P(x, y)$ be a point lying on a line segment AB, where the coordinates of A and B are (x_1, y_1) and (x_2, y_2) respectively. Suppose P divides AB in the ratio 1 : 1. In other words, P is the mid-point of AB.

$$\Rightarrow AP = PB$$

Then coordinates of P are given by $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

Centroid of a Triangle

The straight line joining the vertex of a triangle to the mid-point of the opposite side is called a median of the triangle.

The point which divides a median of a triangle in the ratio 2 : 1 is called the centroid of the triangle.

Thus, if AD is a median of $\triangle ABC$ and G is its centroid, then $\frac{AG}{GD} = \frac{2}{1}$

Let the vertices of $\triangle ABC$ are $A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$.

Then the coordinate of centroid are given by $\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right)$