

Coordinate Geometry

Distance Formula

The distance between the points (x_1, y_1) and (x_2, y_2) is given by :

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

The distance of the point (x, y) from origin is given by :

$$\sqrt{x^2 + y^2}$$

Three points A, B and C are collinear if $AB + BC = AC$

Section Formula

The section formula states that any point P(x, y) that divides a line segment in the ratio m:n can be represented as $(\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n})$

The following are the corollaries of the section formula :

- The midpoint of a line segment joining (x_1, y_1) and (x_2, y_2) is: $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$
- The centroid G of a triangle, with vertices (x_1, y_1) , (x_2, y_2) and (x_3, y_3) is:

$$(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3})$$



Area of a Triangle

If $A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$ are three vertices of a triangle, then the area of a triangle is given by :

$$\text{area of a triangle ABC} = \frac{1}{2} \times [x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)]$$

