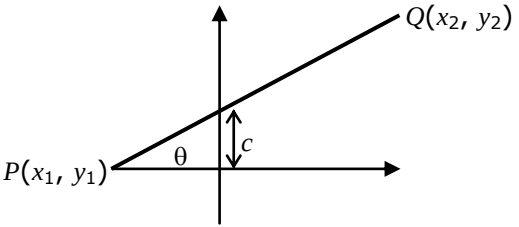
11. Co-ordinate Geometry



(i) Distance PQ = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

(ii) Slope of PQ = m = $y_2 - y_1/x_2 - x_1 = \tan \theta$

(iii) Equation of PQ is $y - y_1/y_1 - y_2 = x - x_1/ x_1 - x_2$ or $y = mx + c$

(iv) The product of the slopes of two perpendicular lines is –1

(v) The distance between the points (x_1, y_1) and (x_2, y_2) is $\sqrt{[(x_1 - x_2)^2 + (y_1 - y_2)^2]}$.

(vi) If point P(x, y) divides the segment AB, where

(vii) $A \equiv (x_1, y_1)$ and $B \equiv (x_2, y_2)$, internally in the ratio m : n, then,

$$x = \frac{mx_2 + nx_1}{m + n} \text{ and } y = \frac{my_2 + ny_1}{m + n}.$$

(viii) $A \equiv (x_1, y_1)$ and $B \equiv (x_2, y_2)$, externally in the ratio m : n, then,

$$x = \frac{mx_2 - nx_1}{m - n} \text{ and } y = \frac{my_2 - ny_1}{m - n}.$$

(ix) If P is the midpoint, then $x = x_1 + x_2 / 2$ and $y = y_1 + y_2 / 2$.

(x) If G (x, y) is the centroid of triangle ABC, $A \equiv (x_1, y_1)$, $B \equiv (x_2, y_2)$, $C \equiv (x_3, y_3)$, then $x = x_1 + x_2 + x_3 / 3$ and $y = y_1 + y_2 + y_3 / 3$.

(xi) If I (x, y) is the in-centre of triangle ABC,

(xii) $A \equiv (x_1, y_1)$, $B \equiv (x_2, y_2)$, $C \equiv (x_3, y_3)$, then, $x = ax_1 + bx_2 + cx_3 / a+b+c$ and $y = ay_1 + by_2 + cy_3 / a+b+c$ where a, b and c are the lengths of BC, AC and AB respectively.

(xiii) The equation of a straight line is $y = mx + c$, where m is the slope and c is the y-intercept ($\tan \theta = m$, where θ is the angle that the line makes with the positive X-axis)