

## FORMULAE – Linear Function

- **General Form**

$$Ax + By + C = 0$$

- **Gradient-Intercept Form**

$$y = mx + b$$

- **Distance**

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

- **Midpoint**

$$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

- **Gradient**

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

- **Gradient given angle at x-axis**

$$m = \tan \alpha$$

- **Intercept Form**

$$\frac{x}{a} + \frac{y}{b} = 1$$

- **Point-Gradient**

$$y - y_1 = m(x - x_1)$$

- **Two-Point**

$$\frac{y - y_1}{x - x_1} = \frac{y_2 - y_1}{x_2 - x_1}$$

- **Parallel Lines**

$$m_1 = m_2$$

- **Perpendicular Lines**

$$m_1 m_2 = -1$$

- **Perpendicular Distance from a Point to a Line**

$$d = \left| \frac{Ax_1 + By_1 + C}{\sqrt{A^2 + B^2}} \right|$$

- **Angle between two lines**

$$\tan \theta = \left| \frac{m_1 - m_2}{1 + m_1 m_2} \right|$$

- **Dividing interval in given ratio**

$$P = \left( \frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n} \right)$$