SUMMARY OF FORMULAE AND RESULTS

LINEAR FUNCTIONS

- **The Gradient of an Interval**

- **The Midpoint of an Interval**

- **The Length of an Interval**

- **The Equation of a Line**

    - **Gradient-Intercept Form**

    - **Intercept Form**

    - **Point Gradient Form**

    - **Two Point Form**

    - **General Form**

- **Parallel Lines**

- **Perpendicular Lines**

- **The Angle a line Makes with the Positive x-axis**

- **Angle Between Two Lines**

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

- **Dividing an Interval in a Given Ratio**

SUMMARY OF FORMULAE AND RESULTS

LINEAR FUNCTIONS

- **The Gradient of an Interval**

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

- **The Midpoint of an Interval**

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

- **The Length of an Interval**

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

- **The Equation of a Line**

  - **Gradient-Intercept Form**

$$y = mx + b$$

  - **Intercept Form**

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

  - **Point Gradient Form**

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

  - **Two Point Form**

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

  - **General Form**

$$Ax + By + C = 0$$

- **Parallel Lines**

$$m_1 = m_2$$

- **Perpendicular Lines**

$$m_1 \times m_2 = -1$$

- **The Angle a line Makes with the Positive x-axis**

$$m = \tan\alpha$$

- **Angle Between Two Lines**

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

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

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

- **Dividing an Interval in a Given Ratio**

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

SUMMARY OF FORMULAE AND RESULTS

QUADRATIC FUNCTIONS

- **The Quadratic Formula**

- **Sum and Product of the Roots**

- **Axis of Symmetry of a Parabola**

- **The Discriminant**

- **Types of Roots**

  - **Real Roots**

  - **Not Real Roots**

  - **Equal Roots**

  - **Rational Roots**

  - **Irrational Roots**

- **Definiteness**

  - **Positive Definite**

  - **Negative Definite**

  - **Indefinite**

SUMMARY OF FORMULAE AND RESULTS

QUADRATIC FUNCTIONS

- **The Quadratic Formula**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- **Sum and Product of the Roots**

$$\alpha + \beta = \frac{-b}{a}$$
$$\alpha\beta = \frac{c}{a}$$

- **Axis of Symmetry of a Parabola**

$$x = \frac{-b}{2a}$$

- **The Discriminant**

$$\Delta = b^2 - 4ac$$

- **Types of Roots**

    - **Real Roots**

    $$\Delta \geq 0$$

    - **Not Real Roots**

    $$\Delta \leq 0$$

    - **Equal Roots**

    $$\Delta = 0$$

    - **Rational Roots**

    Δ is a perfect square

    - **Irrational Roots**

    Δ is not a perfect square

- **Definiteness**

    - **Positive Definite**

    $$a > 0, \Delta < 0$$

    - **Negative Definite**

    $$a < 0, \Delta < 0$$

    - **Indefinite**

    $$\Delta \geq 0$$