

QUADRATIC EQUATION & BINOMIAL THEOREM

Quadratic Equation

⇒ A polynomial of two degree is called a quadratic expression with the form of;

$$y = ax^2 + bx + c \quad \text{where } a \neq 0$$

By the process of completing the square we have;

$$ax^2 + bx + c = a \left[\left(x + \frac{b}{2a} \right)^2 - \frac{b^2 - 4ac}{4a^2} \right]$$

We have the quadratic equation $ax^2 + bx + c = 0$

$$\therefore ax^2 + bx + c = a \left[\left(x + \frac{b}{2a} \right)^2 - \frac{b^2 - 4ac}{4a^2} \right] = 0$$

We obtain roots;

$$\alpha = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

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

⇒ Discriminant (Δ) = $b^2 - 4ac$

i- If $b^2 - 4ac > 0$ the roots α & β are real

ii- If $b^2 - 4ac < 0$ the roots α & β are no roots

they have a complex number as their roots.

iii- If $b^2 - 4ac = 0$ the roots α & β are real and equal.