

EQUATIONS

Chapter 2

A mathematical statement of equality

Linear Equation

x - variable (one value)
 a, b, c are constants

Quadratic

$$: - ax^2 + bx + c = 0$$

x has two solutions

Cubic

$$: - ax^3 + bx^2 + cx + d = 0$$

x has three solutions

Quadratic

$$\rightarrow ax^2 + bx + c$$

$$\text{discriminant} = b^2 - 4ac$$

$b^2 - 4ac < 0$	$b^2 - 4ac = 0$	$b^2 - 4ac > 0$	
		Perfect sqr	Not Perf. sqr
Roots are unequal, imaginary	Real	Real	Real
	Equal	Distinct	Distinct
	$\alpha, \beta = \frac{-b}{2a}$	Rational	Irrational

$$ax^2 + bx + c = 0$$

$$\alpha + \beta = \frac{-b}{a} \quad (\text{sum of roots})$$

$$\alpha \beta = \frac{c}{a} \quad (\text{product of roots})$$

General form

$$x^2 - (\text{sum of roots})x + \text{product of roots}$$

If roots reciprocal then :- product = 1

$$\alpha\beta = \frac{c}{a} = 1, a = c$$

Cubic Equations

$$ax^3 + bx^2 + cx + d = 0$$

$$\text{Sum :- } \alpha + \beta + \gamma = \frac{-b}{a}$$

$$\text{Product :- } \alpha + \beta + \gamma = \frac{-d}{a}$$

$$\alpha\beta + \beta\gamma + \gamma\alpha = \frac{c}{a}$$