Polynomials

Division Algorithm

If $p(x)$ and $g(x)$ are two polynomials with $g(x) \neq 0$, then $p(x) = g(x) \times q(x) + r(x)$ where, $r(x) = 0$ or degree of $r(x)$ < degree of $g(x)$

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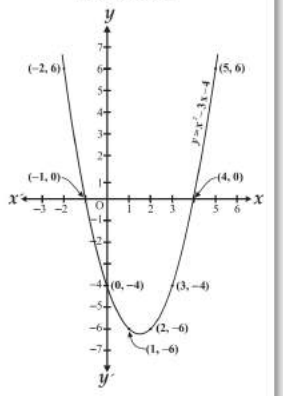
Graphical Representation Quadratic Polynomial

Parabola



$y = x^2 - 3x - 4$

Relationship between Zeroes (roots) and Coefficient of a Polynomials

Quadratic

α and β are zeroes of Quadratic Polynomial

$ax^2 + bx + c$

Then,

Sum of zeroes

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

Product of zeroes

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

Cubic

If α, β and γ are zeroes of Cubic Polynomial

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

Then,

Sum of zeroes,

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

Sum of products of the zeroes taken two at a tim

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

Product of zeroes,

$\alpha\beta\gamma = -\frac{d}{a}$

Degree of Polynomial

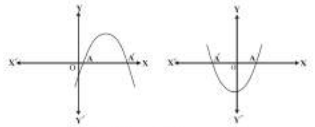
Highest power of x in a Polynomial, $p(x)$

Types

Polynomial	Degree	General Form
Linear	1	$ax+b$
Quadratic	2	ax^2+bx+c, $a \neq 0$
Cubic	3	ax^3+bx^2+cx+d, $a \neq 0$

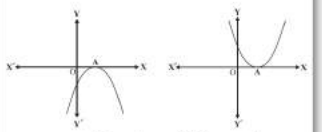
Zeroes of Polynomial Graphically

Case 1- Graph cuts x-axis at 2 points



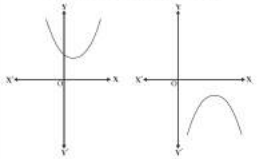
Number of Zeroes 2

Case 2- Graph cuts x-axis at exactly one point



Number of Zeroes 1

Case 3- Graph does not cut x-axis



Number of Zeroes 0

Trace the Mind Map

▸ First Level ▸ Second Level ▸ Third Level