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 $g(x)$

Graphical Representation Quadratic Polynomial

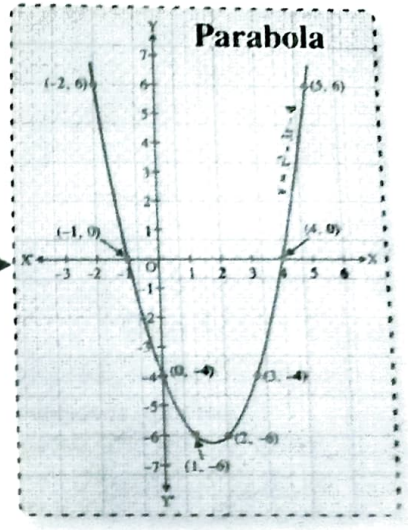


Table of values for $y = x^2 - 3x - 4$

x	–2	–1	0	1	2	3	4	5
y	6	0	–4	–6	–6	–4	0	6

Relationship between Zeroes and Coefficient of Polynomials

Quadratic

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

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

Degree of Polynomial

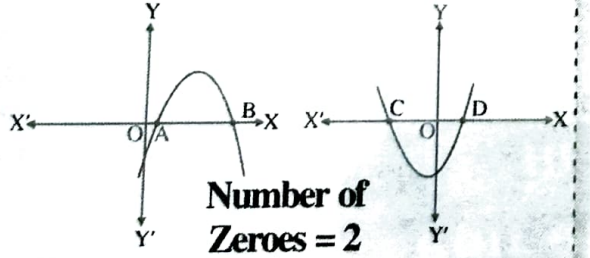
Highest power of x in polynomial, $p(x)$

Types

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

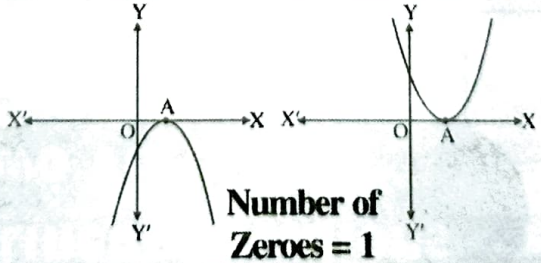
Zeroes of Polynomial Graphically

Case 1-Graph cuts x-axis at 2 points



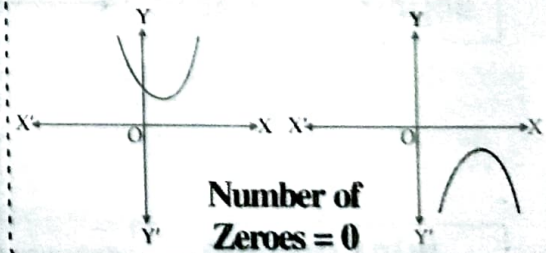
Number of Zeroes = 2

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