POLYNOMIALS

An expression

$p(x) = a_0x^n + a_1x^{n-1} + a_2x^{n-2} + \dots a_n$

is a polynomial.

Where a_0, a_1, ……….. a_n are real numbers and n is non-negative integer.

REMAINDER THEOREM

Let $p(x)$ is a polynomial of degree greater than or equal to 1 and a is any real number, if $p(x)$ is divided by the linear polynomial $x - a$ then the remainder is $p(a)$.

ALGEBRIC IDENTITIES

- $(x+y)^2 = x^2 + 2xy + y^2$
- $(x-y)^2 = x^2 - 2xy + y^2$
- $x^2 - y^2 = (x+y)(x-y)$
- $(x+y+z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$
- $(x+a)(x+b) = x^2 + (a+b)x + ab$
- $(x+y)^3 = x^3 + y^3 + 3xy(x+y)$
- $(x-y)^3 = x^3 - y^3 - 3xy(x-y)$
- $x^3 + y^3 + z^3 - 3xyz = [(x+y+z)(x^2 + y^2 + z^2 - xy - yz - zx)]$
- If $x + y + z = 0$ $\Rightarrow x^3 + y^3 + z^3 = 3xyz$
- $x^3 + y^3 = (x+y)(x^2 - xy + y^2)$
- $x^3 - y^3 = (x-y)(x^2 + xy + y^2)$

- A polynomial of degree one is called a **linear polynomial** e.g. $ax + b$, where $a \neq 0$.
- A polynomial of degree two is called a **quadratic polynomial** e.g. $ax^2 + bx + c$ where $a \neq 0$.
- A polynomial of degree 3 is called a **cubic polynomial** e.g. $px^3 + qx^2 + rx + s$, $p \neq 0$.
- A polynomial of degree 4 is called a **biquadratic polynomial** e.g. $px^4 + qx^3 + rx^2 + sx + t$, $p \neq 0$.

- Polynomials having only one term are known as **monomials**.
- Polynomials having two terms are known as **binomials**.
- Polynomials having three terms are known as **trinomials**.

- Value of a polynomial $p(x)$ at $x = a$ is $p(a)$.
- Zero of a polynomial $p(x)$ is a number 'a' such that $p(a) = 0$.

FACTOR THEOREM

If $p(x)$ is a polynomial of degree $x \geq 1$ and a is any real number then.

(i) x – a is a factor of $p(x)$ if $p(a) = 0$.

(ii) $p(a) = 0$ if $(x - a)$ is a factor of $p(x)$.

Degree of a polynomial is the greatest exponent of the variable in the polynomial.

- Constant polynomial is a polynomial of degree zero. The **constant polynomial** $f(x) = 0$ is called **zero polynomial**.
- Degree of zero polynomial is not defined.

C-9, Greater Kailash Enclave 2, New Delhi; Phone: 9810815644, 9910393669
Email: info.educonclave@gmail.com; sangeettuli@gmail.com