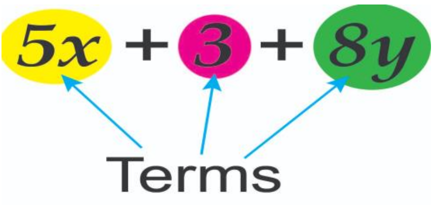
POLYNOMIALS

- **Constants**: A symbol having a fixed numerical value is called a constant (0 to 9)
- **Variables**: A symbol which may be assigned different numerical values is known as variable(a to z).
- **Algebraic expressions**: A combination of constants (0 to 9) and variables(a to z). Connected by some or allof the operations +, -, X and is known as algebraic expression. For example x + 3, x-3.
- **Terms:** The several parts of an algebraic expression separated by '+' or '-' operations arecalled the terms of the expression. For example



- **Polynomials:** An algebraic expression in which the variables involved have only non-negative integral powers is called a polynomial.

Or

we can say power of An algebraic expression should be in whole number

(i) $3x^7 - 9x^2 - 2x - 8$ is a polynomial in variable x.

(ii) $9 + 8x^{\frac{3}{2}} + 6x^{-2}$ is an expression but not a polynomial.

Polynomials are denoted by p(x), q(x) and r(x)etc.

- **Coefficients**: In the polynomial $7x^3 + 9x^2 + 5x + 1$, coefficient x^3, x^2, x are $7, 9, 5$ respectivel and we also say that +1 is the constant term in it.

- Degree of a polynomial in one variable: In case of a polynomial in one variable the highest power of the variable is called the degree of the polynomial.
- Classification of polynomials on the basis of degree.

Degree	Polynomial	Example
(a) 1	Linear	$2x+3$
(b) 2	Quadratic	ax^2+bx+c etc.
(c) 3	Cubic	x^3+3x^2+1 etc. etc.
(d) 4	Biquadratic	x^4-1

Classification of polynomials on the basis of no. of terms

No. of terms		Polynomial & Examples.
(i)	1	Monomial - $\frac{1}{3}$
(ii)	2	Binomial - $(3+6x)$, $(x-5y)$ etc.
(iii)	3	Trinomial- $2x^2+4x+2$ etc. etc.

Some algebraic identities useful in factorization:

(i) $(x+y)^2 = x^2+2xy+y^2$

(ii) $(x-y)^2 = x^2-2xy+y^2$

(iii) $x^2-y^2=(x-y)(x+y)$

(iv) $(x+a)(x+b) = x^2+(a+b)x+ab$

(v) $(x+y+z)^2 = x^2+y^2+z^2+2xy+2yz+2zx$

(vi) $(x+y)^3 = x^3+y^3+3xy(x+y)$

(vii) $(x-y)^3 = x^3-y^3-3xy(x-y)$

(viii) $x^3+y^3+z^3-3xyz = (x+y+z)(x^2+y^2+z^2-xy-yz-zx)$

$x^3+y^3+z^3 = 3xyz \quad if \; x+y+z=0$