## Algebraic Expressions

It is an expression containing variables, numbers and operators.

## Terms

It is a constant, a variable or variables multiplied by a constant.

## Coefficient

When a constant is multiplied by a variable, the constant is called its coefficient.

## Degree

The sum of a term's exponent. Exponent of a constant is considered to be zero.

## Like Terms

Terms in which same variable is raised to same exponent.

## Unlike Terms

Terms which do not have same variable or exponent or both.

## Polynomials

An algebraic expression that involves operations of addition, subtraction, multiplication and non-negative integer exponents of variable.
A single variable polynomial of degree $n$ is,

$$
a_{n} x^{n}+a_{n-1} x^{n-1}+\ldots+a_{0} x^{0}
$$

## Degree Of Polynomial

It is the greatest exponent in various terms of polynomial.

## Types Of Polynomials

1 Monomial An expression with one term. For e.g., $21 x^{2} y, 17 x, 9 p$ etc.
2 Binomial An expression with two unlike terms. For e.g., $3 x^{2}+4 x, 5 x+9 y$ etc.
3 Trinomial An expression with three unlike terms. For e.g., $3 x^{2}+5 x-9, a+b-c$ etc.

## Addition and Subtraction Of Polynomials

Step 1: Group all the like terms together in two polynomials.
Step 2: Combine all the like terms to get balance polynomial.

## 2 Subtraction

Step 1 : Change the sign of all terms of polynomial to be subtracted.
Step 2: Group all the like terms together.
Step 3 : Combine all the like terms to get balance polynomial.

## Algebraic Identity

It is an equality that holds for any values of its variable.

## Important Algebraic Identities

| $1(a+b)^{2}=a^{2}+2 a b+b^{2}$ | $8 a^{3}-b^{3}=(a-b)\left(a^{2}+a b+b^{2}\right)$ |
| :---: | :---: |
| $2(\mathrm{a}-\mathrm{b})^{2}=\mathrm{a}^{2}-2 \mathrm{ab}+\mathrm{b}^{2}$ | $9(a+b+c)^{2}=a^{2}+b^{2}+c^{2}+2 a b+2 b c+2 a c$ |
| $3 a^{2}-b^{2}=(a+b)(a-b)$ | 10 $\begin{aligned} a^{3}+b^{3}+c^{3}-3 a b c= & (a+b+c) x \\ & \left(a^{2}+b^{2}+c^{2}-a b-b c-c a\right) \end{aligned}$ |
| $\begin{aligned} 4 a^{2}+b^{2} & =(a+b)^{2}-2 a b \\ & =(a-b)^{2}+2 a b \end{aligned}$ | $11 a^{4}+a^{2}+1=\left(a^{2}+a+1\right)\left(a^{2}-a+1\right)$ |
| $5(\mathrm{a}+\mathrm{b})^{3}=\mathrm{a}^{3}+\mathrm{b}^{3}+3 \mathrm{ab}(\mathrm{a}+\mathrm{b})$ | $12 a^{4}-b^{4}=\left(a^{2}+b^{2}\right)(a+b)(a-b)$ |
| $6(a-b)^{3}=a^{3}-b^{3}-3 a b(a-b)$ | $13 \mathrm{a}^{8}-\mathrm{b}^{8}=\left(\mathrm{a}^{4}+\mathrm{b}^{4}\right)\left(\mathrm{a}^{2}+\mathrm{b}^{2}\right)(\mathrm{a}+\mathrm{b})(\mathrm{a}-\mathrm{b})$ |
| $7 \mathrm{a}^{3}+\mathrm{b}^{3}=(\mathrm{a}+\mathrm{b})\left(\mathrm{a}^{2}-\mathrm{ab}+\mathrm{b}^{2}\right)$ |  |

