

Algebraic expressions and Identities

- Algebraic expression : Combination of variables and constants
- Term: Terms are parts of an algebraic expression separated by + and - signs . Each term in an algebraic expression is a product of one or more number(s) and (or) literals These numbers and /or literal(s) are called as factors of the term.
- Expressions are formed by adding terms.
- Constant: symbol having a fixed numerical value
- Variable : a symbol that has no fixed or constant value and takes on various numerical values
- constant factor: numerical factor or numerical coefficient
- variable factor: literal factor
- Polynomial: an expression with one or more terms with having whole numbers as exponents
- Like terms ; terms with same variables and powers of variables also same ; same literal factors ; $3a$, $-8a$
- Unlike terms ; terms having different variables or even if they have same variables, they are raised to different powers ; different literal factors; $2a$, $2b$, $3a^2$
- Like terms can be added subtracted ; Coefficients of like term need not be same
- Subtraction of a number is same as addition of its additive inverse. Additive inverse of $+a$ is $-a$ and vice versa
- Constant term: term having no literal factor
- Coefficient : in the term of an expression, any of the factors with the sign of the term is called coefficient of the product of other factors
- While simplifying an algebraic expression, first gather all like terms together and then simplify them and then move on to unlike terms

Classification of expressions based on number of terms

Special name	Number of terms
Monomial	1
Binomial	2
Trinomial	3
Quadrnomial	4

Multiplication of algebraic expressions

Expression1 x expression 2	=Resultant
Monomial x monomial	monomial
Monomial x binomial	binomial
Monomial x trinomial	trinomial
Monomial x polynomial	Polynomial; every term of polynomial is multiplied with monomial
Polynomial x polynomial	Every term of first polynomial is multiplied with every other term of second polynomial

Identity: An equality that is true for all the variable(s) in the equality

Equation: An equality that is true for only a specific value(s) of the variable(s)

Standard identities:

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

$$(a - b)^2 = a^2 + b^2 - 2ab$$

$$(a + b)(a - b) = a^2 - b^2$$

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

Applications of identities:

- Used to simplify the algebraic expressions
- Provide alternative and convenient methods to calculate products of large numbers, squares of large numbers etc