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Class: VIII	Subject: Mathematics	Topic: Algebraic expression and Identities	Notes

Introduction

A branch of mathematics that deals with symbols and rules for manipulating those symbols is Algebra.Studying algebra helps you to think logically and critically to solve many problems both in studies and real-life situations.

Literal Numbers

Literal numbers are the letters of English alphabet like a,b,c,m,p,r,x,y,z,etc, used in place of unknown quantities in a problem.

Literal Numbers are used along with the numbers which we are already using, eg integers, fraction and decimals along with the operational symbols +,-,x, ÷ etc, and they obey all rules of numbers.

We have been solving problems like 8+?=10,

Which means “to find a number when added to it would give 10”.

In Algebra, the above problem is written by using any letter a,b,c,p,x,…like 8+x=10.

Here ? has been replaced by the letter x (we can use any other letter in place of x, there is no strict rule of the letter to be used).

The solution of problem lies in finding a suitable value of x which will make the statement 8+x=10 true.

We find that number 2 can replace x, because 8+2 makes 10.

Therefore x=2 solves the problem.

Constant and Variables

The numerical numbers 0,1,2,3, …,-1,-2,-3,… fractional numbers, decimal numbers,i.e all such numbers, which have a fixed value are called constants.

The numbers whose value differs or varies, are called variables

for example, (i) 10-x=7 is satisfied by x=3

(ii) x+5=10 is satisfied by x=5

(iii) for 10x=60 is satisfied by x=6

Value of x is different in above three example . so x is a variable

Algebraic Expression

The expressions 8+x, 10-x, x+5, 10a y/2, which contain constants and variables combined by the symbols of +,-,x or ÷ are known as Algebraic Expressions.

(i) 3x + y is an algebraic expression which means three times the variable x added to variable y
(ii) 2(x+y) means sum of x and y multiplied by 2
(iii) (x+y) /z means sum of x and y divided by z.
(iv) p-q / pq means difference of q from p divided by the product of p and q

Monomial

An algebraic expression containing one term.eg-6/3abc,$2x^2$ etc

Binomials

An algebraic expression containing two terms.eg-($a^2 + b^2$)etc.

Trinomials

An algebraic expression containing three terms.eg-(2a+b-c)etc

Polynomial

An algebraic expression that contains two or more terms.eg-$2xy+5x+7$.

Degree of a polynomial

The highest power of the variable of a polynomial in one variable.eg-Degree of $9x^6$ is 6

Mulitiplication of Algebraic expression

RULES :

1) The product of two factors with like sign is positive and the product of two factors with unlike sign is negative.Thus we have
   a) (+) x (+) = +
   b) (--) x (--) = +
   c) (+) x (--) = ---
   d) (+) x (--) = ---
2) If p is any variable and m,n are positive integers then $p^m \times p^n = p^{m+n}$.

Standard Identities

An identity is an equality ,which is true for all values of the variables.The basic important identities are ;

1) $(a + b)^2 = a^2 + 2ab + b^2$
2) $(a – b)^2 = a^2 -- 2ab + b^2$
3) $(a + b)(a – b) = a^2 – b^2$
4) $(x + a)(x + b) = x^2 + (a + b)x + ab.$