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(Affiliated to CBSE up to +2 Level)

CLASS: VIII

SUB.: MATHS

DATE: 29-06-2021

Algebraic Expressions:

1. Multiplying a Monomial by a Monomial:

(a) Multiplication of two monomials:

Let us look at some examples:

Example 1: Multiplication of terms 4 and y will be 4y.

Example 2: Multiplication of terms 4x and 3y will be 12xy.

(b) Multiplication of three or more monomials:

Let us look at some examples:

Example 1: Multiplication of terms 4, x, and y will be 4xy.

Example 2: Multiplication of terms 4x, 3y, 2 and z will be 24xyz.

2. Multiplying a Monomial by a Polynomial:

(a) Multiplication of Monomial by a Binomial

Let us look at some examples:

Example 1: Multiplication of 4 and (x + y) will be (4x + 4y).

Example 2: Multiplication of 5x and (3y + 2) will be (15xy + 10x).

(b) Multiplication of Monomial by a Binomial:

Let us look at some examples:

Example 1: Multiplication of 4 and (x + y + z) will be (4x + 4y + 4z).

Example 3: Multiplication of $7x^3$ and $(2x^4 + y^4 + 2)$ will be $(14x^7 + 7x^3y^4 + 14x^3)$.

Examples based on Multiplying a Monomial by a Polynomial:

Example 1: Simplify $2a(4a - 2) + 7$ and find its values for a) $x = 2$ b) $x = 1/2$

Solution: On simplifying, $2a(4a - 2) + 7$, we get, $8a^2 - 4a + 7$

(a) For $x = 2$,

$$\begin{aligned} & 8a^2 - 4a + 7 \\ &= 8(2)^2 - 4(2) + 7 \\ &= 31 \end{aligned}$$

(b) For $x = 1/2$,

$$\begin{aligned} & 8a^2 - 4a + 7 \\ &= 8(1/2)^2 - 4(1/2) + 7 \\ &= 7 \end{aligned}$$

Example 2: Multiply $(5/7 \times ab)$ and $(-21/10 \times a^2b^2)$.

Solution: $(5/7 \times ab) \times (-21/10 \times a^2b^2)$

$$\begin{aligned} &= (5/7) \times (-21/10) \times ab \times a^2b^2 \\ &= (-3/2) a^3b^3 \end{aligned}$$

3. Multiplying a Polynomial by a Polynomial:

(a) Multiplication of Binomial by a Binomial:

Let us look at some examples:

Example 2: Multiplication of $(5x^2 + 3y)$ and $(3y + 2)$ will be $(15x^2y + 10x^2 + 9y^2 + 6y)$.

(b) Multiplication of Binomial by a Trinomial:

Let us look at some examples:

Example 1: Multiplication of $(4x + 2)$ and $(x + y + z)$ will be $(4x^2 + 4xy + 4xz + 2x + 2y + 2z)$.

Examples based on Multiplying a Polynomial by a Polynomial

Example 1: Multiply the binomials $(2ab + 3b^2)$ and $(3ab - 2b^2)$.

$$\begin{aligned} \text{Solution: } (2ab + 3b^2) \times (3ab - 2b^2) &= 2ab \times (3ab - 2b^2) + 3b^2 \times (3ab - 2b^2) \\ &= 6a^2b^2 - 4ab^3 + 9ab^3 - 6b^4 \\ &= 6a^2b^2 + 5ab^3 - 6b^4 \end{aligned}$$