Algebraic Expression

Algebraic Exp. : $9x^2 - 3xy + 5$

Term: $9x^2$, $-3yx$, 5

$9x^2$ → $9 \times x \times x$ Factors

$-3yx$ → $-3 \times x \times y$ Factors

Like & Unlike terms

Like term having same algebraic factor..

Ex. $3xy, 5xy$

$3xy = 3 \times x \times y$

$5xy = 5 \times x \times y$

Unlike term having diff. algebraic factor.

Ex. $4x^2y = 4 \times x \times x \times y$

$2xy = 2 \times x \times y$.

Degree

Highest power of the variable in a term.

Ex. $3x^2 + x + 1$ deg 2

Ex. $x^1y^1z^1 + x^2 + 1$ deg 3

* if term contain more than one variable we have to add the power of all variable.

Ex. $-3x^2y$

- Numerical coefficient is -3
- Coefficient of y is $-3x^2$
- Coefficient of x^2 is $-3y$

Division

Ex. Divide.

$15x^3 + 12x^2 + 21x$ by $3x$

Sol. $\frac{15x^3 + 12x^2 + 21x}{3x}$

$= \frac{15x^3}{3x} + \frac{12x^2}{3x} + \frac{21x}{3x}$

$= 5x^2 + 4x + 7$

* When the remainder is zero the divisor is called a factor of the dividend..

Ex. Find the value of a if $2x - 3$ is a factor of $2x^4 - x^3 - 3x^2 - 2x + a$.

Sol. First we divide $2x^4 - x^3 - 3x^2 - 2x + a$ by $2x - 3$.

$$2x-3 \overline{)\ 2x^4 - x^3 - 3x^2 - 2x + a\ (\ x^3 + x^2 - 1}$$

$2x^4 - 3x^3$ (− +)

$2x^3 - 3x^2$

$2x^3 - 3x^2$ (− +)

$-2x + a$

$-2x + 3$ (+ −)

$a - 3$

$2x - 3$ is a factor of $2x^4 - x^3 - 3x^2 - 2x + a$ if, $a - 3 = 0$ Hence, $a = 3$.

Multiplication

Ex. Multiply $(x + y)(x^2 + y^2 - xy)$

Sol. $x(x^2 + y^2 - xy) + y(x^2 + y^2 - xy)$

$x^3 + xy^2 - x^2y + y^3 - xy^2 + yx^2$

$= x^3 - y^3$

Types of Algebraic Exp

According to the No. of terms

Monomial ⟶ Single term **Ex.** $2xy$

Binomial ⟶ Two terms **Ex.** $x + y$

Trinomial ⟶ Three terms **Ex.** $x + y + z$

Multinomial ⟶ More than 3 term **Ex.** $x^3 + x^2 + 7x + 1$

Addition & Subtraction

We can add & subtract only the like terms.

Ex. Add $5ab$, $4ab$

Sol. $5ab + 4ab$

$= (5+4)\ ab = 9ab$

Ex. Subtract of $7xy$ from $2xy$

Sol. $2xy - 7xy = (2 - 7)\ xy = -5xy$.