Algebraic Expressions

Monomial : is an algebraic expression with 1 term. It can be:

- A variable: a ; x ; t
- A constant: 5 ; -3 ; $\dfrac{1}{2}$
- A product: $2a$; $-4x^2$; $3xy$; $\dfrac{1}{2}x^2y$

Note: the exponent must be a non-negative integer. i.e. $3x^{-2}$; $2\sqrt{x}$; $5x^{1/3}$ are not monomials

Coefficient: is the factor by which a variable is multiplied

$$3x^n \to \exp onent \in N$$
$$\vdots \ddots$$
$$coefficient \qquad var iable$$

Note: if the coefficient is 1, it is not written for example: ab = 1ab ; $-1x^2 = -x^2$

Like terms: are terms with identical variables and identical exponents (not coefficients)

Examples:
    6 and -2 $-2a^3b^2$ and $5a^3b^2$
    3a and 4a $0.5xy^5$ and $10xy^5$

The Degree of a term is the sum of the exponents of the variables.

Examples:
    3   degree   0
    3x   degree   1
    $3x^2$ or 3xy   degree   2
    $3x^2y$ degree   3
    $3x^2y^3$ degree   5   etc.

To find the numerical value of an algebraic expression we replace the variable by the given value.

Examples:

$4x^3 \quad if x = 2$
$$=4(2)^3$$
$$=4(8)$$
$$=32$$

$2a^2 \quad if a = -3$
$$=2(-3)^2$$
$$=2(9)$$
$$=18$$

$2x^3y^2 \quad if x = 2; y = -3$
$$=2(2)^3(-3)^2$$
$$=2(8)(9)$$
$$=144$$

Binomial: is an algebraic expression with 2 terms.

Examples: 3x + 2 ; $2a^2$ + 3a ; 4ab − 2a

Trinomial: is an algebraic expression with 3 terms.

Examples: $2a^2$ + 3a + 5 ; b^3 − 2b + 5 ; $2x^2$ − 6xy + 7y

Polynomial: is an algebraic expression with 1 or more terms, separated by +/-, and the terms are written in decreasing order of powers.

The degree of a polynomial: is the degree of the term with the highest degree.
Example: $3x^2y^2$ + $4xy^2$ has degree 4

Simplifying an algebraic expression means representing it using as few terms as possible (collecting like terms)

The **Zero** of a polynomial is the value of the variable which makes the polynomial equal to zero