15.1 Polynomials

A monomial is a number, a variable, or the product (multiplication) of a number and one or more variables with whole number exponents.

Examples of monomials...

42 a $3a$ $-7xy$

Examples of NON-monomials...

$\frac{1}{x}$ $b^{1/2}$

The degree of a monomial is the sum (addition) of the exponents of the variables.

EXAMPLES State the degree of each monomial.

1. $-5x^4y^2$ $4+2=6$
2. $\frac{2}{3}b^3$ 3
3. 12 0
4. $7g^2h^1$ $2+1=3$
5. -10 0
6. $-9p^1$ 1

15.1 Polynomials

A polynomial is a monomial or a sum or monomials.

Special kinds of polynomials:
- binomial - has 2 terms Ex: $3x+2y$
- trinomial - has 3 terms Ex: $4x+3y+2z$

Polynomials are usually written in standard form, which means that the terms are arranged in decreasing order of the exponents.

For example, $x^{2} + 4x^{1} - 3$ is in decreasing (descending) order.
Increasing (ascending) order would look like $-3 + 4x + x^{2}$.

EXAMPLES Determine whether each expression is a polynomial.

1. $7x^{2}y^{3} + 6xy - y^{5}$ polynomial trinomial

2. $\frac{2}{3}g^{2} - 1$ polynomial binomial

3. $\frac{-5}{h^{3}} + 14h$ not a polynomial
   ↖ can't have variables in denominator

4. 7
   polynomial

The degree of a polynomial is the greatest degree of its terms.

EXAMPLES State the degree of each polynomial.

1. $6g^{4}h^{3} + 7g^{2}h^{9}$

7 11

2. $-8x^{3} + 4x^{2} - \frac{2}{3}x^{1} - 15$

3

Identify the polynomial by degree and by the number of terms.

Polynomial	Degree	Identified by Degree	Identified by # of terms
6	0	constant	monomial
$3x^{1} + 1$	1	linear	binomial
$-x^{2} + 2x - 5$	2	quadratic	trinomial
$4x^{3} - 8x$	3	cubic	binomial

EXAMPLES Classify each polynomial by its degree and the number of terms.

1. $-3x^{1} + 1$

linear binomial

2. $9k - 3 - 6k^{2}$

quadratic trinomial

EXAMPLES Classify each polynomial by its degree and the number of terms.

3. 18 degree: 0

constant monomial

4. $-7h + 15h^{3}$

cubic binomial