9.1: Add/Subtract Polynomials

Goals:

***Identify polynomials**

- Classify polynomials as **monomials, binomials or trinomials** based on the number of terms in each.

***Identify degree of monomials and polynomials**

***Write polynomial expressions in descending order**

***Add and subtract polynomials by combining like terms**

Monomial – a number, variable, or product of a number and variables with whole number exponents. **One Term**

Degree of a monomial – The sum of the exponents of the variables

Ex: Monomial? Yes or no? Why? Why not? If yes, what is the degree?

a. 17

Yes, a number
Degree = 0

b. $\frac{x^3}{2}$

Yes, product.
Degree = 3

c. $\frac{5}{x}$

No, x has a neg. exp. (–1)

d. $4x^2y^5z$

Yes
Degree = 8

e. $5 + x$

No, sum

f. 4^a

No, exp. is not a whole #

g. x^{-1}

No, exp. not a whole #

h. $\frac{1}{2}ab^2$

Yes
Degree = 3

Polynomial – A monomial, or sum of monomials. Each monomial is a term.

Binomial – A two-term polynomial

Trinomial – A three-term polynomial

Degree of a polynomial – The degree of the highest monomial

Ex: Classify each polynomial as a monomial, binomial, trinomial or polynomial, then find the degree of each.

1. $15x - x^3 + 3$

Trinomial, Deg = 3

2. $5xy^2$

Monomial, Deg = 3

3. $6a^2c + 5ac^5$

Binomial, Deg = 6

4. $5x^3 - 4xy^2 - 2x + 6$

Polynomial, Deg = 3

5. $7b^3c + 4bc^4$

Binomial, Deg = 5

6. $6n^4 + 3n + 7x^8 - 4n^3$

Polynomial, Deg = 8

****Write Polynomials in Descending Order****

Polynomials should be written so the first alphabetical variable's exponents decrease from left to right.

Example: $-5x + x^2 + 3 + 2x^3$ is a 3rd degree polynomial, if written in descending order it would look like:

$2x^3 + x^2 - 5x + 3$

Rewrite the following polynomials in descending order, based on the variable that comes first alphabetically.

1. $15x - x^3 + 3$

$-x^3 + 15x + 3$

2. $-xy + x^4y^2$

$x^4y^2 - xy$

3. $-3ac^4 + a^2c^2 - a^3c$

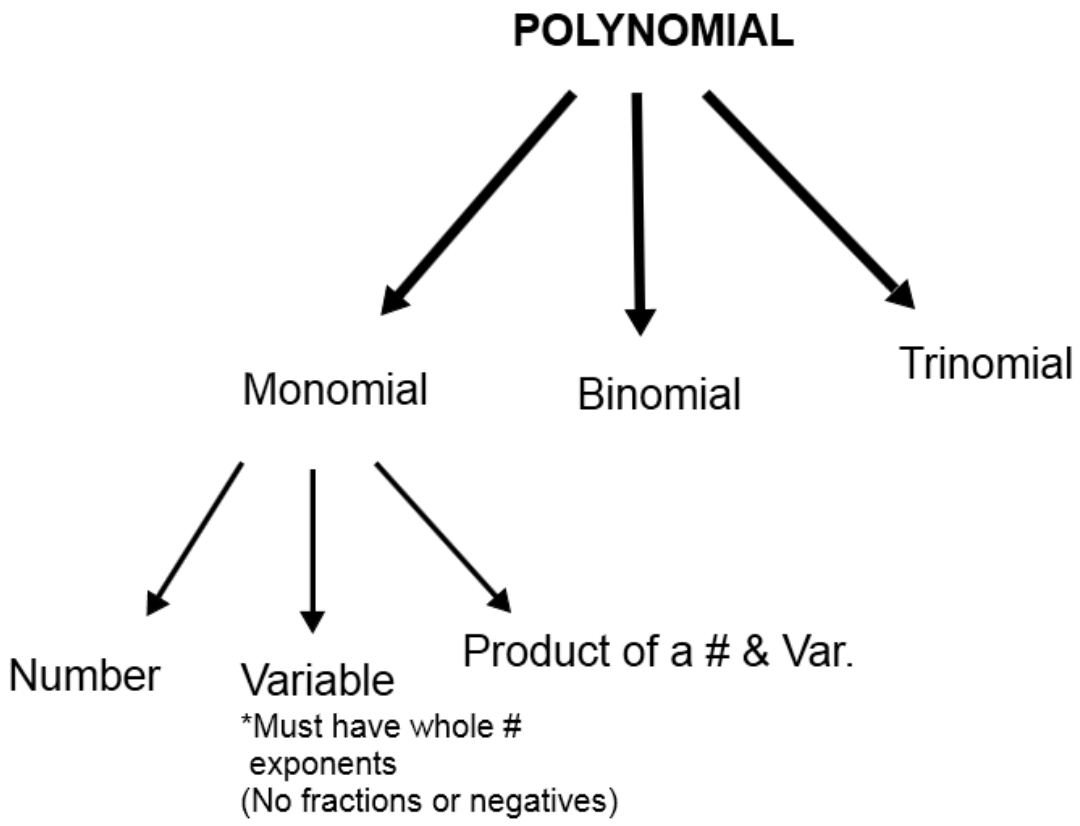
$-a^3c + a^2c^2 - 3ac^4$

4. $3b^3 - 4b^4 + b^2$

$-4b^4 + 3b^3 + b^2$

5. $7x^2y + 4xy^3 - 3x^3y^2$

$-3x^3y^2 + 7x^2y + 4xy^3$



Adding Polynomials – Same as adding like terms

Ex: $(2x^3 - 5x^2 + x) + (2x^2 + x^3 - 1)$

$3x^3 - 3x^2 + x - 1$

Ex: $(3x^2 + x - 6) + (x^2 + 4x + 10)$

$4x^2 + 5x + 4$

Ex: $(-2x^2 + 3x - x^3) + (3x^2 + x^3 - 12)$

$X^2 + 3x - 12$

Ex: $(4x^3 + 2x^2 - 4) + (x^3 - 3x^2 + x)$

$5x^3 - x^2 + x - 4$

Subtracting Polynomials – Add a negative to everything being subtracted!

Ex: $(4n^2 + 5) - (-2n^2 + 2n - 4)$

$6n^2 - 2n + 9$

Ex: $(4x^2 - 3x + 5) - (3x^2 - x - 8)$

$x^2 - 2x + 13$

Ex: $(2c^2 - 8) - (3c^2 - 4c + 1)$

$-c^2 + 4c - 9$

Ex: $(5y^2 + 2y - 4) - (-y^2 + 4y - 3)$

$6y^2 - 2y - 1$

CHALLENGE

$(4x^3y + 3x^2\ y^2 - 5xy^3 + 6x - 2y) + (7y - 4x + 6x^2y^2 - x^3y + 2xy^3)$

$3x^3y\ + 9x^2y^2 - 3xy^3 + 2x + 5y$