**Polynomials**

A *polynomial* refers to a multiple term algebraic expression.

A *binomial* refers to a two term polynomial.

Example:

a + b

2x + 5

6x3 +4x

A *trinomial* refers to a three term polynomial.

Example:

a + b + c

3x2 + x + 7

8x3+9x2+15x

The *degree of a polynomial* refers to the highest degree in the polynomial.

Example:

6x3 + 4x2 + 2x + 1 The highest degree in this equation would be 3

5x + 5 The highest degree in this equation would be 1

2x2 + 3x2 + 1 + 7x3 The highest degree in this equation would be 3

6xyz + 2x3y7 – 4yz – y4 The highest degree would be 10

**Adding and Subtracting Polynomials**

Adding and subtracting polynomials follows the same rules as working with monomials. You may only work with LIKE TERMS and the only thing that is changing is your coefficients (numbers in front).

Example: 2x3 – 5x2 + 3x – 2x3 + x – 1

**Step #1**

Re-write the sentence in alphabetical order and in decreasing order of exponents.

*Note – when moving an algebraic term, take the symbol in front of it*

2x3 – 2x3 – 5x2 + 3x + x – 1

**Step #2**

Reduce the equation by adding / subtracting your coefficients of your like terms.

-5x2 + 4x – 1

**Example 2:** (2x3 + 7x2 – 16x + 1) – (x3 – 3x2 + 5)

**Step #1:**

2x3 – x3 + 7x2 – -3x2 – 16x + 1 – 5

**Step #2:**

Make sure you respect the negative between brackets!!!

x3 + 10x2 – 16x – 4

**Multiplying Binomials by Binomials**

When multiplying a binomial by another binomial, you need to multiply every term in the first bracket by every term in the second bracket.

**F**irst

FOIL

FOIL

**O**utside

**I**nside

**L**ast

( x + 3 ) ( x – 4 )

x2 – 4x +3x – 12

x2 – x – 12

Example 2:

(2x2 – 1)(x3 + 7)

2x5 + 14x2 – x3 – 7

2x5 – x3 +14x2 -7

Example 3: (a + 1)2

When you get problems that have a binomial squared – simply double the bracket and use FOIL

(a + 1)2

(a + 1)(a + 1)

a2 + 1a + 1a + 1

a2 + 2a + 1

**Multiplying Polynomials by Binomials**

(2x – 1 )(x2 – 10x + 3)

Step 1 – Multiply the first term in the 1st bracket by ALL the terms in the 2nd bracket

(2x – 1 )(x2 – 10x + 3)

2x3 – 20x2 + 6x

Step 2 – Multiply the second term in the 1st bracket by all the terms in the 2nd bracket

(2x – 1 )(x2 – 10x + 3)

-1x2 +10x -3

Step 3 – add both answers and simplify the like terms

2x3 – 20x2 + 6x – 1x2 +10x – 3

2x3 – 21x2 +16x – 3

Example #2

(7a2 + 16ab)(ab – abc – 5c)

Step 1 – Multiply the first term in the 1st bracket by ALL the terms in the 2nd bracket

(7a2 + 16ab)(ab – abc – 5c)

7a3b – 7a3bc – 35a2c

Step 2 – Multiply the second term in the 1st bracket by all the terms in the 2nd bracket

(7a2 + 16ab)(ab – abc – 5c)

16a2b2 – 16a2b2c – 80abc

Step 3 – add both answers and simplify the like terms

7a3b – 7a3bc – 35a2c + 16a2b2 – 16a2b2c – 80abc

**Division of Polynomials**

When you divide a polynomial by a monomial, each term of the polynomial is divided by the monomials.

Examples:

Don’t forget to follow your laws of exponents for dividing same bases and the rule NUMBERS WITH NUMBERS, LETTERS WITH LETTERS !!!

(18x4 – 12x3 + 24x2) ÷ 6x2

\_\_\_\_
 6x2

\_\_\_\_
 6x2

\_\_\_\_
 6x2

18x4 – 12x3 + 24x2 = 3x2 – 2x + 4

(25x3 + 5x) ÷ 5x

If a variable has an exponent of 0 ... eliminate it completely!

25x3 + 5x = 5x2 + 1

\_\_\_\_
 5x

\_\_\_
 5x

Find the missing measure of this figure:

Area= 2x5+ 3x2 + 12x

?

2x