**Algebra 1 - Unit 8: Polynomials Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**10.1 - Adding and Subtracting Polynomials**

**Definitions**

A **Polynomial** is an expression that is the sum of the form $ax^{k}$, where k is nonnegative integer.

Examples:

The **Standard Form** of a polynomial is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Examples:

The **degree** is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the variable.

Examples:

The **Degree of a Polynomial** is the \_\_\_\_\_\_\_\_\_\_\_\_ degree of its terms.

Examples:

A **Coefficient** is the \_\_\_\_\_\_\_\_\_\_\_\_ in a term that is the product of a number and a variable.

Examples:

The **Leading Coefficient** is the coefficient of the \_\_\_\_\_\_\_\_\_\_\_\_ term in a polynomial that is written in standard from.

Examples:

**Adding polynomials:**

1. $\left(2x^{2}+x-5\right)+\left(x+x^{2}+6\right)=$
2. $\left(5x^{3}-x+2x^{2}+7\right)+\left(3x^{2}+7-4x\right)+\left(4x^{2}-8-x^{3}\right)=$

**Subtracting polynomials:**

1. $\left(-2x^{3}+5x^{2}-x+8\right)-\left(-x^{3}+3x-4\right)=$
2. ($x^{2}-8)-(7x+4x^{2})=$
3. $\left(3x^{2}-5x+3\right)-\left(2x^{2}-x-4\right)=$

**10.2 - Multiplying Polynomials**

**Distribution:**

Distribution is one of the methods that allow us to multiply polynomials. Distribution is simplest when a polynomial is multiplied by a monomial:



We can use distribution to multiply two binomials by using distribution \_\_\_\_\_\_\_\_\_



After we distribute we must always ­­­\_\_\_\_\_\_\_\_\_\_\_\_\_ by combining \_\_\_\_\_\_\_\_\_\_\_\_\_

Distribution is also the most effective way to multiply larger polynomials



*Multiply the following polynomials using distribution*

1. $3\left(x+2\right)=$
2. $x\left(x^{2}+4\right)=$
3. $\left(x+2\right)\left(x-3\right)=$
4. $\left(3x+4\right)\left(x^{2}+5\right)=$

**FOIL:** When we are multiplying two binomials (which are polynomials with two terms) we can use the FOIL method, FOIL stands for:

F:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 0: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ I:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ L:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

To use this method, calculate the produces of the first, inner, outer and last terms; then add.



The product of the **F**irst terms is \_\_\_\_\_\_\_

The product of the **I**nner terms is \_\_\_\_\_\_\_

The product of the **O**uter terms is\_\_\_\_\_\_\_

The product of the **L**ast terms is \_\_\_\_\_\_

The sum of the first, inner, outer and last terms is: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Multiply the following polynomials using the FOIL method*

5. =

6. 

7. 

**10.3 – Special Product Patterns**

**Special Product Patters**

**Sum and Difference Pattern**

$$\left(a+b\right)\left(a-b\right)=a^{2}-b^{2}$$

Examples:

**Square of a Binomial Pattern**

$$\left(a + b\right)^{2}=a^{2}+ 2ab + b^{2} \left(a - b\right)^{2}=a² - 2ab + b²$$

Examples:

**Practice:**

1. $\left(x+3\right)\left(x-3\right)=$
2. $\left(a+4\right)\left(a+4\right)=$
3. $\left(y-1\right)\left(y-1\right)=$
4. $\left(x^{2}-4\right)\left(x^{2}+4\right)=$