Name: _____ Block: _____

Unit 7: Quadratic Expressions

Learning Goal 7.1 – Operations with Polynomials

In this unit, you will learn how to do the following:

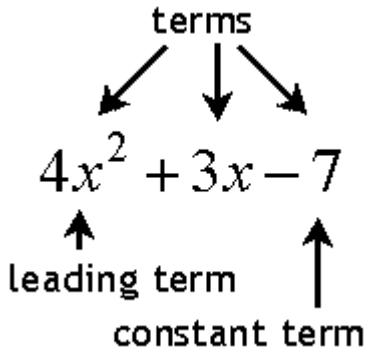
Learning Target #1: Operations with Polynomials

- Classify polynomials by degree and terms
- Add polynomials
- Subtract polynomials
- Multiply polynomials
- Apply operations of polynomials to real world problems

Mon, 1/6 *Day 1:* Review Expectations, Classify Polynomials	Tues, 1/7 *Day 2:* Adding & Subtracting Polynomials	Wed, 1/8 *Day 3*: Multiplying Polynomials	Thurs, 1/9 *Day 4:* Applications with Polynomials	Fri, 1/10 **Learning Goal 7.1 Assessment**
Mon, 1/13 *Day 5:* Factoring Trinomials	Tues, 1/14 *Day 6*: Factoring Trinomials	Wed, 1/15 *Day 7:* Factoring Trinomials	Thurs, 1/16 *Day 8:* Factoring Practice Day	Thurs, 1/17 **Learning Goal 7.2 Assessment**

Day 1 – Classifying Polynomials

A **POLYNOMIAL** is a mathematical expression consisting of terms, which can include a constant, variable, or product of a constant and variable, that are connected together using addition or subtraction. Variables must have exponents raised to whole number exponents.



Number of Terms: _____

Terms: _____

Coefficient(s): _____

Constant(s): _____

Polynomials CANNOT contain:

- Radicals
- Fractional exponents
- Negative exponents
- No variables in the denominator

Cross off all expressions that are NOT polynomials:

$-8x^5 + 2x - 7$ $\quad 6x^{-2} - 3x$

$\frac{1}{x^3}$ $\quad 3x^4 - \sqrt{x}$

$-9 + x$ $\quad 4x^2$

Polynomials are typically written in **STANDARD FORM**, which means the terms are arranged in decreasing order from the largest exponent to the smallest exponent. When you write polynomials in standard form, you can easily identify the degree of the polynomial. The **DEGREE** is the largest exponent of the variable in the polynomial.

Rewrite each polynomial in standard form. Then identify the degree of the polynomial:

a. $5x - 6x^2 - 4$

Standard Form:

Degree:

b. $-7x + 8x^2 - 2 - 8x^2$

Standard Form:

Degree:

c. $6(x - 1) - 4(3x^2) - x^2$

Standard Form:

Degree:

Classifying Polynomials

Polynomials are classified by **DEGREE** and **NUMBER OF TERMS:**

Degree	Name	Example

Terms	Name	Example

Complete the table below. Simplify the expressions or put in standard form if necessary.

Polynomial	Degree	# of Terms	Classification
$8x$			
$x^2 - 4$			
10			
$-24 + 3x - x^2$			
$5x^3 - 12 + 8$			
$7x - 9x + 1$			
$4x^2 - 5x^3 - 4 + 5x - 1$			
$2x + 3 - 7x^2 + 4x + 7x^2$			

Day 2 - Adding & Subtracting Polynomials

When adding, combine like terms.

a. $(4x^2 + 2x + 8) + (8x^2 + 3x + 1)$

b. $(-2x + 5) + (-4x^2 + 6x + 9)$

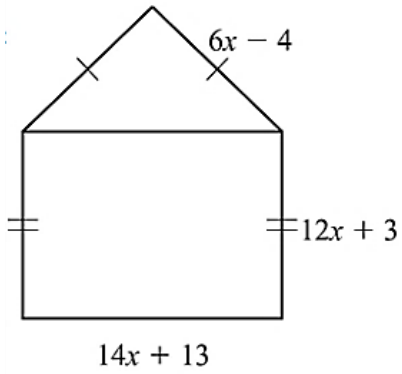
c. $(5 - 2x + x^2 + 7) + (3x^2 + 7 - 4x)$

d. $(2x^2 + x - 5) + (x + x^2)$

Application: Find an expression that represents the perimeter of the house.

What does it mean to find the perimeter of an object?

Perimeter of the house:



Subtracting Polynomials

Subtracting polynomials is similar to adding polynomials except we have to take care of the minus sign first. Subtracting polynomials require the following steps:

- Distribute the negative (minus sign)
- Combine like terms

a. $(7x^2 – 2x + 1) – (-3x^2 + 4x – 7)$

b. $(3x^2 + 5x) – (4x^2 + 7x – 1)$

c. $(5x^2 – 4x + 8) – (-2 + 3x)$

d. $(3 – 5x + 3x^2) – (-x + 2x^2 - 4)$

e. $(8x + x^2 – 6) – (-10x + 7 – 2x^2)$

f. $(-7x^2 + 8x – 4) – (2 – 14x^2)$

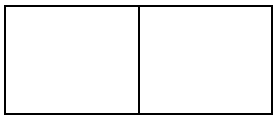
Day 3 – Multiplying Polynomials

There are several different ways to multiply polynomials. You will learn the distributive method and area method. Once you have practiced both methods, you can determine which one you like best and works for you.

EXAMPLE 1:

Distributive Method: $2x(x - 4)$

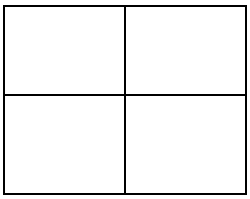
Area Method: $2x(x - 4)$



EXAMPLE 2:

Distributive Method: $(x + 2)(x - 9)$

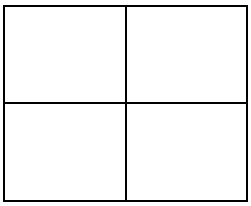
Area Method: $(x + 2)(x - 9)$



EXAMPLE 3:

Distributive Method: $(2x - 4)^2$

Area Method: $(2x - 4)^2$



EXAMPLE 4:

Distributive Method: $(x + 6)(x - 6)$

Area Method: $(x + 6)(x - 6)$

Practice Problems

Simplify these problems with a method of your choosing.

1. $(x - 7)(x + 4)$

2. $(x - 9)^2$

3. $(x + 10)(x - 10)$

4. $x(x - 12)$

5) $(3x + 7)(2x + 1)$

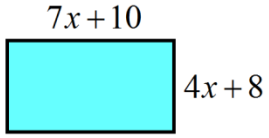
6. $(x + 3)^2$

7. $(2x - 1)(3x - 4)$

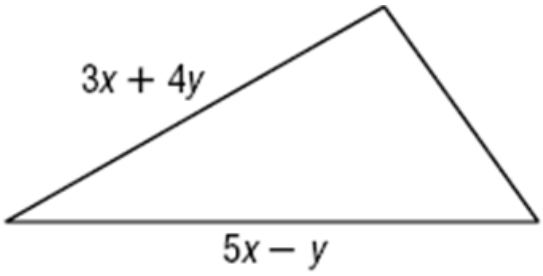
8. $(4x - 5)(x^2 + 3x - 6)$

Day 4: Applications Using Polynomials

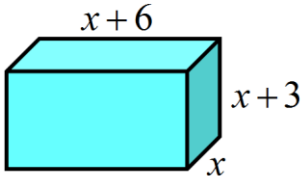
a. Write an expression that represents the perimeter and area of this rectangle.



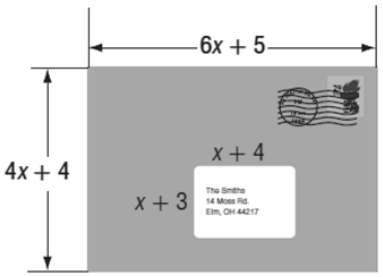
b. The measures of two sides of a triangle are given. If *P* is the perimeter, and $P = 18x + 9y$, find the measure of the third side.



c. Write an expression that represents the volume of this rectangular prism. (V = *lwh*)



d. Find the expression that represents the area not covered by the mailing label.



e. The polynomial $c(x) = x^2 - 7x + 15$ models the cost a company incurs from making an item at a price x. The polynomial $i(x) = 3x^2 + 4x - 50$ represents the income from selling the same item at a price x. Write a polynomial that expresses the profit from making and selling the item. (hint: profit = income – cost)