**Algebra 1-2: 6-1 Polynomial Operations: Adding and Subtracting**

I will: Classify, add and subtract polynomials.

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an expression consisting of a number, variable, or product of numbers and variables that have *whole number exponents*. A monomial cannot have more than one term, and it *cannot have a variable in its denominator*.

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can be a monomial or the sum of any number of monomials

**Examples: Non-Examples:**

-----------------------------------------------------Polynomial Classifications-----------------------------------------------

|  |  |
| --- | --- |
| **Degree** (highest power exponent) | Name |
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4+ |  |



|  |  |
| --- | --- |
| **Number of Terms** | Name |
| 1 |  |
| 2 |  |
| 3 |  |
| 4+ |  |

------------------------- Standard Form ------------------------------------------------------------------------------------

A polynomial is in standard form when terms are written in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_order from the largest to the smallest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. When there are “ties” the terms are listed alphabetically.

Write in standard form, name by degree and name by number of terms:

1)  2)  3)  4) 

---------------------Simplifying Polynomials by ADDING and SUBTRACTING-------------------------

Polynomials are simplified by ***combining like terms***. Like terms are monomials that have the ***same*** variables raised to the ***same*** powers. Unlike terms have different powers.

5. 6)  

A.

B.

C.

1.

2.

3.

4.

**Algebra 1-2: 6-2 Multiplying and Factoring Polynomials**

You will: Use the *distributive property* to multiply and factor polynomials.

1. Write expressions for the areas of the two rectangles: 2) Now, write an expression for the area of this rectangle:

 +



1. Multiply by Vertically Horizontally
2. 
3. 
4. 

The total area of this rectangle is representedby **.**

|  |
| --- |
|  square units |

What are some possible expressions for the dimensions of the rectangle?

|  |  |
| --- | --- |
|  | **Prime Factor Form** |
|  | Coefficients | Variables |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Common Factors |  |  |  |  |  |  |  |  |  |

GCF: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Example: Find the GCF of

1. List the prime factors of each term.
2. Identify the factors common to all terms

GCF= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Find the GCF of the terms:

7) 

8) 

A polynomial is **factored completely** when it has no \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_other than 1.

Steps:

A. Rewrite the terms as a product of the GCF and other terms.

B. Factor out the GCF (reverse the distribution process)

C. Check your answer by re-multiplying (distributing)

To check whether the polynomial's factored form is equivalent to its expanded form, you can multiply the factors to see if the product yields the original polynomial.

Example: *Factor* completely:

Factor completely:

9) 10)  *11)*



**Algebra 1-2: 6-3 Multiplying Binomials**

You will: Write binomials in expanded form.

1. Multiply and write the product in ***standard*** form.

**Using a table:**   **Using Distribution:**

|  |  |
| --- | --- |
|  |  |
|  |  |

Multiply:

|  |  |
| --- | --- |
|  |  |
|  |  |

|  |  |
| --- | --- |
|  |  |
|  |  |

|  |  |
| --- | --- |
|  |  |
|  |  |

What do you notice about example #4? How could we rewrite the binomials in a simpler form?

1. The measure of a side of a square is x units. A new square is formed with each side 6 units longer than the original square’s side. Write an expression to represent the area of the new square.
2. The width of a rectangular painting is 3 in. more than twice the height. A frame that is 2 in. wide goes around the painting. Write an expression for the area of the frame without the painting.



**Algebra 1-2: 6-4a Factoring Trinomials**

You will: Find the linear factors of basic, factorable quadratic trinomials a=1

Multiply the binomials below and write the product in standard form

1) 2) 3)

|  |  |
| --- | --- |
|  |  |
|  |  |

|  |  |
| --- | --- |
|  |  |
|  |  |

|  |  |
| --- | --- |
|  |  |
|  |  |

What patterns do you notice in the above problems?

We saw in our last lesson that factoring is the reverse process of multiplication. We factor a polynomial by reversing the distribution process. This works for quadratic trinomials too:

|  |  |  |
| --- | --- | --- |
| Factored Form | Expanded Form | Standard (Simplified) Form |
|  🡪 |  🡪 |  |

When we compare the numbers in the factored form with the numbers in the expanded form, we see that is the product of the coefficients of the -terms and is their sum . The latter is even more obvious when we look at the expanded form before the like terms are combined.

We will “T it up” Adds to *b*

Use the T method to find the correct factors that multiplies to “a times c” AND “adds to b”.

4) 5) 6) 7) 8)

 30 11 24 10 -18 -3 -25 0 12 -8

Now, let’s use the process to factor the following quadratic expressions. Multiply the factors to check your answers.

9)

10)

11)

****

**Algebra 1-2: 6-4b Advanced Factoring Strategies**

You will: Factor quadratic expressions that are not easily factorable. a≠1

1) Multiply

|  |  |
| --- | --- |
|  |  |
|  |  |

What’s different about this problem?

Do the patterns we observed yesterday hold true in this type of quadratic?

|  |  |  |
| --- | --- | --- |
|  Factored Form | Expanded Form | Standard (Simplified) Form |
|  🡪 |  🡪 |  |

What’s different about this problem than the problems we saw in our warm-up?

Do the patterns we used to factor trinomials hold true in this type of quadratic?

|  |  |  |
| --- | --- | --- |
|  Factored Form | Expanded Form | Standard (Simplified) Form |
|  🡪 |  🡪 |  |

2)  *3*)

4)  *5*)

**Sometimes we need to factor out a GCF to make a problem factorable.**

6) 7)

**Algebra 1-2: 6-5 Difference of Perfect Square Polynomials**

You will: Factor Perfect Square Polynomials

1. Factor a) b) c)
2. Examine the following binomials and their factored form:

1. What do they have in common?
2. Do you see a pattern?
3. Describe in words how to factor binomials in this form. Then write a rule.

**Rule**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Factor:

a) b) c) d)

1. Do you see a perfect square in this polynomial? Sometimes, we have to factor out a GCF to find our perfect square
2. b) c)

**Algebra 1-2: 6-6 Beyond Binomial Multiplication**

You will: Multiply polynomial expressions

If you multiplied two binomials, how many terms would you get before simplifying?

Now consider multiplying a binomial and a trinomial. How many terms would you get before simplifying?

How about a trinomial times a trinomial?

Use a table to multiply the following polynomials.

 2) 

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |

3) 4)

Continued on back:

**Row Review: Multiplying Polynomials**

1. Partner one completes the exercises in column A.
2. Partner two completes those in column B.
3. Add you and your partner’s answers together.
4. Check your answer against the value in the middle column. If it doesn’t match, go back and check your work to see if you can find your error.

|  |  |  |  |
| --- | --- | --- | --- |
|  | ***Column A*** | ***Sum*** | ***Column B*** |
| **1** |   |   |   |
| **2** |   |   |   |
| **3** |  |   |  |
| **4** |   |  |   |
| **5** |  |   |  |

Homework. Complete on a *separate* sheet of paper:

**1. 4.**  **7. **

**2.  5.  8. **

**3.  6.  9. **