**INTRODUCTION TO GEOMETRY**

**UNIT 2: QUADRATIC REVIEW**

***Lesson 1: Polynomial Addition and Subtraction
Intro to Geometry***

**AIM**: 🠖 To review the definitions of monomial and polynomial
 🠖 To add and subtract polynomials

Monomial: A number, variable or product of these two.

EXAMPLES: NON-EXAMPLES:

Polynomial: A monomial or the sum (or difference) of 2 or more monomials. Each monomial is called a TERM. Terms of a polynomial are separated by a “+” or “-“ sign.

Binomial is a polynomial with 2 terms and a Trinomial is a polynomial with 3 terms.

A polynomial is in SIMPLEST FORM when it has no like terms.

**ADDING POLYNOMIALS**: To add polynomials we combine like terms.

Ex. 1: Add the following polynomials.

 (a) 

 (b) 

 (c) 

 (d) 

\*\*\* (e) 

 (f) 

**SUBTRACTING POLYNOMIALS**: When we subtract one polynomial from another, it is the same as adding its opposite (or changing the signs of its terms and then adding).

EXAMPLE: 

  (Change the sign of each term that was being subtracted)

  (Combine like terms or add like terms to get simplest form)

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Ex. 2: Simplify the following polynomials.

 (a)  (b) 

 (c)  (d) 

 (e)  (f) 

 (g) Word Problem: Subtract from . (Remember: ***FROM is 1st!!!***)

7x-3

3x+2

 (h) Find the perimeter of the rectangle:

***Polynomial Addition and Subtraction- Homework
Intro to Geometry***

Directions: Simplify each of the following polynomials completely (By addition or subtraction).

1.  2. 

3.  4. 

5.  6. 

7.  8. 

9.  10. 

11. Subtract from 

***Lesson 2: Multiplying Monomials & Polynomials
Intro to Geometry***

**AIM**: 🠖 To recall properties of exponents
 🠖 To multiply monomials & polynomials

 🠖 To multiply polynomials using FOIL & Box methods

 Write each product in its simplest form:

Do
Now

 (a)  (b)  (c) 

Using exponent properties is necessary when multiplying monomials and polynomials with exponents.

 **Multiplying Monomials/Monomials by Polynomials**

***Ex. 1*** Find the following products.

(1)  (2)  (3) 

(4)  (5)  (6) 

(7)  (8)  (9) 

**Multiplying Polynomials**

Multiplying two linear binomials is such an important skill that a mnemonic has been developed to help remember it:
**FOIL** – Multiply the **F**irst, **O**uter, **I**nner, and **L**ast terms of the two binomials together and then combine the like terms.

 ***Ex. 1*** 

F

O

I

L

You can also use the Box Method to multiply polynomials.

 ***Ex. 2*** 









 ***Ex. 3*** Multiply the following polynomials together.

(1)  (2)  (3) 

(5)  (6) 

 ***Multiplying Monomials & Polynomials***

***HOMEWORK***

Find the product:

1.  2.  3. 

4.  5.  6. 

7.  8.  9. 

10.  11.  12. 

13. If the side length of a square is given by , then what
 is the square’s *area*?

***Lesson 3: Factors & GCF Factoring***

***Intro to Geometry***

**AIM**: 🠖 To define factor and determine how to find the Greatest Common Factor (GCF) of a polynomial
 🠖 To factor expressions by finding the GCF

 Each of the numbers or variables that can be multiplied together to obtain a product is a *factor* of that product.

 Factoring is breaking algebraic expressions into a product of factors.

***Ex. 1*** Find the factors of the following monomials.

 (a)  (b)  (c) 

GREATEST COMMON FACTOR or GCF: Largest number and/or variable with the highest exponent that is a factor of both (or all) or that divides both (or all).

***Ex. 2*** Find the GCF of the following pairs.

 (a) 36 and 30 (b) 49 and 98

 (c)  and  (d)  and 

We would now like to use this skill to write binomials and trinomials in factored form. We will essentially “reverse” the distributive property by “factoring out” the GCF from binomials and trinomials.

***Ex. 3*** Write each of the following expressions as equivalent products of their GCFs and another factor.

 \**Check* your factoring by using the distributive property

(a)  (b)  (c) 

(d)  (e)  (f) 

(g)  (h)  (i) 

***Factors & GCF Factoring- HOMEWORK***

***Intro to Geometry***

Write each of the following expressions as equivalent products of their GCFs and another factor.

 \**Check* your factoring by using the distributive property

(a)  (b)  (c) 

(d)  (e)  (f) 

(g)  (h)  (i) 

***2.*** The area of a rectangle is represented by the polynomial . If its width is given by the monomial , then which of the following would represent its length?

(a)  (b)  (c)  (d) 

***Lesson 4: Factoring the Difference of Two Squares***

***Intro to Geometry***

**AIM**: 🠖 To review perfect squares and multiplying
 binomials that are conjugates

 🠖 To factor expressions using the DOTS pattern
 🠖 To discuss complete factoring

Do
Now

 Write each of the following as a monomial squared.

 (a)  (b)  (c)  (d) 

It is essential for you to be able to distinguish between monomials that are perfect squares and those that are not.

Conjugate binomials are also important to the DOTS factoring pattern.

 **Conjugate** binomials **only differ** in the **sign** that connects
 the two monomials.

Write each of the following products without parentheses.

 (a)  (b) 

Notice that when multiplying conjugates the inner and outer terms *cancel* and we are left with only the difference of perfect squares.

***Ex. 1*** Write each of the following binomials as the product of two conjugate pairs. In other words, factor the following binomials.
 (a)  (b)  (c) 

***Ex. 2*** Factor each of the following binomials.
 (a)  (b)  (c) 

 (d)  (e)  (f) 

***Complete factoring*** is factoring an expression until it cannot be factored any further.

***Ex. 3*** Consider the binomial 

 GCF:

***Ex. 4*** **Completely** factor each of the following binomials.

(a)  (b)  (c) 

(d)  (e)  (f) 

***Factoring the Difference of Two Squares***

**HOMEWORK**

Factor the following expressions ***completely***. ( remember to factor out the GCF first if applicable )

1.  6. 

2.  7. 

3.  8. 

4.  9. 

5.  10. 

***Lesson 5: Factoring Trinomials with a Coefficient of 1
Intro to Geometry***

**AIM**: 🠖 To review the terms of a quadratic polynomial

 🠖 To factor trinomials using guess & check

 Write each of the following products without parentheses:

Do Now

1.  (b)  (c) 

Each of the above problems gave a product in the form . The  term is called the **quadratic** term, the  term is called the **linear** term, and the  term is called the **constant**.

The linear term and the constant play important roles in factoring quadratics of the form .

***Ex. 1*** Try to write the following trinomials as the product of two binomials (*Hint: Look at the results from the Do Now*)

1.  (b)  (c) 
* What do you notice about the relationship between the linear term and the binomial factors?
* What do you notice about the relationship between the constant and the binomial factors?
* How can you check to see if you factored a trinomial correctly?

**⮿**

Some helpful rules regarding the constant term:

* Sign of the constant term is “+” 🠲 binomial factors have like signs

Ex.  🠲 
Sign of the constant term is “- ” 🠲 binomial factors have different signs

Ex.  🠲 

🟄Always check your factoring by multiplying the binomial factors🟄

Class Practice:

1.  (f) 
2.  (g) 

 (c)  (h) 

 (d)  (i) 

 (e)  (j) 

Factoring Trinomials

Homework

Factor the following trinomials.

1.  6. 

2.  7. 

3.  8. 

4.  9. 

5.  10. 

8. The area of the parallelogram below is  and the
 base is . What is the measure of the height, *h*?

*h*

***Lesson 6: Factoring Completely
Intro to Geometry***

***Class work / Homework***

***Complete factoring*** is factoring an expression until it cannot be factored any further.

Directions: Factor the following expressions *completely* using GCF, DOTS, and Trinomial factoring
 methods.

1.  6. 

2.  7. 

3.  8. 

4.  9. 

5.  10. 

11.  17. 

12.  18. 

13.  19. 

14.  20. 

15. 

16. 

**Lesson 7: Simplifying Rational Expressions
Intro to Geometry**

**AIM**: 🠖 To simplify R.E. with monomial denominators
 🠖 To simplify more complex R.E. by factoring

Do
Now

Now

 Simplify the following:

 (a)  (b)  (c) 

**Simplifying Rational Expressions with Monomial Denominators**

**Ex. 1** Simplify the following monomial. Do not leave exponents negative.

  🢣  🢣 

Simplify each part separately

***Practice*** Simplify the following. Do not leave exponents negative.

(a) (b) (c) (d)

Division, like multiplication, distributes over addition and subtraction. Thus, we can also simplify rational expressions that have polynomials in the numerator.

**Ex. 3** Simplify the following. Start by factoring the numerator *FIRST*.


 🢣 🢣 🢣

***Practice*** Simplify the following. Start by factoring the numerator *FIRST*.

(a) (b) (c)

**Ex. 4** Simplify the following. COMPLETELY FACTOR the numerator and denominator before
 canceling factors.


 🢣 🢣



***Practice*** Simplify the following. COMPLETELY FACTOR the numerator & denominator before
 canceling factors.

(a) (b) (c)



 (d) (e) The area of a given rectangle is given by the binomial
 If its length is given by , then its width must be

 (1) (2) (3) (4)

**Simplifying Rational Expressions
Intro to Geometry**

**Homework**

1. Simplify each of the following rational expressions.

1.  (b)  (c) 

 (d) 

2. Simplify each of the following rational expressions by factoring the numerator FIRST, then
 canceling common factors.

 (a)  (b)  (c) 

 (d)  (e)  (f) 

3. Simplify each of the following rational expressions. COMPLETELY FACTOR the numerator and
 denominator before canceling common factors.

(a)  (b)  (c) 

(d) 

4. The area of a rectangle is given by the trinomial . What is the width of this rectangle
 if its length is ?

Lesson 8: Multiplying and Dividing Rational Expressions

Intro to Geometry

1. Factor each numerator and denominator separately
2. Simplify out factors common to numerator(s) and denominator(s)
3. Directions to Cancel: Vertically & Diagonally

\**Remember to cancel binomials that are* ***the same***

*Examples:*

*Simplify*

|  |  |
| --- | --- |
| 1.
 | 1.
 |
| 1.
 | 1.
 |

*To Divide rational expressions, remember the saying, ”Stay Change Flip” or “Keep Change Flip.”*

|  |  |
| --- | --- |
| 1.
 | 1.
 |

1. A rectangle has a width of  and a length of . Express the area of the rectangle in simplest form.

|  |  |
| --- | --- |
| 1.
 | 1.
 |
| 1.
 | 1.
 |
| 1.
 | 1.
 |
| 1. A rectangular prism has a length of , a width of , and a height of . Express the volume of the prism in simplest form.
 |

Multiplying and Dividing Rational Expressions

Homework

*Simplify*

|  |  |
| --- | --- |
| 1.
 | 1.
 |
| 1.
 | 1.
 |
| 1.
 | 1.
 |
| 1.
 | 1.
 |