Geometry Lomac 2015-2016	Date 12/2 due 12/3	Factoring Polynomials 6.3L

Name _____ **Per**_____

LO: I can factor polynomial expressions.

emath 7.3

☐ **DO NOW** On the back of this packet

☐ (1) Greatest Common Factor

Factoring expressions is one of the **gateway skills** that is necessary for much of what we do in algebra for the rest of the course. The word **factor** has two meanings and both are important.

THE TWO MEANINGS OF FACTOR

1. **Factor (verb):** To rewrite an algebraic expression as an **equivalent product**.
2. **Factor (noun):** An algebraic expression that is one part of a larger factored expression.

***Exercise* #1:** Consider the expression $6x^2+15x$.

(a) Write the individual terms $6x^2$ and $15x$ as completely factored expressions. Determine their **greatest common factor**.

$6x^2 =$ $15x =$

(b) Using the Distributive Property, rewrite $6x^2+15x$ as a product involving the **gcf** from (a).

(c) Evaluate both $6x^2+15x$ and the factored expression you wrote in (b) for $x=2$. What do you find? What does this support about the two expressions?

It is important that you are **fluent** reversing the **distributive property** in order to factor out a common factor (most often the greatest common factor). Let's get some practice in the next exercise just identifying the greatest common factors.

***Exercise* #2:** For each of the following sets of monomials, identify the greatest common factor of each. Write each term as an extended product (if necessary).

(a) $12x^3$ and $18x$

(b) $5x^4$ and $25x^2$

(c) $21x^2y^5$ and $14xy^7$

(d) $24x^3, 16x^2$, and $8x$

(e) $20x^3, -12x^2$, and $28x$

(f) $18x^2y^2, 45x^2y$, and $90xy^2$

☐ (2) Factoring Polynomials Monimial GCF

Once you can identify the greatest common factor of a set of monomials, you can then easily use it and the distributive property to write equivalent factored expressions.

***Exercise* #3:** Write each polynomial below as a factored expression involving the greatest common factor of the polynomial.

(a) $6x^2+10x$ (b) $3x-24$ (c) $10x^2-15x$

(d) $4x^2+8x+24$ (e) $6x^3-8x^2+2x$ (f) $10x^3-35x^2$

(g) $10x^2-40x-50$ (h) $8x^4-2x^2$ (i) $8x^3+24x^2-32x$

☐ (3) Factoring Polynomials Binomial GCF

Being able to **fluently** factor out a gcf is an essential skill. Sometimes greatest common factors are more complicated than simple monomials. We have done this type of factoring back in Unit #1.

***Exercise* #4:** Rewrite each of the following expressions as the product of two binomials by factoring out a common binomial factor.

(a) $(x+5)(x-1)+(x+5)(2x-3)$ (b) $(2x-1)(2x+7)-(2x-1)(x-3)$

☐ (4) Factoring Polynomials Binomial GCF

5. Rewrite each of the following expressions as the product of two binomials by factoring out a common binomial factor. Watch out for the subtraction problems (b) and (d).

(a) $(x+5)(x+1)+(x+5)(x+8)$

(b) $(2x-1)(3x+5)-(2x-1)(x+4)$

(c) $(x-7)(x-9)+(x-7)(4x+5)$

(d) $(x+1)(5x-7)-(x+1)(x-3)$

☐ (5) Polynomial Reasoning

APPLICATIONS

6. The area of a rectangle is represented by the polynomial $16x^2+56x$. The width of the rectangle is given by the binomial $2x+7$.

(a) Give a monomial expression in terms of x for the length of the rectangle. Show how you arrived at your answer.

(b) If the length of the rectangle is 80, what is the width of the rectangle? Explain your thinking.

REASONING

7. These crazy polynomials keep acting like integers. We can factor integers to determine their factors. We can also do the same for polynomials.

(a) List all of the positive factors of the integer 12 by writing all possible positive integer products (such as $12=3\cdot4$).

(b) List all of the factors of $2x^2-6x$ by also writing all possible products, such as $2\left(x^2-3x\right)$.

8. Which of the following is *not* a factor of $4x^2+12x$?

(1) $x+3$

(3) $3x$

(2) x

(4) 4

☐ (6) **Exit Ticket**

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☐ (7) **Homework**
cont.

FLUENCY

1. Identify the greatest common factor for each of the following sets of monomials.

(a) $6x^2$ and $24x^3$ (b) $15x$ and $10x^2$ (c) $2x^4$ and $10x^2$

(d) $2x^3$, $6x^2$, and $12x$ (e) $16t^2$, $48t$, and 80 (f) $8t^5$, $12t^3$, and $16t$

2. Which of the following is the greatest common factor of the terms $36x^2y^4$ and $24xy^7$?

(1) $12xy^4$ (3) $6x^2y^3$

(2) $24x^2y^7$ (4) $3xy$

3. Write each of the following as equivalent products of the polynomial's greatest common factor with another polynomial (of the same number of terms). The first is done as an example.

(a) $8x-28$ (b) $50x+30$ (c) $24x^2+32x$

$=4(2x-7)$

(d) $18-12x$ (e) $6x^3+12x^2-3x$ (f) x^2-x

(g) $10x^2+35x-20$ (h) $21x^3-14x$ (i) $36x-8x^2$

(j) $30x^3-75x^2$ (k) $-16t^2+96t$ (l) $4t^3-32t^2+12t$

4. Which of the following is *not* a correct **factorization** of the binomial $10x^2+40x$?

(1) $10x(x+4)$ (3) $5x(2x+4)$

(2) $10(x^2+4x)$ (4) $5x(2x+8)$

Exit Ticket Name_____ Date _____ _____ Per_ _____ 6.3L

The LO (Learning Outcomes) are written below your name on the front of this packet. Demonstrate your achievement of these outcomes by doing the following:

(1) Write the polynomial below as a product involving the GCF.

$6a^3 - 12a + 3a^5$

(2) Write the expression as a product of two binomials by factoring out a common binomial factor.

$(3x - 4)(7x + 4) - (3x - 4)(x - 5)$

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(1) Translation to algebra progress. Write one or more algebraic statement(s) to represent this situation. Be sure to write at least one "Let" statement to define any variables.

A company is mixing a blend of two different coffees. The first kind (x) costs $8 a pound, and the second (y) costs $5 per pound. How many pounds of each should they use if they want 60 pounds of coffee that costs $375?