Name: _____ Math 7.2, Period _____

Mr. Rogove Date: _____

Learning Objective: We will manipulate polynomial expressions and perform operations on more sophisticated polynomials.(Lesson 84a)

Concept Development:

Remember these properties of arithmetic:

Distributive Property: If a, b, and c are real numbers, then $a(b + c) = ab + ac$.

Commutative Property of Addition: If a and b are real numbers, then $a + b = b + a$. ANY ORDER

Associative Property of Addition: If a, b, and c are real numbers, then $(a + b) + c = a + (b + c)$. ANY GROUPING

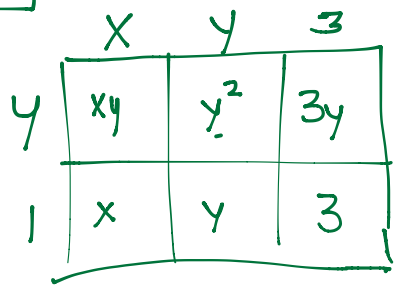
Commutative Property of Multiplication: If a and b are real numbers, then $a \times b = b \times a$. ANY ORDER

Associative Property of Multiplication: If a, b, and c are real numbers, then $(ab)c = a(bc)$. ANY GROUPING

Guided Practice:

Consider the expression $(x + y + 3) \times (y + 1)$.

a. Draw a picture to represent the expression.



b. Write an equivalent expression by applying the distributive property.

(D) $(x+y+3)(y+1)$

$xy+y^2+3y+x+y+3$

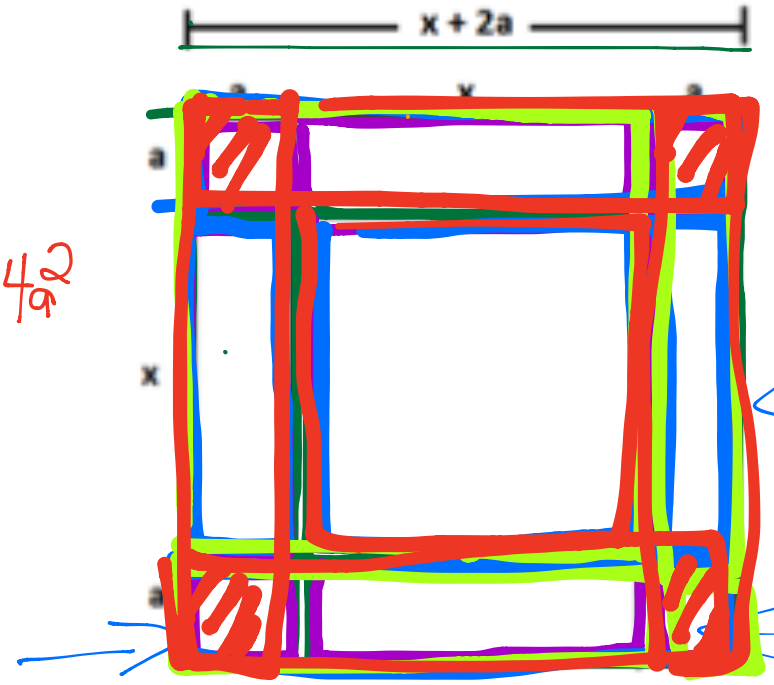
(C, A) $x+xy+y^2+(3y+y)+3$

$x+xy+y^2+4y+3$

Name: _____ Math 7.2, Period _____

Mr. Rogove Date: _____

Consider the following diagram:



$x^2+4[a(x+2a)]-4a^2$

$x \cdot (x+2a)$

Sarah looked at $(x + 2a)^2$ and she saw 4 rectangles and concluded that $(x + 2a)^2 = x^2 + 4a(x + a)$. What are the rectangles that she is seeing?

$(x+a \cdot a)$ 4 of them.

How else can you express the picture using algebraic expressions?

1. $4ax+4a^2+x^2$
2. $x^2+2(2a^2+ax)+2ax$

   $a(2a+x)$
3. $(a+x)^2+[2a\cdot(a+x)]+a^2$

Name: _____ Math 7.2, Period _____

Mr. Rogove Date: _____

Thinking More about Multiplying Polynomials

The polynomial $10x^2 + 6x^3$ is the result of applying the distributive property to the expression $2x^2(5 + 3x)$. It is also the result of applying the distributive property to $2(5x^2 + 3x^3)$ or $x(10x + 6x^2)$.

For the questions below, write down an expression such that if you applied the distributive property to your expression it will give the result presented. Write down your partner's expression, compare, and verify that you are correct.

	Your Expression	Partner's Expression
$6a + 14a^2$	$2(3a+7a^2)$	$a(6+14a)$ $2a(3+7a)$
$2x^4 + 2x^5 + 2x^{10}$	$x^4(2+2x+2x^6)$	$2x^4(1+x+x^6)$
$6z^2 - 15z$	$3z(2z-5)$	
$42w^3 - 14w + 77w^5$	$w(42w^2-14+77w^4)$	$7w(6w^2-2+11w^4)$
$z^2(a+b) + z^3(a+b)$	$z^2((a+b)+z(a+b))$	$(a+b)(z^2+z^3)$
$\left(\frac{3}{2}s^2 + \frac{1}{2}\right)$	$\frac{1}{2}(3s^2+1)$	
$(4x+3)(x^2+x^3) - (2x+2)(x^2+x^3)$	$(x^2+x^3)((4x+3)-(2x+2))$	
$(2z+5)(z-2) - (13z-26)(z-3)$ $13(z-2)$	$z-2((2z+5)-13(z-3))$	

$az^2 + bz^2 + az^3 + bz^3$

Name: _____ Math 7.2, Period _____

Mr. Rogove 1:54 Date: _____

Independent Practice:

1. Referring to the 4-number game we played in class, it is possible to build a numeric expression (with parentheses to show the order used to build the expression) that evaluates to 21. For example, $1 + ((2 + 3) \cdot 4)$ is one such expression.

a. Build TWO more numeric expressions that evaluate to 21 using the criteria above. Both must be different from the example given.

b. In both of your equations, replace 1 with a, 2 with b, 3 with c, and 4 with d to get two algebraic expressions. For example, $a + \big((b + c) \cdot d\big)$ shows the replacement for the example given.

Are your algebraic expressions equivalent? Circle YES or NO.

If they are equivalent, prove that they are using the properties of operations.
If not, provide TWO examples:

1. Find four different numbers (other than 0, 1, 2, 3, 4) that when substituted for a, b, c, and d into each expression evaluate to **different numbers**, and

2. Find four different non-zero numbers that when substituted into each expression, the expressions evaluate to the same number.

Name: _____ Math 7.2, Period _____

Mr. Rogove Date: _____

Activating Prior Knowledge:

Closure:

Notes:

Name: _____ Math 7.2, Period _____

Mr. Rogove Date: _____

4-Number Game

Instructions: Write each positive integer as a combination of the digits 1, 2, 3, and 4; each used at most once, combined with the operations of addition and multiplication ONLY, as well as grouping symbols. What numbers can you come up with? What's the highest? What's the lowest number you can't make?

Value of expression	Expression (using 1, 2, 3, 4, + and x)		Value of expression	Expression (using 1, 2, 3, 4, + and x)
1	1		21	
2	2		22	
3	3		23	
4	4		24	2x3x4 x1
5	1+4		25	2x3x4+1 (3+2)·(4+1)
6	2+4		26	2((4x3)+1)
7	3+4		27	4x2+1)3
8	1+3+4		28	(3·2+1)4
9	2+3+4		29	
10	1+2+3+4		30	(3x2)x(4+1)
11			31	
12			32	2x4x(1+3)
13			33	
14			34	
15			35	
16	(1+3+4)x2, (1+3)4		36	3x4x(2+1)
17			37	
18			38	
19			39	
20			40	