Unit 1 – The Building Blocks of Algebra

9/9/19

Name: _____

CC Algebra 1

① Distribute
② Combine Like Terms < same variable, same exponent

Lesson 2: ***Simplifying Algebraic Expressions***

- **Objective:** Students will be able to simplify algebraic expressions by applying the properties of real numbers.

Warm Up: Simplify each of the following algebraic expressions by combining like-terms.

(a) $4x + 6 - 2x - 9$

$2x - 3$

(b) $(-6x + 9) + (10x + 3)$

$-6x + 9 + 10x + 3$

$4x + 12$

(c) $4y - 10 - 7y^2 + 8$

$-7y^2 + 4y - 2$

Modeling #1: *The Commutative and Associative Properties of Addition* and Multiplication

Identify the number properties used to simplify the algebraic expression below.

$3x+7+2x+8=3x+2x+7+8$ _____

$3x+2x+7+8=(3x+2x)+(7+8)$ _____

$=5x+15$

Commutative Property of Addition $a+b=b+a$
Commutative Property of Multiplication $a \cdot b = b \cdot a$
Associative Property of Addition $a+(b+c)=(a+b)+c$
Associative Property of Multiplication $a \cdot (b \cdot c) = (a \cdot b) \cdot c$

Modeling #2: *The Distributive Property of Multiplication and Division*

THE DISTRIBUTIVE PROPERTY (OF MULTIPLICATION OVER ADDITION)
If a, b, and c all represent real numbers then: $a(b+c)=a \cdot b + a \cdot c$

Example: $5(2x + 3) =$ $10x + 15$

THE DISTRIBUTIVE PROPERTY (OF DIVISION OVER ADDITION)
If a, b, and c all represent real numbers then: $\frac{b+c}{a}=\frac{b}{a}+\frac{c}{a}$

Example: $\frac{8x+4}{2} =$ $4x + 2$

Independent Task: Simplify each expression below by applying the properties of real numbers.

(a) $-7x + 9 + 4x - 9$

$-3x$

(b) $-2y - 18 + 4y - 12 - 6y^2$

$-6y^2 + 2y - 30$

(c) $4x(2 - 7x)$

(d) $\frac{25x - 50}{5}$

2y - 30 - 6y

Group Task:

1) Sophia and Emily are twin sisters. They're saving up for concert tickets and agreed to pay for the tickets together when they have enough money.

They created the expressions below to see how fast they were making money, where *w* represents the number of weeks they have been saving.

Sophia: 35w + 55 – 10w Emily: 28w + 75 – 5w + 12

(a) Combine both expressions to represent their joint savings.

35w + 55 – 10w + 28w + 75 – 5w + 12

48w + 142

(b) Using your new expression, determine if they will have above $350 in *four weeks*. If not, how much additional money do they still need?

2) Express each of the following *quotients* as *binomials* in simplest form.

Hint: Your final answers may contain fractional coefficients.

(a) -3a(2a – 7) **(b)** $\frac{9x+18}{12}$ **(c)** $\frac{6(3x-8)}{3}$

Extension: The measures of two sides of a triangle are 8x + 8 and $2x^2 + 7$. If the perimeter, *P*, measures $10x^2 – 3x + 12$, what is the measure of the third side?

Exit Question: Simplify the following algebraic expressions by applying the properties of real numbers.

(a) $x^2 + 3x – 7x^2 – x + 12$ **(b)** $\frac{3(4x+8)}{6}$

Homework: ***Simplifying Algebraic Expressions***

1) Simplify each of the following algebraic expressions by applying the properties of real numbers.

(a) $4a - 5b + 9a - 10b$

(b) $x^2 + 3x - 7x^2 - x + 12$

(c) $-3(4y - 7)$

(d) $\frac{36x+21}{3}$

(e) $\frac{2(6x-5)}{4}$

(e) $9a(7a + 3b)$

2) Identify the number properties used to simplify the algebraic expression below.

$9x-3+10-5x=9x-5x-3+10$ _____

$9x-5x-3+10=(9x-5x)+(-3+10)$ _____

$=4x+7$