Section 1.4: BASIC RULES OF ALGEBRA

When you are done with your homework you should be able to…

- Understand and use the vocabulary of algebraic expressions
- Use commutative properties
- Use associative properties
- Use distributive properties
- Combine like terms
- Simplify algebraic expressions

WARM-UP:

Perform the indicated operation and simplify:

1. $\frac{57}{4} \div \frac{3}{2}$

2. $\frac{3}{14} - \frac{1}{10}$

VOCABULARY OF ALGEBRAIC EXPRESSIONS

Terms: The _____ of an _____ expression are those parts that are _____ by _____ or _____. A _____ is a _____, a _____, or a _____ _____ by one or more _____.

Coefficient: The _____ part of a _____ is called its _____. What is the coefficient of a term which only has variables?

Constant term: A term that consists of just a _____ is called a _____ _____.

Like terms: Terms that have the _____ the _____ _____ _____ are called _____ _____.

Are constant terms like terms?

Example 1: Consider the following algebraic expression: $-12x+9+7x-8$

1. How many terms are there in the algebraic expression?
2. What is the coefficient of the first term?
3. List the constant term(s):
4. What are the like terms in the algebraic expression?

EQUIVALENT ALGEBRAIC EXPRESSIONS

Two _____ expressions that have the _____ value for _____ replacements are called _____ _____ _____.

Example 2: Evaluate the following two algebraic expressions at $x=2$.

1. $-12x+9+7x-8$
2. $-5x+1$

THE COMMUTATIVE PROPERTIES

Let *a* and *b* represent real numbers, variables, or algebraic expressions.

Commutative Property of Addition:

Changing _____ when adding does not affect the _____.

Commutative Property of Multiplication:

Changing _____ when multiplying does not affect the _____.

Example 3: Use the commutative property to write an algebraic expression equivalent to each of the following:

1. $2x+4$
2. $x \cdot 13$

THE ASSOCIATIVE PROPERTIES

Let *a*, *b*, and *c* represent real numbers, variables, or algebraic expressions.

Associative Property of Addition:

Changing _____ when adding does not affect the _____.

Associative Property of Multiplication:

Changing _____ when multiplying does not affect the _____.

Example 4: Use the associative property to simplify the algebraic expressions:

1. $4x+(7+x)$
2. $25(4x)$

THE DISTRIBUTIVE PROPERTY

Let *a*, *b*, and *c* represent real numbers, variables, or algebraic expressions.

Multiplication _____ over _____.

Example 5: Multiply:

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

OTHER FORMS OF THE DISTRIBUTIVE PROPERTY

PROPERTY	MEANING	EXAMPLES
$a(b-c)$ $=ab-ac$		
$a(b+c+d)$ $=ab+ac+ad$		
$(b+c)a$ $=ba+ca$		

COMBINING LIKE TERMS

The _____ property lets us _____ and _____ like terms.

Example 6: Combine like terms:

1. $3(4x)+(-x+21)$

2. $9x+(x+5)-2(-x+11+3y)$

STEPS FOR SIMPLIFYING ALGEBRAIC EXPRESSIONS

1. Use the _____ property to remove _____.
2. Rearrange terms and _____ _____ terms using the _____ and _____ properties. As you hone your skills, you'll be doing this step mentally!

3. Combine _____ terms by combining the _____ of the _____ and keeping the same _____ _____.

APPLICATIONS

The percentage of U.S. women, *W*, who used the internet *n* years after 2000 can be modeled by the formula $W = 2(2n + 25) + 0.5(n + 2)$.

1. Simplify the formula.

2. Use the simplified form of the mathematical model to find the percentage of U.S. women who used the internet in 2005.