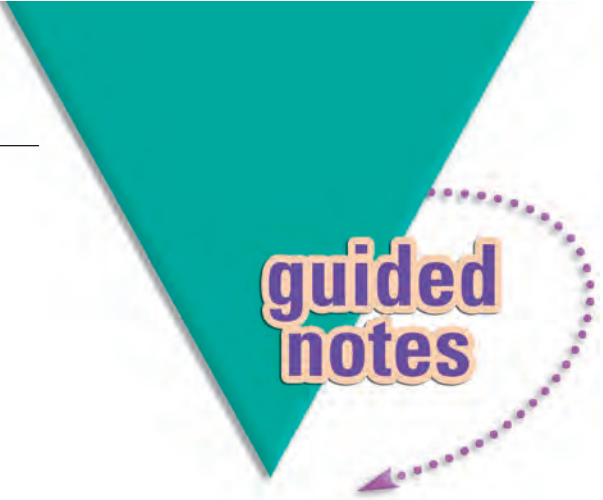


NAME _____

Module 2 Writing and Simplifying Algebraic Expressions

Lesson 3 Identifying Algebraic Properties



guided
notes

Lesson Objectives

- Recognize and use the Commutative and Associative Properties of Addition and Multiplication.
- Recognize the identity elements and inverses for addition and multiplication and use their respective properties.
- Recognize and use the Distributive Property of Multiplication over Addition.

The **Commutative** Property of Addition states that when you add two numbers, the order in which you add them does not matter, or for all real numbers a and b , $a + b = b + a$.

The **Associative** Property of Addition states that when you are adding, the way that you group the numbers does not change the sum, or for all real numbers a , b , and c , $(a + b) + c = a + (b + c)$.

The Commutative Property of Multiplication states that order in multiplication does not matter, or for all real numbers a and b , $ab = ba$.

The Associative Property of Multiplication states that when you multiply, the way you regroup the factors does not matter, or for all real numbers a , b , and c , $(a \cdot b)c = a(b \cdot c)$.

1 $(4.3 + 2) + 8 = 4.3 + (2 + 8)$ **Associative Property of Addition**

2 $6(5 \cdot 3) = 6(3 \cdot 5)$ **Commutative Property of Multiplication**

Subtraction and **Division** are not commutative.

The **Identity** Property of Addition says that when you add zero to a number the sum is that number, or for all real numbers a , $a + 0 = 0 + a = a$. **Zero** is the identity element for addition.

The **Zero Property of Multiplication** _____ says that when you multiply by zero, the product is zero, or for any real number a ,

$$a \cdot 0 = 0 \cdot a = 0.$$

One _____ is the identity element for multiplication. The Identity Property of Multiplication states that for any real number a ,

$$\underline{a \cdot 1 = 1 \cdot a = a}.$$

Another name for reciprocal is **multiplicative inverse** _____. Examples of multiplicative inverses are $\frac{1}{4}$ and **4** _____.

The **Multiplicative Inverse Property** _____ states that the multiplicative inverse, or reciprocal, of any real number a , where $a \neq 0$, is $\frac{1}{a}$. $a \cdot \frac{1}{a} = 1$.

When you add opposites, or **additive inverses** _____, the sum is zero.

The additive inverse, or opposite of any real number a is $-a$ such that

$$\underline{a + (-a) = (-a) + a = 0}.$$

3 $7 + 0 = 7$ **Identity Property of Addition** _____

4 Write an equation that illustrates the Zero Property of Multiplication.

Possible answers: $(10)(0) = 0$, $(4.75)(0) = 0$, $(\frac{1}{2})(0) = 0$.

The **Distributive Property** _____ of Multiplication over

Addition tells us that $50(84 + 10) = 50(84) + 50(10)$, or for all real numbers

a , b , and c , $\underline{a(b + c) = ab + ac}$.

5 $12(5 + 9) = \underline{12(5) + 12(9)}$