

NAME \_\_\_\_\_

**Module 2** Writing and Simplifying Algebraic Expressions  
**Lesson 3** Identifying Algebraic Properties



**independent  
practice**

**Rewrite using the Commutative Property of Addition.**

1.  $65ab + 453abc$

$453abc + 65ab$

2.  $5(64 + 76r)$

$5(76r + 64)$

**Rewrite using the Associative Property.**

3.  $50 \cdot (25 \cdot 39y^3)$

$(50 \cdot 25) \cdot 39y^3$

4.  $(345p + 362k) + 48k$

$345p + (362k + 48k)$

**Rewrite using the Distributive Property of Multiplication over Addition.**

5.  $54(100 - 1)$

$(54)(100) - (54)(1)$

6.  $8(3 - 1)$

$(8)(3) - (8)(1)$

7.  $(42 + 24)5$

$(42)(5) + (24)(5)$

8.  $15(15 + 30)$

$(15)(15) + (15)(30)$

**Name the Property used in each equation.**

9.  $\frac{1}{2} \cdot 1 = 1 \cdot \frac{1}{2}$

Commutative Property of Multiplication

10.  $25(9 - 6) = 225 - 150$

Distributive Property of Multiplication over Addition

11.  $0 = -3r + 3r$

Additive Inverse Property

12.  $345x + (124x + 58) = (345x + 124x) + 58$

Associative Property of Addition

13.  $(a)(44) = 0$

Zero Property of Multiplication

14.  $\left(-\frac{3}{8}\right) + \frac{3}{8} = \frac{3}{8} + \left(-\frac{3}{8}\right)$

Commutative Property of Addition

15.  $(x + y) \cdot (z + w) = (z + w) \cdot (x + y)$

**Commutative Property of Multiplication**

17.  $98x^2 + 75y^5 = 75y^5 + 98x^2$

**Commutative Property of Addition**

19.  $-37 + 0 = -37$

**Additive Identity Property**

16.  $144(x + 2) = 144x + 288$

**Distributive Property of Multiplication over Addition**

18.  $44m + (36m + 23) = (44m + 36m) + 23$

**Associative Property of Addition**

20.  $1 = \frac{3}{5} \cdot \frac{5}{3}$

**Multiplicative Inverse Property**

## Journal

1. Explain how to distinguish between the commutative and associative properties.
2. Write a rule which could be called the Identity Property of Division. What would be the identity element?
3. How can we rewrite a subtraction expression in order to apply the Commutative Property of Addition? Give an example.
4. Why does zero not have a reciprocal?
5. Give an example of an expression that you might want to simplify using the Distributive Property of Multiplication over Addition. Explain why it would be useful to use this property.

## Cumulative Review

**Simplify each expression.**

1.  $65 - 453$

**-388**

2.  $(6 + 7)(3 - 7)$

**-52**

3.  $(6)(8)(-3)$

**-144**

4.  $(4 + 8) \cdot 2$

**24**

5.  $-5(15 - 30)$

**75**

6.  $27 - (3 + 14)$

**10**

7.  $(22 + 24)(-2)$

**-92**

8.  $24 \cdot (-2) + (15 - 6) \cdot 4 - 2^3$

**-20**

9.  $\frac{3}{4} + \frac{7}{8}$   
 **$\frac{13}{8}$  or  $1\frac{5}{8}$**

10.  $6.2 - 4.752$

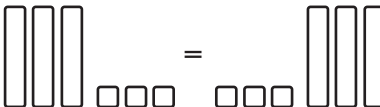
**1.448**

## Manipulative Problems

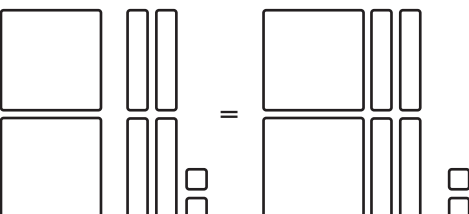
Name the property or properties illustrated.

1. 

Commutative Property of Addition

2. 

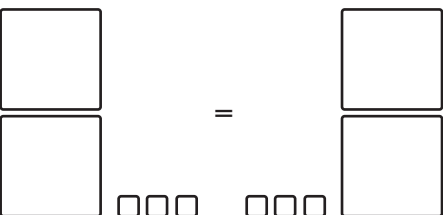
Commutative Property of Addition

3. 

Associative Property of Addition

4. 

Associative Property of Addition

5. 

Commutative Property of Addition

### Possible Journal Responses

1. The Commutative Property is a property of *order*. If the order of the addends changes in a sum or the order of the factors changes in a product, the commutative property states that the result will remain unchanged. The Associative Property is a property of *grouping*, or *association*. The Associative Property tells us that the value of an expression will remain the same if we change the grouping of the addends in a sum or the factors in a product.
2. Any real number divided by one is the original number. The identity element for division would be 1.
3. We can rewrite  $a - b$  as  $a + (-b)$ . Then we can say  $a + (-b) = (-b) + a$ , by the Commutative Property of Addition. For example,  $2 - 6 = 2 + (-6) = -6 + 2$ .
4. Zero does not have a reciprocal because any number times 0 is 0. Reciprocals must result in a product of one when they are multiplied.
5. An expression like  $9(10 + 7)$  would be easier to simplify using the Distributive Property of Multiplication over Addition than using the order of operations. Using the Distributive Property, the expression becomes  $90 + 63 = 153$ .

