TOPIC 7

LESSON 7.3c

Second Verse, Same as the the First

6.EE.2a 6.EE.3

Objective: Equivalent Expressions

Warm-Up

Evaluate each expression.

1. $6 \div \frac{3}{4}$

2. $0.54 + 0.9$

3. $\frac{(16 + 10)}{2}$

4. $\frac{16}{2} + \frac{10}{2}$

5. What do you notice about the answers to Questions 3 and 4?

EXPLORE 3

Factoring Algebraic Expressions

You have used the Distributive Property to multiply and divide algebraic expressions by a given value. The Distributive Property can also be used to rewrite an algebraic expression as a product of two factors: a constant and a sum of terms.

You can write any expression as a product of two factors. In many types of math problems, you often need the coefficient of a variable to be 1. Let's explore how to use the Distributive Property — without algebra tiles—to rewrite expressions so that the coefficient of the variable is 1.

1. Consider the expression 3x + 6.

a. Identify the coefficient of the variable term.

b. Use the Distributive Property to rewrite the expression as the product of two factors: the coefficient and a sum of terms.

c. How can you check your work?

Using the Distributive Property to rewrite the sum of two terms as the product of two factors is also referred to as factoring expressions. In the expression 3x + 6, you factored out the common factor of 3 from each term and rewrote the expression as 3(x + 2). In other words, you divided 3 from each term and wrote the expression as the product of 3 and the sum of the remaining factors, (x + 2).

You can use the same strategy to rewrite an algebraic expression so that the coefficient of the variable is 1 even if the terms do not have common factors.

WORKED EXAMPLE

Let's rewrite the expression 4x − 7 so the coefficient of the variable is 1.

To rewrite the expression, factor out the coefficient 4 from each term. The equivalent expression is the product of the coefficient and the difference of the remaining factors.

$$4x - 7 = 4\left(\frac{4x}{4} - \frac{7}{4}\right)$$
$$= 4\left(x - \frac{7}{4}\right)$$

2. Use the Distributive Property to check that the new expression is equivalent to the original expression in the Worked Example.

3. Rewrite each expression as the product of two factors. Check your answers.

a. 4x + 8

b. 8x − 3

c. $\frac{1}{2}x - 4$

d. 11x + 121

EXPLORE 4

Simplifying Algebraic Expressions

Rewrite each expression using the Distributive Property.

1. $\frac{32 + 4x}{4}$

2. $15x - 10$

3. $\frac{32 + 8x}{8}$

4. $2\frac{1}{2} + \frac{1}{4}x$

Rewrite each algebraic expression in as few terms as possible.

5. $3x + 5y - 3x + 2y$

6. $4x + 4y^2 + 3x + 2y^2$

7. $7x + 5 - 6x + 2$

8. $x^2 + 5y + 4x^2 - 3y$

Rewrite each algebraic expression by applying the Distributive Property and then combining like terms.

9. $4(x + 5y) - 3x$

10. $2(2x + 5y) + 3(x + 3y)$

11. $3x + 5(2x + 7)$

12. $\frac{4x + 6y}{2} - 3y$

13. $3(x + 2y) + \frac{3x - 9y}{3}$

14. $2(x + 3y) + 4(x + 5y) - 3x$

Show You KNOW

Write Right

Mr. Martin asked his class to write expressions equivalent to 7(3a + 5b) and 8 + 3(2x + 5) and got 5 different responses for each. For each response, determine if the original expression was rewritten correctly. For those not rewritten correctly, describe the mistake that was made in rewriting the expression.

1. 7(3a + 5b)

a. 10a + 12b

b. 7(3a) + 7(5b)

c. 21a + 5b

d. 21a + 35b

e. 7(8ab)

2. 8 + 3(2x + 5)

a. 8 + 3 · 2x + 3 · 5

b. 23 + 6x

c. 11(2x + 5)

d. 8 + 6x + 15

e. 13 + 6x

Name: _____ Date: _____ Class: _____

Homework HW

LESSON 7.3c

Second Verse, Same as the the First

Objective

Equivalent Expressions

Practice

1. Rewrite each expression as the product of two factors. Check your answers.

a. $2x + 8$

b. $4x - 3$

c. $\frac{1}{2}x - 8$

d. $12x + 144$

2. Rewrite each expression by combining like terms.

a. $2.5x + (6y - 4.5x) + 7$

a. $4.5x + 7x - 3.5x + 12$

3. Rewrite each expression by applying the Distributive Property and combining like terms.

a. $7(2x + y) + 5(x + 4y)$

b. $9x + 6y + \frac{12y - 16x}{4}$