I can use the distributive property to write equations in expanded form and factored form.

Today I need:

Pencil
Notebook
Worksheet (I will pass out)
Vocabulary Sheet

Warm-Up

In your graph spiral, answer the following questions:

Determine if each statement is *always true*, *sometimes true*, or *never true*.
If *always true*, give a supporting example. If *sometimes true*, give a supporting example and counter-example.
If *never true*, give a counter-example.

1. If m and n are negative rational numbers, then $m + n$ is negative.

2. If m and n are negative rational numbers, then $m \times n$ is negative.

The Distributive Property

You can use the Distributive Property to go between <u>factored form</u> and <u>expanded form</u>.

<u>factored form</u>		**<u>expanded form</u>**
$-3(4+8)$	=	$(-3 \bullet 4) + (-3 \bullet 8)$
$2(n-6)$	=	$(2 \bullet n) - (2 \bullet 6)$

Use the Distributive Property to write each expression in <u>expanded form</u>.

1. $-5(3+2) =$

2. $-5(3-2) =$

3. $-5(3+ \ -2) =$

4. $-5(3- \ -2) =$

Use the Distributive Property to write each expression in <u>factored form</u>.

1. $(6 \bullet 2) + (6 \bullet 3) =$

2. $(6 \bullet 2) - (6 \bullet 3) =$

3. $(-6 \bullet 2) + (-6 \bullet 3) =$

4. $(-6 \bullet 2) - (-6 \bullet 3) =$

4.2 The Distributive Property

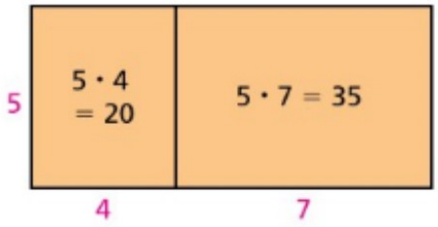
Recall that you can use the Distributive Property to rewrite an expression. The rewritten expression may be easier to calculate or may give new information.

An expression written as a sum of terms is in *expanded form*. If the terms have a common factor, then you can use the Distributive Property to write an equivalent expression. You can write the expression as a product of the common factor and the sum of the other two factors. This is called *factored form*.

With integers:

$$20 + 35 = 55$$

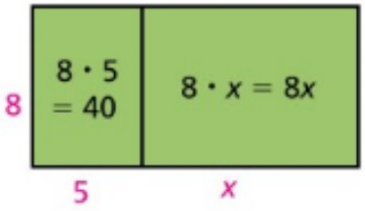
$$5 \cdot 4 + 5 \cdot 7 = 5 \cdot (4 + 7)$$



With a variable:

$$40 + 8x = 8 \cdot 5 + 8 \cdot x$$

$$8 \cdot 5 + 8 \cdot x = 8 \cdot (5 + x)$$



You can also use the Distributive Property to rewrite expressions with negative numbers. Use the Distributive Property to multiply the first factor by each number in the second factor and add the two resulting products.

With integers:	$-3 \cdot (4 + 8) = -3 \cdot 4 + (-3) \cdot 8$
With a variable:	$-2 \cdot (x + 6) = -2 \cdot x + (-2) \cdot 6$

When you apply the Distributive Property to rewrite $5 \cdot x + 5 \cdot (-2.5)$ as $5 \cdot [x + (-2.5)]$, you are factoring out the common factor 5 from the two parts of the sum. When you write the equivalent expression $5 \cdot [x + (-2.5)]$, you can say you have factored the expression into the product of two terms, 5 and $[x + (-2.5)]$.

Distributive Property

A math rule that shows how multiplication combines with addition or subtraction: $a(b + c) = ab + ac$ and $a(b - c) = ab - ac$	**ex:** **3(4 + 6)** $3(4 + 6) = 3 \bullet 4 + 3 \bullet 6 = \underline{12 + 18}$ **2(3x – 5)** $2(3x - 5) = 2 \bullet 3x - 2 \bullet 5 = \underline{6x - 10}$

4.3 What Operations Are Needed?

In the questions below, you will use what you have learned about operations on rational numbers to solve problems. Always ask yourself the following question:

- What operation(s) do you need to solve the problem, and how do you know?

As a team, answer the questions on page 84.
Record the answers in your graph paper.

A Three friends are going hiking with Latisha. For each of the four hikers, she buys two bottles of water and three packs of trail mix. The bottles of water cost $1.50 each, and the packs of trail mix cost $3.75 each.

1. **a.** Can Latisha go through the express checkout lane for customers with 15 or fewer individual items?

b. Write a number sentence to show how you found the total number of items Latisha bought.

c. Write a different number sentence that shows a different way to find the total number of items.

d. Explain how you know which operation(s) to use.

2. Latisha has $60. Does she have enough money to pay for the items?

Class Work Answers:

A. 1a. No, Latisha has 20 items.

b. and **c.** **possible number sentences**

$$4(2+3) \qquad 4 \bullet 2 + 4 \bullet 3$$

d. There are a sum of 5 items, multiplied by 4 people.

2. Yes, the total is $57.

As a team, answer the questions on page 87.
Record the answers in your graph paper.

19. A grocery store receipt shows 5% state tax due on laundry detergent and a flower bouquet. Does it matter whether the tax is calculated on each separate item or the total cost? Explain.

Class Work Answers:

19. It doesn't matter if the tax is calculated on each separate item or the total cost because:

$$0.05(7.99 + 3.99) = 0.05(11.98) = 0.599$$

AND

$$0.05 \bullet 7.99 + 0.05 \bullet 3.99 = 0.3995 + 0.1995 = 0.599$$

Homework:

Worksheet