TOPIC 1

Factors and Area

Lesson 1.1
Taking Apart Numbers and Shapes
Writing Equivalent Expressions Using the Distributive Property
6.EE.2b
6.EE.3

Lesson 1.2a/b
All About That Base...and Height
Area of Triangles and Quadrilaterals
6.G.1

Lesson 1.3a/b
Slicing and Dicing
Composite Figures
6.G.1

Lesson 1.4a/b
Searching for Common Ground
Common Factors and Common Multiples.
6.NS.4

Lesson 1.5a/b
Composing and Decomposing Numbers
Least Common Multiple and Greatest Common Factor
6.NS.4

Topic 1

LESSON 1.1
Numbers and Shapes

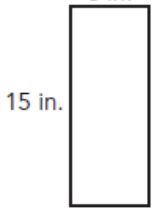
6.EE.2.b
6.EE.3

Objective Writing Equivalent Expressions Using the Distributive Property

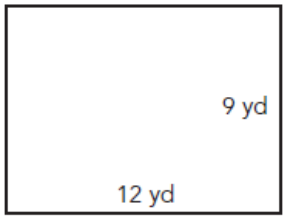
Warm-Up

Calculate the area of each rectangle. Show your work.

1.



2.

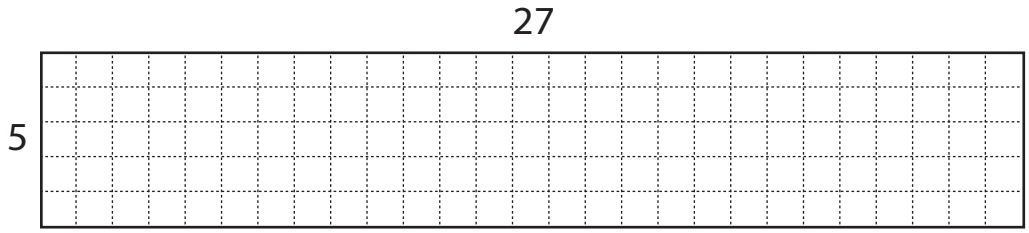


EXPLORE 1

Connecting Area Models and the Distributive Property

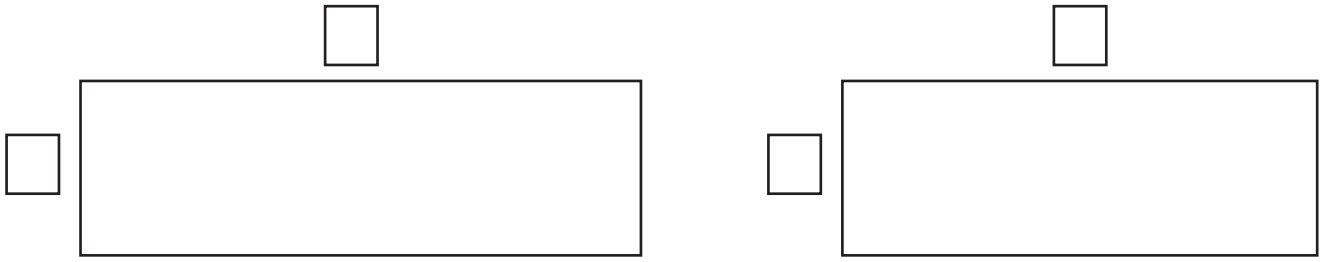
Consider the equation $5 \times 27 = 135$.

In your graphing notebook draw an area model to represent the product of 5 and 27 as shown. The area is 135 square units.



1. Draw a vertical line to split one side length of the area model in to two parts to represent the area of 135 square units a different way.

Use the sample spaces to label the dimensions of the smaller regions in the area model.



2. Calculate the area of each of the two smaller regions. How does the sum of the two smaller regions compare to the total area of 135 square units?

Area of first small region **Area of second small region**

3. Rewrite the original equation 5 × 27 = 135 with an equivalent equation to represent the model you drew.
How can you rewrite the original product (5 × 27 = 135) by substituting the sum of the two lengths making up the split side?

Think about other ways you could split one of the factors and write a corresponding equation. What would the equation look like if you split one of the factors into more than two regions?

4. Mark and label at least 2 more ways you could divide the area model. Write the corresponding equations. Then verify that the sum of the smaller regions is still equal to 135.

5. Reflect on the different ways you can rewrite the product of 5 and 27.

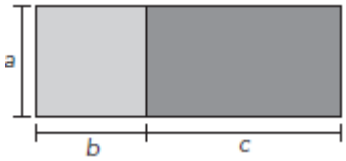
Select one of your area models to complete the example.

5 × 27 = 5(_____ + _____)	How did you split the side length of 27?
= (5 · _____) + (5 · _____)	What are the factors of each smaller region?
= _____ + _____	What is the area of each smaller region?
= _____ What is the total area	

You just used the **Distributive Property**!

The Distributive Property of Multiplication over Addition states that for any numbers a, b, and c,

a(b + c) = ab + ac.



An example of the Distributive Property

4 (2 + 15)= 4 · 2 + 4 · 15

You can read and describe the expression 4(2 + 15) in different ways.
For example, you can say:

- four times the quantity of two plus fifteen,
- four times the sum of two and fifteen, or
- the product of four and the sum of two and fifteen.

You can describe the expression 4(2 + 15) as a product of two factors. The quantity (2 + 15) is both a single factor and a sum of two terms.

7. Write an equation in the form a(b + c) = ab + ac for the other area models you created in this activity

EXPLORE 2

Interpreting a Real-World Situation Using the Distributive Property

Tyler is setting up the gym floor for an after-school program. He wants to include a rectangular area for playing volleyball and another for dodgeball. He also wants to have an area for kids who like to play board games or just sit and read. The gym floor is 50 feet by 84 feet, or 4200 square feet.

1. Create a diagram to show how you would split up the gym floor. Represent your diagram using the Distributive Property and write an explanation for the areas assigned to each activity.

84

50

Show You KNOW

Recognize the Distributive Property

Identify each statement as true or false. If the statement is false, show how you would rewrite it to make it a true statement.

1. True False $3(2 + 4) = 3 \cdot 2 + 4$

2. True False $6(10 + 5) = 6 \cdot 10 + 6 \cdot 5$

3. True False $7(20 + 8) = 7 + 20 \cdot 8$

4. True False $4(5 + 10) = 20 + 10$

5. True False $2(6 + 11) = 12 + 22$

Name: _____ Date: _____ Class: _____

Homework HW

LESSON 1.1

Numbers and Shapes

Objective

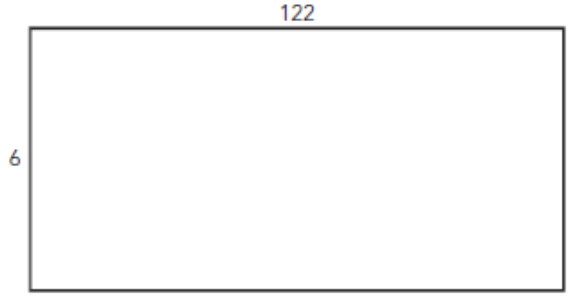
Writing Equivalent Expressions Using the Distributive Property

Practice

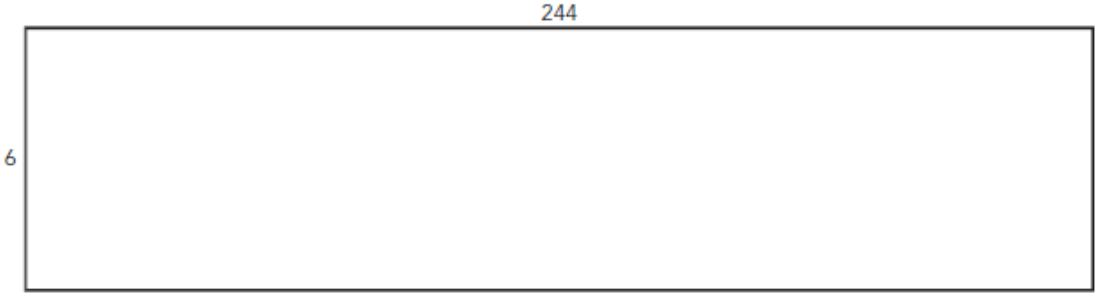
Decompose each rectangle into two or three smaller rectangles to demonstrate the Distributive Property. Then write each area in the form $a(b + c) = ab + ac$.

1.

2.



3.



Evaluate each expression using the Distributive Property. Show your work.

4. $6(12 + 4)$
5. $10 + 4(2 + 20)$
6. $7(4 + 19)$

Review

Calculate the area of each rectangle.

1. Width = 5 feet
   Length = $\frac{2}{3}$ foot

2. Width = 10 feet
   Length = $\frac{2}{3}$ foot