ignore

LESSON 1

← Lesson Number

Taking Apart Numbers and Shapes

Lesson Title

Writing Equivalent Expressions Using the Distributive Property

Lesson sub-title

KEY TERMS

numeric expression

equation

Distributive Property of Multiplication over Addition

Learning Goals

- Write, read, and evaluate equivalent numeric expressions.
- Identify the adjacent side lengths of a rectangle as factors of the area value.
- Identify parts of an expression, such as the product and the factors.
- Write equivalent numeric expressions for the area of a rectangle by decomposing one side length into the sum of two or more numbers.
- Apply the Distributive Property to rewrite the product of two factors.

direction line

REVIEW ▶ (1–2 minutes)

Review section of lesson

Learning Goals for Lesson
This text is probably the most useful in terms of match ES to Lesson

▶ Calculate the area of each rectangle. **Show your work.**

1 6 in.

15 in.

questions

2 9 yd

12 yd

Essential Question

Connecting Statement

You know how to operate with numbers using different strategies. Taking apart numbers before you operate can highlight important information or make calculations easier.

How can you use these strategies to express number sentences in different ways?

Lesson Number > Lesson Title

Getting Started section of lesson

Break It Down to Build It Up

section header

Callie is installing a rectangular walkway up to her house. The width of the walkway is 5 feet and the length is 27 feet. She needs to calculate the area of the walkway to determine the amount of materials needed to build it.

passage

1 Mark and label two different ways you could divide an area model to determine the area of the walkway.

Question stem

question images

2 Determine the areas of each of the subdivided parts of your models.

Question stem

3 What is the total area of the walkway?

Question stem

Topic Name > Topic Title

Activity 1 section of lesson

ACTIVITY 1

MATHia CONNECTION
- Commutative and Associative Properties
- Exploring the Distributive Property with Numeric Expressions
- Using the Distributive Property with Numeric Expressions

section header

Connecting Area Models and the Distributive Property

The *numeric expression* of 5 × 27 represents the area of the walkway from the Getting Started. A **numeric expression** is a mathematical phrase that contains numbers and operations.

The *equation* 5 × 27 = 135 shows that the expression 5 × 27 is equal to the expression 135.

An **equation** is a mathematical sentence that uses an equals sign to show that two expressions are the same as one another.

Instruction

Direction Line

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

1 Select one of your area models to complete the example.

How did you take apart the side length of 27? $5 \times 27 = 5(\_\_\_\_ + \_\_\_)$
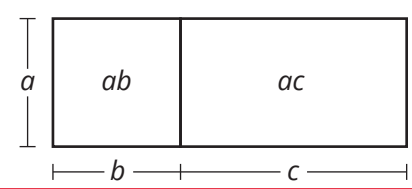
question

What are the factors of each smaller region? $= (5 \cdot \_\_\_\_) + (5 \cdot \_\_\_)$

What is the area of each smaller region? $= \_\_\_\_ + \_\_\_$

Instruction

What is the total area? $= \_\_\_\_$

You just used the *Distributive Property of Multiplication over Addition*!

The **Distributive Property of Multiplication over Addition** states that for any numbers *a*, *b*, and *c*, the equation $a(b + c) = ab + ac$ is true.

2 Explain the Distributive Property using the area model shown.

question

Feature - Habits of Mind

HABITS OF MIND
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Feature - Think about It

THINK ABOUT . . .
What are other ways you could take apart one of the factors and write a corresponding equation? What would the equation look like if you divided the model into more than two regions?

Worked Example

WORKED EXAMPLE

An example of the Distributive Property:

$$4(2+15) = 4 \cdot 2 + 4 \cdot 15$$

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.

TAKE NOTE . . .

You can also use grouping symbols to show that you need to multiply each set of factors before you add them, $(4 \cdot 2) + (4 \cdot 15)$.

Feature - Take Note

3 Fill in the missing addend in each box that makes the equation true.

(a) $7(\underline{\hspace{1cm}} + 10) = 21 + 70$

(b) $3(\underline{\hspace{1cm}} + 15) = 36 + 45$

(c) $8(2 + \underline{\hspace{1cm}}) = 16 + 56$

(d) $5(6 + \underline{\hspace{1cm}}) = 30 + 45$

question

4 Rewrite one of the factors as the sum of two terms in each expression and use the Distributive Property to verify each product.

(a) $4 \times 17 = 68$

(b) $9 \times 34 = 306$

(c) $3 \times 29 = 87$

question

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

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

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

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

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

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

question

TALK THE TALK [section header]

[Talk the Talk section of lesson]

The Floor Is Yours

You can apply the Distributive Property to solve real-world problems. [instruction]

> Consider the situation. [direction line]

[passage]

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 divide up the gym floor. Represent your diagram using the Distributive Property and write an explanation for the areas assigned to each activity.

[question]

LESSON 1 ASSIGNMENT

❯ Use a separate piece of paper for your Journal entry.

section header

JOURNAL

Explain the Distributive Property in terms of composing and decomposing numbers.

Feature - Journal

REMEMBER

Feature - Remember

There are many ways to rewrite equivalent expressions using properties. The Distributive Property of Multiplication over Addition states that for any numbers a, b, and c, $a(b + c) = ab + ac$.
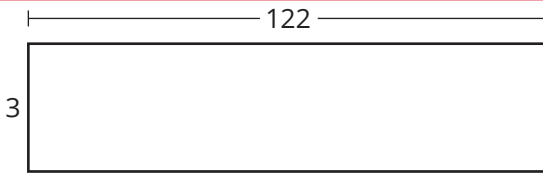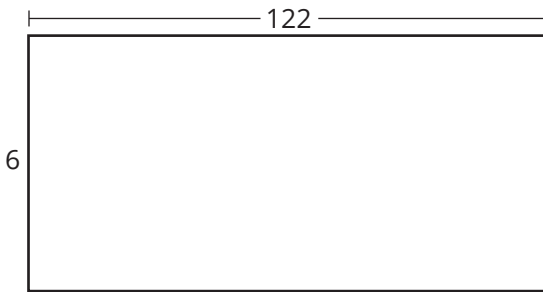
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PRACTICE

section header

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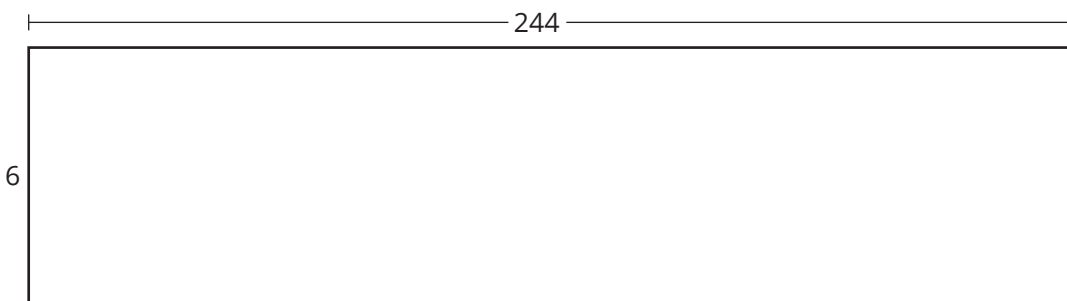
direction line

1 — 122 —

3

questions

2 — 122 —

6

3 — 244 —

6

Go to LiveHint.com for help on the **PRACTICE** questions.

direction line

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

4 6(12 + 4)

5 10 + 4(2 + 20)

6 7(4 + 19)

questions

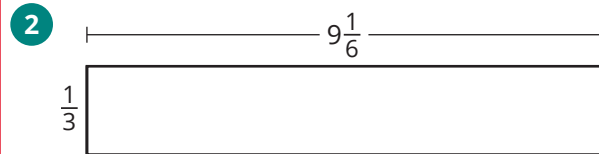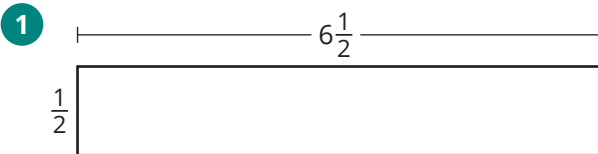section header

STRETCH Optional

> Decompose each rectangle into smaller rectangles to demonstrate the Distributive Property. Write each area in the form $a(b + c) = ab + ac$ and then determine the total area.

direction line

1

$6\frac{1}{2}$

$\frac{1}{2}$

2

$9\frac{1}{6}$

$\frac{1}{3}$

questions