TEA
Texas Education Agency

STRONG FOUNDATIONS
Implementation

Internalization Process

Turn to the Lesson 1 begining page for your grade level

6th – Pg 5A

7th - Pg 5A

8th Pg. 5A

1 Writing Equivalent Expressions Using the Distributive Property

Setting the Stage

- Communicate the objectives and new key terms to look for.
- Tap into your students' prior learning by reading the narrative statement.
- Provide a sense of direction by reading the Essential Question.

OBJECTIVES

- 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.

NEW KEY TERMS

- numeric expression
- equation
- distributive property

Key vocabulary

You know how to add, subtract, multiply, and divide numbers using different strategies. Taking apart numbers before you perform a mathematical operation can highlight important information or make calculations easier.

How can taking apart numbers help you to express number sentences in different ways?

Sample answer:

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, $a(b + c) = ab + ac$.

Model and explain the distributive property

Problem Solving Model & Process

Pg. IL – 1A

Big Book TE

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Internalization Process

Chunking the Activity

- Read and discuss the situation.
- Have students complete Question 1 individually.
- Check in and share.
- Have students complete Questions 2 and 3 individually.
- Share and summarize.

NOTE: This is the first lesson where TEKS 6.1A is highlighted.

- Read and display TEKS 6.1A and explain that this activity is an example of applying mathematics to everyday life and society.

NOTE: This is the first lesson where TEKS 6.1D is highlighted.

- Read and display TEKS 6.1D and explain that in this activity students are communicating mathematical ideas and reasoning using diagrams and language.

Ask Yourself . . . How can you use the area of rectangles in everyday life?

Ask Yourself . . . How does representing mathematics in multiple ways help to communicate reasoning?

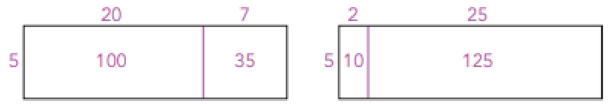
Getting Started

Ask student to read the problem

Sofia is building 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.

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

Sample answer:



Model one way to develop the area model
Students practice another way & share with their learning partner

3. What is the total area of the walkway?

135 square feet

Share the solution and student check their responses

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ACTIVITY 1.1

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 or more quantities are the same as one another.

1. Reflect on the different ways you can rewrite the product of 5 and 27. Select one of your area models to complete the example.

Sample answers:

How did you split the side length of 27?	5 · 27 = 5(25 + 2)
What are the factors of each smaller region?	= (5 · 25) + (5 · 2)
What is the area of each smaller region?	= 125 + 10
What is the total area?	= 135

different ways to represent the operation of mu... 5 ... rep...

What are other ways you could split one of the factors ... a corre... equation? What would the equation look like if you split one of the factors into more than two regions?

Chunking the Activity

- Read and discuss the introduction.
- Group students to ...
- Check in and share.
- Read and discuss the definition of the ...
- Check in and share.
- Read and discuss the Worked Ex...
- ... to complete Questions 3–5.
- Share and summarize.

1) Ask student to read about a numeric expression

2) Ask student to read about an equation

3) Turn and talk with a partner to show how they are the same and different

4) Model problem #1

STAMP THE LEARNING

The definitions provide an opportunity for explicit instruction. Interact with this information as a class and encourage students to restate or explain the information in their own words.

Optimizing Learning

This activity supports decoding of text, mathematical notation, and symbols.

Question 1 presents an opportunity to assess students' understanding of the essential content of the lesson. Use student responses to determine when to schedule Learning Individually Days. To provide additional practice rewriting products using the distributive property assign Skills Practice Set A for this lesson.

NOTE: This is the first lesson where TEKS 6.1C is highlighted.

- Read and display TEKS 6.1C and explain that in this activity students select tools including mental math and number sense to solve problems.

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Internalization Process

5) Sts review the definition & worked example on the distributive property & explain it to their learning partner

6) Teacher clarifies as needed

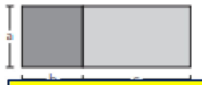
STAMP THE LEARNING

The definition and Worked Example provide an opportunity for explicit instruction. Interact with this information as a class and encourage students to restate or explain the information in their own words.

Question 3 presents an opportunity to assess students' understanding of the essential content of the lesson. Use student responses to determine when to schedule Learning Individually Days. To provide additional practice with determining unknown addends, assign Skills Practice Set A for this lesson.

You just used the *distributive property!*

The **distributive property,** when applied for multiplication, states that for any numbers *a*, *b*, and *c*, the equation $a(b + c) = ab + ac$ is true.

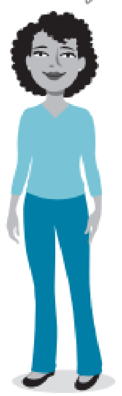


2. Explain the distributive property using the area model shown.

   Sample explanation:

   The area of the whole rectangle is equal to $a(b + c)$, because a is the width and $b + c$ is the length. The area of the smaller rectangle is $a \cdot b$ and the area of the larger rectangle is $a \cdot c$. The sum of those areas, $ab + ac$, is equal to the area of the whole rectangle, $a(b + c)$.

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



WORKED EXAMPLE

Consider this 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.

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

   a. $7(\underline{3} + 10) = 21 + 70$

   b. $3(\underline{12} + 15) = 36 + 45$

   c. $8(2 + \underline{7}) = 16 + 56$

   d. $5(6 + \underline{9}) = 30 + 45$

EB STUDENT TIP

For "Advanced" and "Advanced High" proficiency levels

Remind students to refer to the Academic Glossary to review the definition of **describe** and related phrases. Suggest they ask themselves these questions:

- How should I organize my thoughts?
- Did I consider the context of the situation?

EB STUDENT TIP

For "Advanced" and "Advanced High" proficiency levels

Have students differentiate between the terms *expression* and *equation*.

Have students share the similarities and differences between expressions and equations. Then, ask them to provide additional examples of each.

Internalization Process

7) Students practice with a partner in completing 4 A,B,C

4. Rewrite a factor as the sum of two terms in each equation and us[e] the distributive property to verify each product.

a. $4 \cdot 17 = 68$

Sample answer:

$4(10 + 7) = 68$

$40 + 28 = 68$

$68 = 68$

b. $9 \cdot 34 = 306$

Sample answer:

$9 \cdot 34 = 306$

$9(30 + 4) = 306$

$270 + 36 = 306$

$306 = 306$

c. $3 \cdot 29 = 87$

Sample answer:

$3 \cdot 29 = 87$

$3(20 + 9) = 87$

$60 + 27 = 87$

$87 = 87$

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 $3(2 + 4) = 3 \cdot 2 + 4$

False;

$3(2 + 4) = 3 \cdot 2 + 3 \cdot 4$

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

True

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

False;

$7(20 + 8) = 7 \cdot 20 + 7 \cdot 8$

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

False;

$4(5 + 10) = 20 + 40$

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

True

Ask Yourself . . .
What tools or strategies can you use to solve this problem?

Questions 4 and 5 present an opportunity to assess students' understanding of the essential content of the lesson. Use student responses to determine when to schedule Learning Individually Days. To provide additional practice using the distributive property to decompose expressions, assign Skills Practice Set C. To provide additional practice identifying equivalent expressions, assign Skills Practice Set D.

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Internalization Process

Chunking the Activity

- Group students to complete the activity.
- Share and summarize.
- Have students answer the Essential Question on the lesson opener.

Optimizing Learning

This activity optimizes relevance, value, and authenticity.

Talk the Talk

The Floor Is Yours

8) Students complete the Talk the Talk or Exit Ticekt A or Exit Ticket B or both

Exit Ticket A

6th Grade Math
Readiness Standard
Category 1

6.7D # 8Z

Shea wrote the expression $5(y + 2) + 4$ to show the amount of money five friends paid for snacks at a baseball game. Which expression is equivalent to the one Shea wrote?

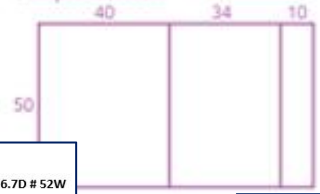
F $5 + y + 5 + 2 + 4$

G $5 \cdot y \cdot 5 \cdot 2 + 4$

H $5 \cdot y \cdot 4 + 5 \cdot 2 \cdot 4$

J $5 \cdot y + 5 \cdot 2 + 4$

9) Teacher walks around monitoring and assisting students as needed.



+ 34 + 10) = 5

ed the length of

erent sizes for each activity.

de the area for playing volleyball the largest, 50 feet by

eet.

de the area for playing dodgeball, 50 feet by 34 feet, close to the same size as the volleyball area but a bit smaller.

- I made the smallest area of the gym, 50 feet by 10 feet, for playing board games or reading since those are activities that require less movement.

Exit Ticket B

6th Grade Math

6.7D # 52W

Which two expressions are equivalent?

F $9(6 + x)$
$9 \cdot 6 + 9 \cdot x$

G $x + (8 \cdot 9)$
$(x + 8) \cdot 9$

H $8 \cdot 6 \div x$
$8 \cdot x \div 6$

J $6 \cdot x + 3$
$6 \cdot (x + 3)$

10) Teacher shares solutions and does a formative check. Thumbs up (both correct) , thumb sideways (1 correct) or thumbs down (none correct).

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STRONG FOUNDATIONS Implementation

Lesson 1 Assignment

Write

Explain the distributive property in terms of composing and decomposing numbers.

Remember

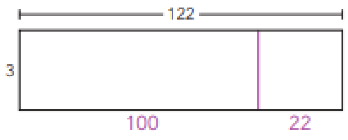
There are many ways to rewrite equivalent expressions using properties. The distributive property of multiplication over addition states that for any numbers a, b, and c, $a(b + c) = ab + ac$.

Practice

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

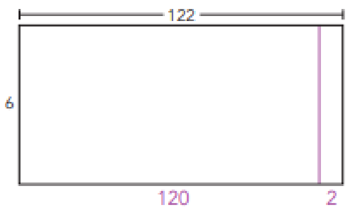
Sample answers:

1.



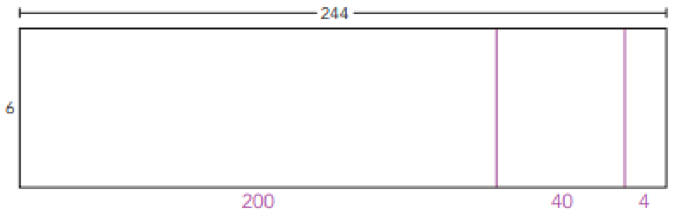
$3(100 + 22) = 300 + 66$

2.



$6(120 + 2) = 720 + 12$

3.



$6(200 + 40 + 4) = 1200 + 240 + 24$

Write

Sample explanation: When you have a rectangle that is composed of two smaller rectangles,

Good STAAR Connections

$a \cdot b + a \cdot c$, where a and b are the dimensions of one rectangle and a and c are the dimensions of the second rectangle. This area is equal to the area of the large rectangle, determined by multiplying the shared side length times the sum of the two other side lengths, or $a(b + c)$.

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Lesson 1 Assignment

4. $6(12 + 4)$
   $= 6 \cdot 12 + 6 \cdot 4$
   $= 72 + 24$
   $= 96$

5. $10 + 4(2 + 20)$
   $= 4 \cdot 2 + 4 \cdot 20 + 10$
   $= 8 + 80 + 10$
   $= 98$

6. $7(4 + 19)$
   $= 7 \cdot 4 + 7 \cdot 19$
   $= 28 + 133$
   $= 161$

Prepare

1. In the array of numbers shown, circle the prime numbers, cross out the composite numbers, and use a box to identify any number that is neither prime nor composite.

[1]	(2)	(3)	~~4~~	(5)	~~6~~	(7)	~~8~~	~~9~~	~~10~~
(11)	~~12~~	(13)	~~14~~	~~15~~	~~16~~	(17)	~~18~~	(19)	~~20~~