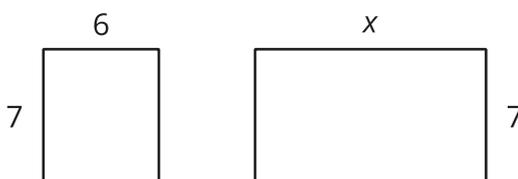


Lesson 8: Areas and Equivalent Expressions

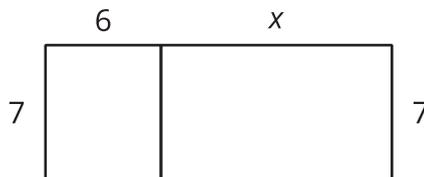
- Let's write different expressions to represent the same area.

8.1: Ways to Express the Area

- Here are two rectangles with their side lengths labeled. Write the sum of the areas of the two rectangles.



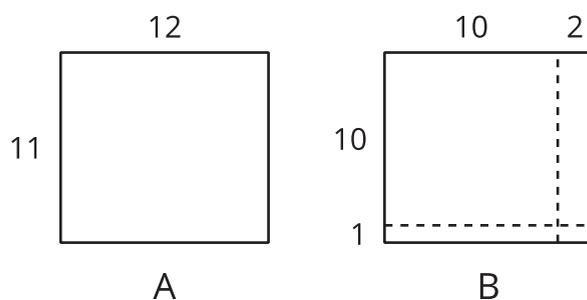
- The two rectangles can be composed into a larger rectangle as shown.



- Write the length and width of the new, large rectangle.
 - Write an expression for the area of the new rectangle.
- How are the two expressions for area alike? How are they different?

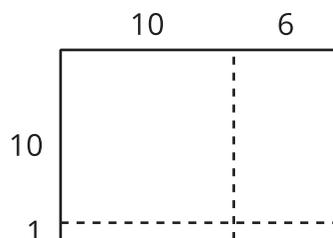
8.2: Multiplying Two-Digit Numbers and the Distributive Property

1. Here are two rectangles.



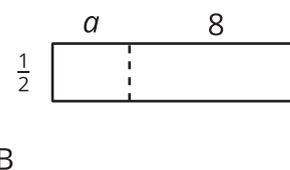
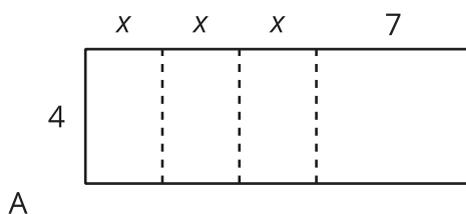
- Find the area of Rectangle A.
- Find the area of each of the 4 smaller rectangles that make up Rectangle B.
- Use the sum of the areas of the small rectangles to find the area of Rectangle B.
- How is finding the area of Rectangle B like multiplying $(10 + 1)(10 + 2)$?

2. Find the area of this rectangle two different ways:



8.3: Using the Distributive Property to Write Equivalent Expressions

1. Express the area of each rectangle in two ways: as a sum of the areas of the sub-rectangles, and a product of length and width of the large rectangle.



2. Select **all** the expressions that are equivalent to $4(2 + 3x)$. Be prepared to explain or show how you know.

- $8 + 12x$
- $8 + 3x$
- $4(5x)$
- $12x + 8$
- $2(4) + 3x(4)$
- $12x + 2$
- $2(2 + 3x) + 2(2 + 3x)$

3. Write at least three expressions that can represent the area of a rectangle that is 12 units long by $(10 + a)$ units wide. If you get stuck, try drawing a diagram.

4. Each expression represents the area of a rectangle. Name a possible length and width of each rectangle. Be prepared to explain or show how you know.

a. $3x + 21$

b. $4(9) + 4(20)$

c. $8^2 + 8a$

d. $(30)(30) + 30(4) + 30(b)$

5. Sort the expressions into three groups, so that all three of the expressions in a group could represent the area of the same rectangle.

• $100 + 20 + 90 + 18$

• $10 \cdot 22$

• $100 + 90 + 90 + 81$

• $(10 + 2)(10 + 9)$

• $(10 + 9)(10 + 9)$

• 19^2

• $10(2 \cdot 10 + 2)$

• $2 \cdot 100 + 20$

• $12 \cdot 19$

