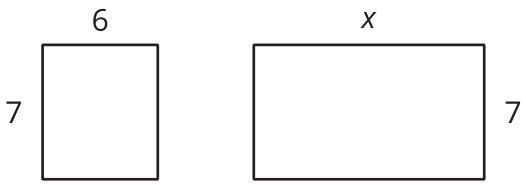
Areas and Equivalent Expressions

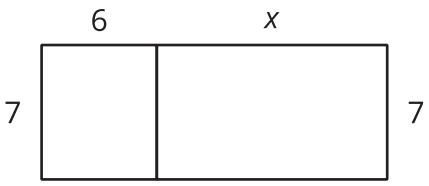
Let's write different expressions to represent the same area.

8.1 Ways to Express the Area

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



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



   a. Write the length and width of the new, large rectangle.

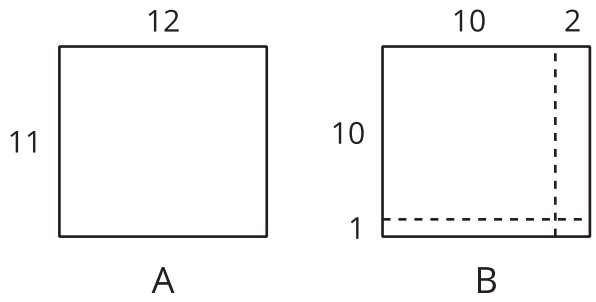
   b. Write an expression for the area of the new rectangle.

3. How are the two expressions for area alike? How are they different?

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8.2 Multiplying Two-Digit Numbers and the Distributive Property

1. Here are two rectangles.



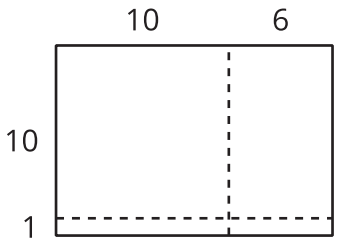
   a. Find the area of Rectangle A.

   b. Find the area of each of the 4 smaller rectangles that make up Rectangle B.

   c. Use the sum of the areas of the small rectangles to find the area of Rectangle B.

   d. How is finding the area of Rectangle B like multiplying $(10 + 1)(10 + 2)$?

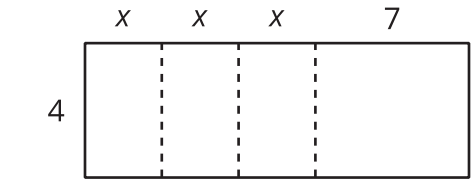
2. Find the area of this rectangle two different ways:



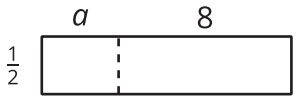
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8.3 Using the Distributive Property to Write Equivalent Expressions

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



A



B

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.

- $100 + 20 + 90 + 18$
- $100 + 90 + 90 + 81$
- $(10 + 9)(10 + 9)$
- $10(2 \cdot 10 + 2)$
- $12 \cdot 19$
- $10 \cdot 22$
- $(10 + 2)(10 + 9)$
- 19^2
- $2 \cdot 100 + 20$

