

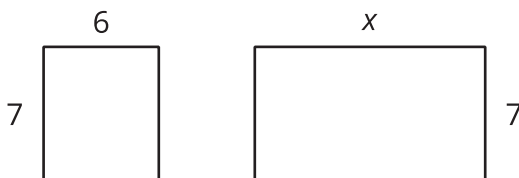


# Areas and Equivalent Expressions

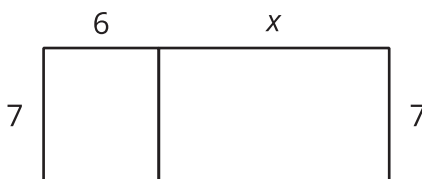
Let's write different expressions to represent the same area.

## 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.

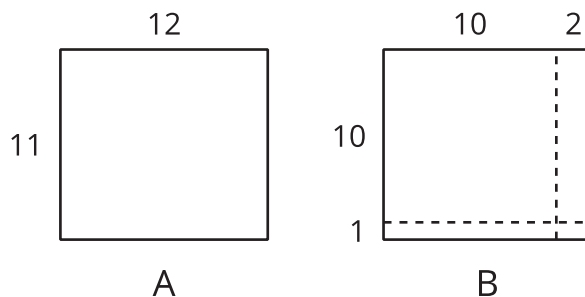


- Write the length and width of the new, large rectangle.
  - Write an expression for the area of the new rectangle.
- How are the two expressions for area alike? How are they different?

## 8.2

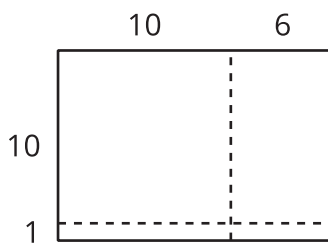
# Multiplying Two-Digit Numbers and the Distributive Property

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  $(10 + 1)(10 + 2)$ ?

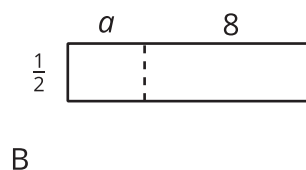
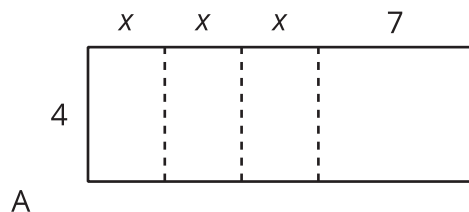
2. Find the area of this rectangle two different ways:



## 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 as 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.

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

