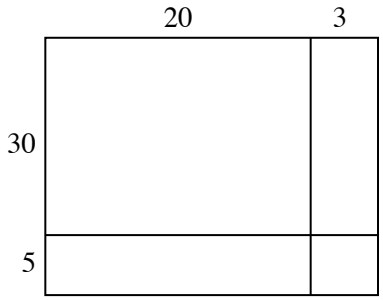
MULTIPLICATION WITH GENERIC RECTANGLES

If a large rectangle is cut into a number of smaller rectangles, then the area of the large rectangle is equal to the sum of the areas of all the smaller rectangles. The idea of breaking a product up into parts is the basis for multiplication using generic rectangles. We say "generic" because the dimensions are not to scale. We use it to help us visualize multiplication and as a way to multiply numbers by using a diagram. Multiplication using rectangle models reinforces the multiplication algorithm and will continue to be used and extended through Algebra 1 and Algebra 2. For additional information, see the Math Notes box in Lesson 2.3.2 of the Core *Connections, Course 1* text and Lesson 2.2.1 of the *Core Connections, Course 2* text.

Example 1

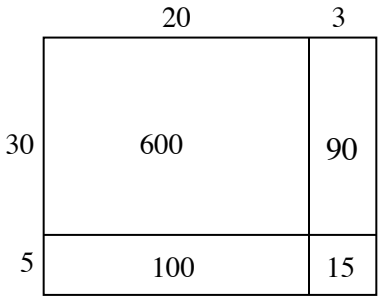
Multiply $23 \cdot 35$ using a generic rectangle.

Since we are multiplying a two-digit number by a two-digit number we need a generic rectangle as shown at right. The numbers to be multiplied are separated (decomposed) based on place value. In this case, for example, 23 has two tens (20) and 3 ones.



The area of the product (the large rectangle) is equal to the sum of the areas of each of the smaller rectangles. The area of each of the smaller rectangles is found by multiplying its dimensions.

Find the area of each of the smaller rectangles and then sum them together.

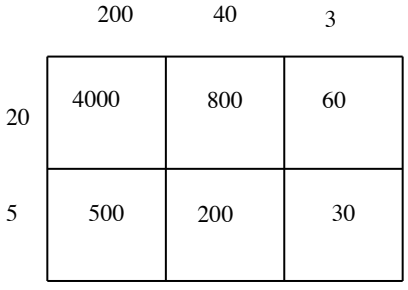


$23 \cdot 35 = (20 + 3)(30 + 5) = 600 + 100 + 90 + 15 = 805$

Example 2

Multiply $243 \cdot 25$ using a generic rectangle.

Since we are multiplying a three-digit number by a two-digit number we need six sections in our rectangle. Fill in the areas and add them together to get:



$243 \cdot 25 = 4000 + 800 + 500 + 200 + 60 + 30 = 5590$

Problems

Use a generic rectangle to find each product.

1. $47 \cdot 52$
2. $38 \cdot 84$
3. $126 \cdot 35$
4. $72 \cdot 39$
5. $67 \cdot 89$
6. $347 \cdot 85$

What multiplication problem does each generic rectangle represent and what is the product?

7.

	6
30	1500
	250

8.

70	
	200
210	15

9.

		7
30		1800
1600		56

Answers

1. 2444
2. 3192
3. 4410
4. 2808
5. 5963
6. 29,495
7. $56 \cdot 35 = 1960$
8. $75 \cdot 43 = 3225$
9. $267 \cdot 38 = 10,146$