

Name _____

Multiply 2-Digit by 2-Digit Numbers

Let's Build

Lesson 3-5

I can ... use area models and strategies to help multiply 2-digit by 2-digit numbers.

Explore and Share

Jada sets a goal to reach a personal best time in a race. In order to do that, it is recommended that she runs 75 miles each month for 3 months before race day. In the first week, she plans to run 16 miles. If she continues to do this for 12 weeks before the race, do you think she'll reach her goal?



Essential Question

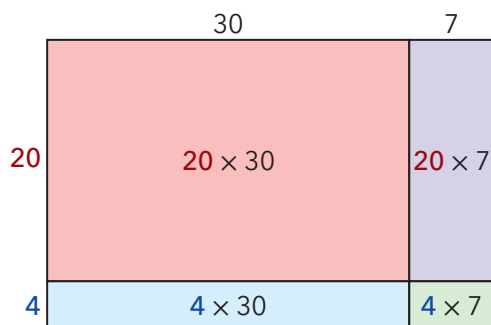
How Do You Multiply 2-Digit Numbers by 2-Digit Numbers?

Animation



Visual Learning

- A** A ferry carried 37 cars per trip on the weekend. If the ferry made 11 trips on Saturday and 13 trips on Sunday, how many cars did it carry on the weekend?



You can add to find that 24 trips were made on Saturday and Sunday. So the ferry carried 37×24 cars on the weekend.



B One way

Use the area model to find the **partial products** for 24×37 .

$$\begin{array}{r}
 37 \\
 \times 24 \\
 \hline
 28 \\
 120 \\
 \hline
 140 \\
 + 600 \\
 \hline
 888
 \end{array}$$

$4 \times 37 = 148$

$20 \times 37 = 740$

The ferry carried 888 cars on the weekend.

C Another way

Use the **standard algorithm**.

Step 1: Multiply by the **ones**.

Step 2: Multiply by the **tens**.

$$\begin{array}{r}
 2 \\
 37 \\
 \times 24 \\
 \hline
 148 \\
 + 740 \\
 \hline
 888
 \end{array}$$

Step 1: 148 (4×37)

Step 2: $+ 740$ (20×37)

The ferry carried 888 cars.

Talk About Math Ideas

What are ways you can estimate to check the reasonableness of the answer?

Guided Practice

Do You Understand?

- 1. Critique Reasoning** Janet said that the standard algorithm is just a shortcut for partial products. Do you agree? Explain.

Do You Know How?

- 2.** Use an algorithm or partial products to find the product. Estimate to check if your answer is reasonable.

$$\begin{array}{r} 41 \\ \times 23 \\ \hline 122 \\ + 820 \\ \hline 943 \end{array}$$

Practice and Problem Solving

For **3-10**, use an algorithm or partial products to find the product. Use and draw area models as needed.

Lesson Help

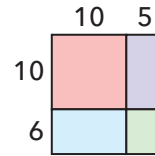


3.

$$\begin{array}{r} 16 \\ \times 22 \\ \hline \square 2 \\ + \square \square 0 \\ \hline \square \square \square \end{array}$$

4.

$$\begin{array}{r} 15 \\ \times 16 \\ \hline \square \square \\ + \square \square \square \\ \hline \square \square \square \end{array}$$



Use estimation to check if your answers are reasonable.



5.

$$\begin{array}{r} 27 \\ \times 12 \\ \hline \end{array}$$

6.

$$\begin{array}{r} 18 \\ \times 15 \\ \hline \end{array}$$

7. 53×17

8. 81×46

9. 15×16

10. 17×21

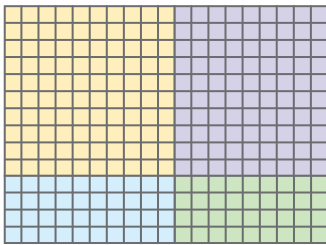
11. Make Sense and Persevere

The *Queen Mary 2*'s height above water is about the same as a 14-story building. What is the *Queen Mary 2*'s height above water?

Each story is 12 feet tall.



- 12. Model with Math** Label each part of the model and write the multiplication expression it represents. Find the partial products. Then calculate the final product.



- 13. Higher Order Thinking** An elevator can carry 15 adults or 20 children at one time. During the course of a day, the elevator carries a full passenger load 52 times. If all the passengers were children, how many more people would the elevator carry than if all the passengers were adults? Explain your answer.

Assessment Practice

- 14.** Eleven years ago, Melissa planted a tree in her back yard. She has taken a photo of the tree every week so she can see how it grows as time passes. How many photos of the tree does Melissa now have?

- Ⓐ 63 photos
- Ⓑ 302 photos
- Ⓒ 572 photos
- Ⓓ 631 photos

There are 52 weeks in one year.

- 15.** Mr. Morris bought sketchpads for 24 of his students. Each pad contained 50 sheets. How many sheets of paper were in all the pads?

- Ⓐ 1,000 sheets
- Ⓑ 1,200 sheets
- Ⓒ 1,400 sheets
- Ⓓ 1,600 sheets

