

Lesson 12: Double-Digit Multiplication With the Distributive Property

Lesson Objectives

- Students will use the distributive property to solve double-digit multiplication problems to increase fluency.

Instructional Materials

Material	Quantity	Description
How Am I Doing? graph	1 per student	
Colored pencils	1 per student	
Display Masters	1 each	<ul style="list-style-type: none">• Preview: Key Idea: Distributive Property• Demonstrate: 27×5 A–F• Demonstrate: 8×32 A–F• Demonstrate: 58×9 A–C
Handouts	1 per student	<ul style="list-style-type: none">• Cumulative Review• Practice 1• Practice 2• Independent Practice
Answer Keys	1 each	<ul style="list-style-type: none">• Cumulative Review• Practice 1• Practice 2• Independent Practice

Cumulative Review

Have students answer the questions on the Cumulative Review handout. Go over the answers. Correct misconceptions. Have students use a colored pencil to make corrections as needed. Collect student papers to determine who needs additional instruction.

Preview

This lesson will build on students' conceptual knowledge of multiplying by multiples of 10 and using the distributive property.

Display and introduce through a brief explanation the key idea for this lesson:

- When multiplying a 2-digit number by a 1-digit number, break apart the 2-digit number and multiply, using the distributive property.

Use the Key Idea: Distributive Property  display master as needed.

Engage Prior/Informal Knowledge

To open the lesson, present problems and questions to activate students' background knowledge and preskills, such as the following:

- $4(2 + 7) =$
- $6(8 + 5) =$
- $3(9 + 6) =$
- In the problems above, explain how the distributive property works. What does it mean to distribute a number?

Demonstrate

1. Multiply a 2-digit number by a 1-digit number, using the distributive property and an area model.

Say: *Today we will use the distributive property to multiply 2-digit numbers by 1-digit numbers.*

Say: *Consider the problem 27×5 . Using the distributive property is 1 way to find the product of a 2-digit by 1-digit multiplication fact.*

Use the 27×5 A  display master as needed.

Say: *In previous lessons, we learned that the distributive property involves breaking apart 1 factor into an addition problem, so the problem is easier to solve. In this problem, 27×5 , we will break apart 27. 27 can be broken into $20 + 7$.*

Use the 27×5 B  display master as needed.

Say: *To help us solve the new problem, $(20 + 7) \times 5$, we will use an area model to represent the multiplication fact. Along the left side, we write the first factor vertically in expanded form, $20 + 7$. Along the top, we write the other factor, 5.*

Use the 27×5 C  display master as needed. Complete the multiplication with students.

Say: *This area model shows us how the parts of the factors in our problem are related to the parts of the product we will find. We look at the first rectangle. To the left is the factor 20 and at the top is the factor 5. 20×5 is equal to what number? (100) This problem was easier because we have discovered patterns for multiplying by multiples of 10.*

Say: *Next, we look at the bottom rectangle. To the left is the factor 7 and at*

the top is the factor 5. 7×5 is equal to what number? (35)

Use the 27×5 D  display master as needed.

Say: *Now we can calculate our answer. It is in 2 parts, 100 and 35. What operation do we need to perform to get the answer? (addition)*

Use the 27×5 E  display master as needed. Complete the addition with students.

Say: *To get the product of our original problem, we have to find the sum of the 2 products we found in the area model: 100 and 35. What is $100 + 35$? (135)*

Say: *Therefore, 27×5 equals 135. To calculate the product, we used the distributive property to break the problem into simpler problems.*

Use the 27×5 F  display master as needed.

2. Multiply a 1-digit number by a 2-digit number, using the distributive property and an area model.

Say: *Consider the problem 8×32 . Using the distributive property is 1 way to find the product.*

Use 8×32 A  display master as needed.

Say: *In this problem, 8×32 , we will break apart 32. 32 can be broken into $30 + 2$.*

Use the 8×32 B  display master as needed.

Say: *To help us multiply the new problem, $8 \times (30 + 2)$, we will draw an area model. Along the left side, we write the first factor, 8. Along the top, we write the second factor in expanded form, $30 + 2$. This area model shows us how the parts of the factors in our problem are related to the parts of the product we will find.*

Use the 8×32 C  display master as needed.

Say: Let's find the product of the problem in the left rectangle, or the rectangle's area. To the left is the factor 8 and at the top is the factor 30. 8×30 is equal to what number? (240)

Say: Next, we find the area of the right rectangle. To the left is the factor 8 and at the top is the factor 2. 8×2 is equal to what number? (16)

Say: By multiplying the first factor, 8, by both 30 and 2, it has been distributed between the 2 parts of the second factor in the problem, 32.

Use the 8×32 D  display master as needed.

Say: Now we can calculate our answer. The entire model represents the product of 8×32 . We will add the areas of the smaller rectangles, 240 and 16, to find this product.

Use the 8×32 E  display master as needed. Complete the addition with students.

Say: What is the sum of 240 and 16? (256)

Say: Therefore, 8×32 equals 256.

Use the 8×32 F  display master as needed.

3. Multiply a 2-digit number by a 1-digit number, using the distributive property. Do not use an area model.

Say: Let's solve a problem without using an area model. In this problem, 58×9 , we will break apart 58. Using the strategy we just learned, how should we break it apart? ($50 + 8$)

Use the 58×9 A  display master as needed.

Say: We now multiply each part of 58 by 9. 50×9 is equal to what number?

(450) 8×9 is equal to what number? (72)

Use the 58 x 9 B  display master as needed. Complete the addition with students.

Say: Now, we can calculate our answer. $450 + 72$ equals what number? (522)
Because the sum of 50×9 and 8×9 is 522, we know that 58×9 also equals 522.

Use the 58 x 9 C  display master as needed.

Practice

For each practice activity, provide detailed feedback to students, highlighting what was done correctly and what needs improvement. Provide opportunities for students to correct their errors. Collect student work to review and monitor student progress.

Activity 1: Help students complete the activity on the Practice 1 handout.

Activity 2: Have students work in pairs to complete the activity on the Practice 2 handout.

Independent Practice

1. Have students work independently to complete the activity on the Independent Practice handout.
2. Go over the answers (students self-check and correct, using a colored pencil).
3. Have students record the number correct in the box and complete their How Am I Doing? graph.
4. Collect the papers to review and monitor student progress.

Closure

Review the key idea. Have students provide examples from the lesson.

Have students discuss their answer to the following question:

- In the previous lesson, we observed that to solve a problem like 5×300 , we can multiply 5×100 and then multiply the product by 3. Explain why this method works, using the distributive property.

Clear up any misconceptions. Students who do not know when to use the distributive property to solve multiplication problems may benefit from additional instruction.