

You know about multiplying, and you know about fractions; in this chapter, you will learn about multiplying fractions!

In Section 5.1, you will calculate portions of fractions, or “parts of parts.” You will use these ideas to develop strategies for multiplying fractions and mixed numbers.

In Section 5.2, your new knowledge of multiplying fractions will help you understand decimal multiplication. You will also investigate how multiplying by a number close to, much larger than, or much smaller than 1 affects size of the product.

Section 5.3 focuses on the question, “*How can we use what we know about the areas of basic shapes to find the areas of complex shapes?*” As you develop new strategies for finding the areas of shapes, you will be able to solve new problems that involve more complex areas.

Guiding Questions

Think about these questions throughout this chapter:

How can I visualize it?

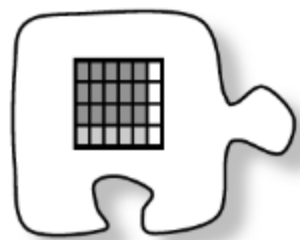
Is there another way to see it?

How can I break it into smaller pieces?

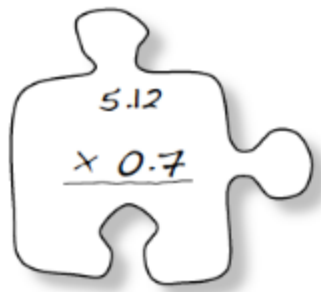
How can I rearrange the shape?

- Learn how to calculate a part of another part.
- Discover how to multiply fractions, mixed numbers, and decimals.
- Find the areas of shapes, including rectangles, triangles, parallelograms, and trapezoids.
- Break a complex shape into smaller pieces to find area.

Chapter Outline



Section 5.1 You will learn how to multiply fractions by examining portions of fractions. Then you will connect this process to finding the products of mixed numbers.



Section 5.2 In the second section, you will extend what you learned in the first section to find products of decimals. This will also help you understand how multiplication by a number greater than or less than 1 affects the product.

5.1.1 How can I describe it?

Representing Fraction Multiplication

In Section 3.1 you learned about multiple representations of portions. Now you will return to the idea of portions as you develop strategies for finding parts of parts.

5-1. MURAL MADNESS

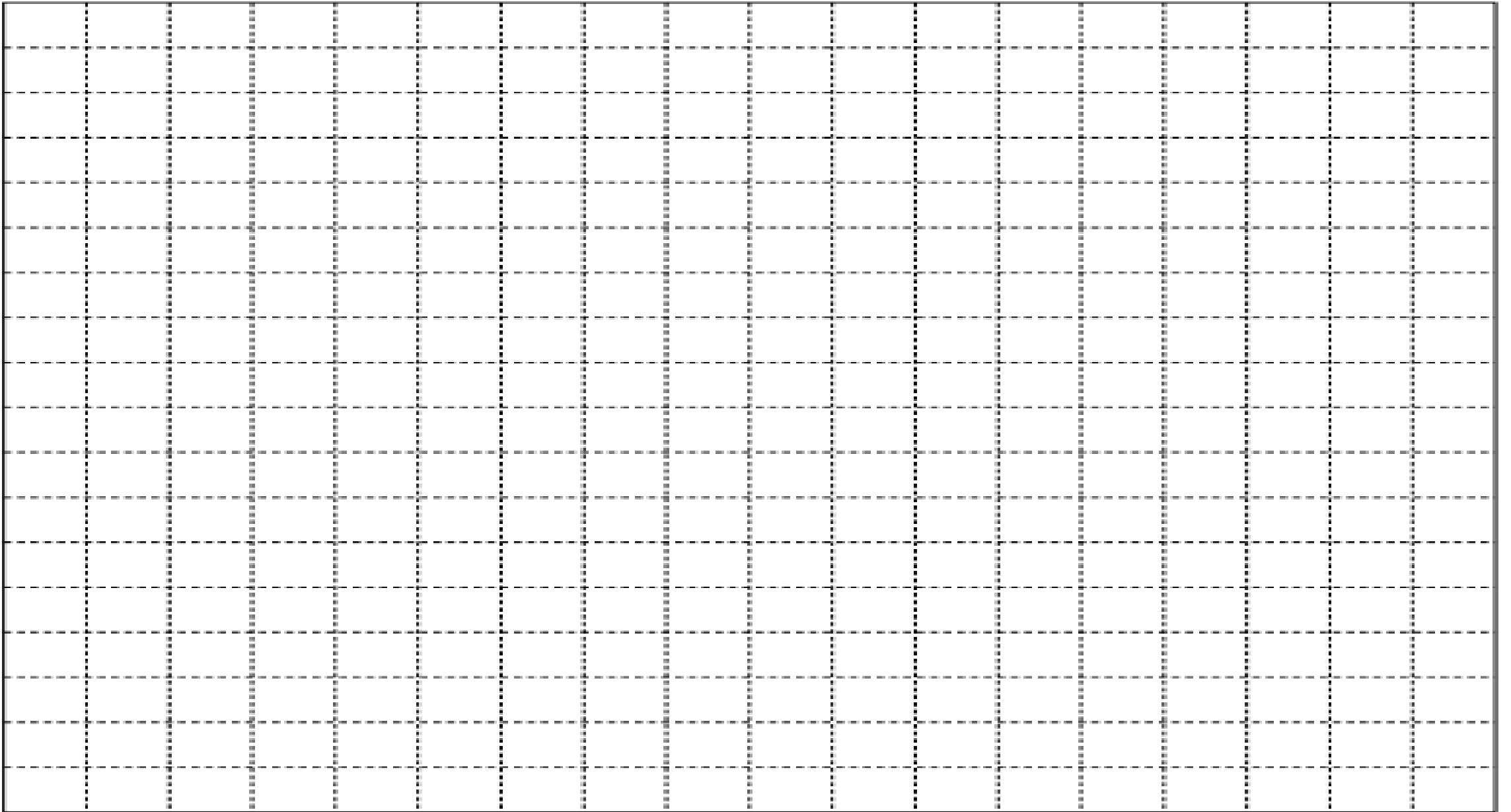
Riley, Morgan, and Reggie were making plans for a mural on the side of their local community center. They needed to clean and seal the wall before painting the mural.

Riley agreed to prepare $\frac{1}{2}$ of the area,

Morgan agreed to clean and seal $\frac{1}{3}$ of the

area, and Reggie agreed to finish the work on the remaining $\frac{1}{6}$ of the area.





A few days later, none of them had completed the whole section each had committed to clean and seal. Riley had completed $\frac{1}{3}$ of his part. Morgan had completed $\frac{5}{6}$ of her part. Reggie had completed $\frac{2}{3}$ of his part.

Your Task: After you get a [Lesson 5.1.1 Resource Page](#), work with your team to decide:

- Who has completed the least of the total mural area? The most?
- Find at least two ways to divide the mural into pieces so you can count how many of these pieces each student has completed.
- Write the fraction of the whole mural that each student has prepared.

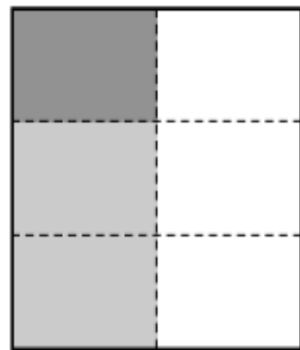
Be prepared to defend your conclusions to the class in as many ways as you can.

Discussion Points

How can we draw a diagram to help us compare the parts?

Does anyone see it in another way?

5-2. Juanne drew a square with side lengths of 1 unit. Then she shaded the diagram at right as she worked on “Mural Madness” (problem 5-1). Her brother Jaymes looked over her shoulder and asked, “*Oh, you’re learning about area?*”



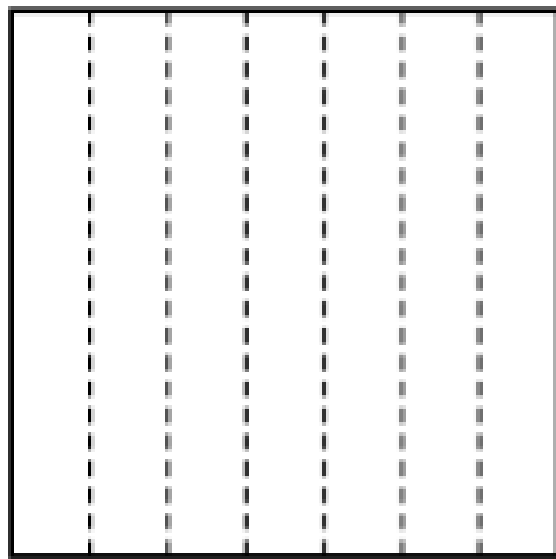
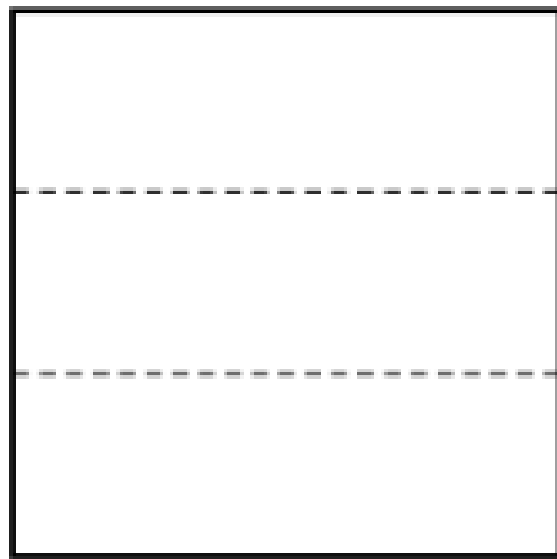
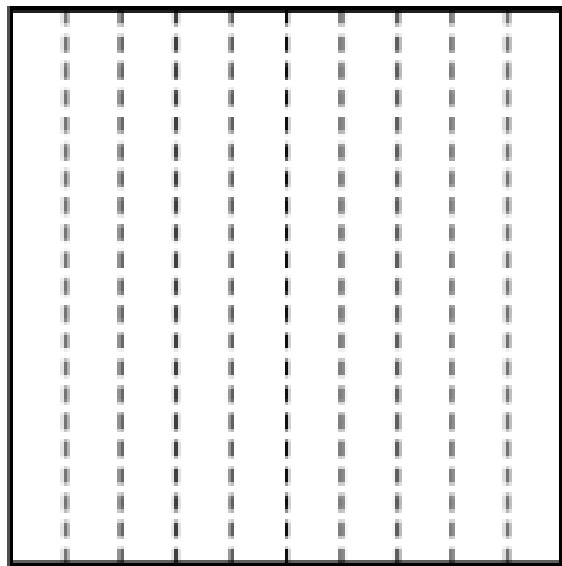
“*Why do you say that?*” Juanne asked.

He answered, “*It looks like you have a small rectangle in the upper left corner with a length of $\frac{1}{3}$ unit and a width of $\frac{1}{2}$ unit, and you have shaded its area.*”

- Is Jaymes correct? Discuss this with your team, and then answer the questions that follow.
- What is the area of the entire diagram? What does the shaded part represent in the original problem?
- What does the darkly shaded portion represent in the diagram? What is the area of the darkly shaded rectangle in Juanne’s diagram?
- Write the area of the darkly shaded rectangle as a product of length and width.


5-3. For each product below, choose the diagram below that might be useful. Copy the diagram on your own paper and complete it to find the product. You may find graph paper helpful.

a. $\frac{3}{4} \cdot \frac{1}{3}$



b. $\frac{1}{5} \cdot \frac{1}{7}$

c. $\frac{1}{3} \cdot \frac{3}{10}$


5-7. Change each fraction greater than one to a mixed number, and change each mixed number to a fraction greater than one. [Homework Help](#) 

a. $4 \frac{4}{5}$

c. $4 \frac{13}{15}$

b. $\frac{17}{7}$

d. $\frac{68}{3}$

5-8. Simplify each of the following expressions. Be sure to simplify each of your answers as much as possible. Write any answers greater than one as mixed numbers. [Homework Help](#) 

a. $\frac{3}{5} + \frac{1}{4}$

c. $5\frac{1}{2} + 4\frac{1}{3}$

b. $\frac{3}{4} - \frac{2}{3}$

d. $\frac{7}{8} \cdot \frac{5}{6}$