Family Guide to CPM CHAPTER 5

In this chapter, you will:

- 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 5 Main Ideas

Section 5.1
Students look at multiplication of fractions, decimals, and mixed numbers. The lessons begin with geometric representations: dividing whole figures into parts, and then further dividing them, calculating "parts of parts" to find the product. Students then generalize this process to develop an algorithm for multiplying fractions.

Section 5.2
Students look at multiplying decimals, making sense of the expected size of a product, and thus the placement of the decimal point.

Section 5.3
Students focus on looking at area, which was introduced in Lesson 1.1.2 with the "Toothpicks and Tiles" investigation. To begin, students are challenged to find the area of a complex shape by rearranging it into a rectangle. Formulas for finding the area of parallelograms, triangles, and trapezoids are developed as students find ways to recompose those shapes into rectangles.

How You Can Help at Home

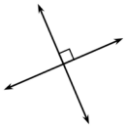
Encourage practicing multiplication problems using fractions and decimals.
Ask your student to consider the following questions:
"How can I visualize this?"
"Is there another way to see it?"
"How can I break it into smaller pieces?"
"How can I rearrange the shape?"

Perseverance during productive struggle is the key to continued success- and not just in math.

Key Words

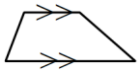
dimensions- The dimensions of a figure that is a flat region or space tell how far that the figure extends in each direction. For example, the dimensions of a rectangle might be 16 cm wide by 7 cm high

perpendicular-Two rays, line segments, or lines that meet (intersect) to form a right angle (90º) are called perpendicular. A line and a flat surface may also be perpendicular if the line does not lie on the flat surface but intersects the surface and forms a right angle with every line on the flat surface passing through the point of intersection. A small square at the point of intersection of two lines or segments indicates that the lines form a right angle and are therefore perpendicular.



quadrilateral- A polygon with four sides. The shape below is a quadrilateral.

trapezoid- A quadrilateral with at least one pair of parallel sides.



Where These Topics Are Revisited

Operations with fractions will return in Chapter 6 and 7 as students learn to divide by fractions and decimals.

The concept of area is integral to the focus on variables represented by algebra tiles in Chapter 6.

Students will apply their strategies for finding area by investigating surface area and volume of three-dimensional shapes in Chapter 9.

What's Coming Up in the Next Chapter

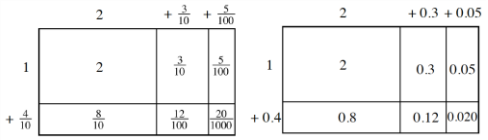
Students will look at Dividing and Building Expressions in Chapter 6.

On the Chapter 5 assessment, students will be expected to show their understanding of the following:
6.RP.3c Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
6.NS.3 Fluently add, subtract, multiply, and ~~*divide*~~ multi-digit decimals using the standard algorithm for each operation.*(Division is not covered until chapters 6 & 7.)*
6.G.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

Sample Problems from the Chapter

Multiplying Decimals

There are at least two ways to multiply decimals. One way is to convert the decimals to fractions and use your knowledge of fraction multiplication to compute the answer. The other way is to use the method that you have used to multiply integers. The examples below show both ways by using generic rectangles. **1.4(2.35)**

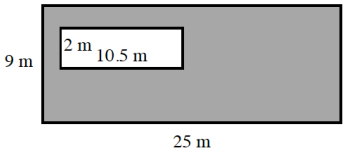


If you carried out the computation as shown above, you can calculate the product in either of the two ways shown below. In the first one, you write down all of the values in the smaller rectangles within the generic rectangle and add the six numbers. In the second example, you combine the values in each row and then add the two rows. You usually write the answer as 3.29 since there are zero thousandths in the product.

2.35	2.35
× 1.4	× 1.4
0.020	0.940
0.12	2.35
0.8	3.29
0.05	
0.3	
2.0	
3.290	

How can rectangles help you find the areas of the irregular shapes below? Talk with your team or partner about what rectangles you see in the shapes and how the areas of those rectangles can help you find the total area of each larger, irregular shape. All angles are right angles.

Find the shaded area.

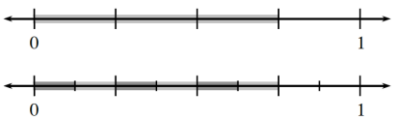


Each of the pairs of diagrams below shows a first and a second step that could be used to represent a multiplication problem.
For each pair, write the corresponding multiplication problem and its solution. Be prepared to share your ideas with the class.

a.

b.

c.



d.

Multiplying Fractions

You can find the product of two fractions, such as $\frac{2}{3}$ and $\frac{3}{4}$, by multiplying the numerators of the fractions together and dividing that by the product of the denominators. So $\frac{2}{3} \cdot \frac{3}{4} = \frac{6}{12}$, which is equivalent to $\frac{1}{2}$.
The reason that this rule works can be seen using an area model of multiplication, as shown at right, which represents $\frac{2}{3} \cdot \frac{3}{4}$. The product of the denominators is the total number of smaller rectangles, while the product of the numerators is the number of the rectangles that are double-shaded.