Family Guide to CPM CHAPTER 4

<u>In this chapter, students will learn how to</u>:

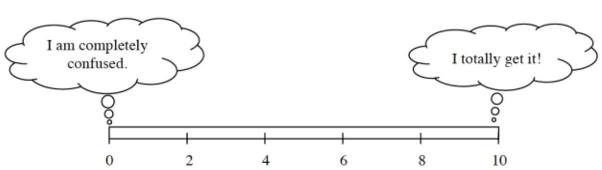
- Use variables to generalize and to represent unknown quantities.
- Write multiple expressions to describe a pattern and recognize whether the expressions are equivalent.
- Find the value of an algebraic expression when the value of the variable is known.
- Enlarge and reduce figures while maintaining their shapes.

Chapter 4 Main Ideas

Section 4.1
Students look at the concept of using a variable to represent an unknown quantity. They work with variables and informal solving techniques. Students investigate a square frame pattern and describe in different ways how the pattern is growing. They generate several equivalent numerical expressions to describe the number of tiles in a particular frame and transition into generating equivalent algebraic expressions.

Section 4.2
Students are introduced to the concepts of scale factor, similarity, and ratios. Ratios are used in several contexts: as the enlargement or reduction of linear measurements, as the relationship between a part and a whole, as the relationship between two parts of a mixture, and as abstract division of numbers.

Encourage your student to critique their own thinking and reflect on their understanding of the skills they are working on. Using a graphic such as the one below allows students to take ownership over their own learning.

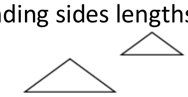


Color or shade in a portion of the bar that represents your level of understanding and comfort with completing that problem on your own.
If students are struggling, have them ask…
"What can I do to better understand this problem?"
"What steps can I take?"
"I wonder how this connects to other problems that I really understand?"

Key Words

expression -An expression is a combination of individual terms separated by plus or minus signs. Numerical expressions combine numbers and operation symbols; algebraic (variable) expressions include variables. For example, 4 + (5 − 3) is a numerical expression. An expression does not have an "equals" sign.

similar figure- Similar figures have the same shape but are not necessarily the same size. For example, the two triangles below are similar. In similar figures, the measures of corresponding angles are equal and the ratio of the corresponding sides lengths are equal.



variable- a variable is a letter used to represent an *unknown* number

vertex- a vertex is the point at which two line segments meet to form a "corner."(plural: vertices)

Ratios can be written in a variety of ways . They are an important skill in 6th grade and prepare students for the rigorous tasks to come in junior high and high school math.

4 : 10

$\frac{4}{10}$

4 to 10

Where These Topics Are Revisited

Operations with variables will be expanded in Chapters 6 and 7.
Ratio concepts are further expanded in Chapters 7, 8, 9.

What's Coming Up in the Next Chapter

Students will look at Multiplying Fractions and Area in Chapter 5.

How You Can Help at Home

Encourage practicing ratios by comparing similar objects and multiplication and division skills.
Ask your students to consider these questions:
"How can I represent it?"
"How can I use a variable?"
"How can I change the size but keep the shape the same?"
"How is it the same or different?"

On the Chapter 4 assessment, students will be expected to show their understanding of the following:

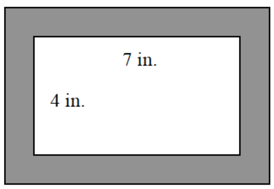
6.RP.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

6.EE.2a Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y*

6.EE.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

Sample Problems from the Chapter

Tina is going to put 1-inch square tiles on the picture frame shown below.



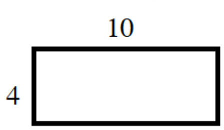
If the frame is one tile wide, how many 1-inch-square tiles will she need?
Would more 1-inch square tiles fit inside the frame or on the frame? Show how you know.

Trei correctly spelled 60% of the words on her last spelling test!

How many words did she spell correctly for each word that she spelled wrong? That is, what is her ratio of correctly to incorrectly spelled words?

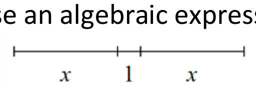
Luis spelled 3 words correctly for every 1 that he spelled incorrectly. Did Luis do better than Trei on the test? What is Luis's score represented as a percent?

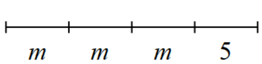
You have discovered that when you enlarge a figure, the ratio of side lengths between the original and the enlargement stay the same. What about the perimeters? What about the areas? When you enlarge a figure, does the ratio of the *perimeters* between the original and the enlargement stay the same, too? What about the ratio of the *areas?* Think about this as you conduct the following investigation.



a. Find the perimeter and area of the rectangle at right.
b. Draw a new rectangle that is an enlargement of the rectangle at right, so that the ratio of the sides of the original rectangle to the new one is 2:3. Label the length and width.
c. Find the perimeter and area of the new, larger rectangle.
d. Write the ratio of the original perimeter to the new perimeter. Then write the ratio of the original area to the new area. Are the ratios the same?

Use an algebraic expression to represent each sequence of lengths shown below.

a. 

b. 

c.