

## KEY CONCEPT OVERVIEW

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In Topic B, students expand their knowledge of proportional relationships by learning how to calculate the **constant of proportionality**. They will identify this value in tables, graphs, and equations. Students will use the constant of proportionality to write equations and solve real-world problems. Finally, students will use their knowledge of proportional relationships to further analyze graphs.

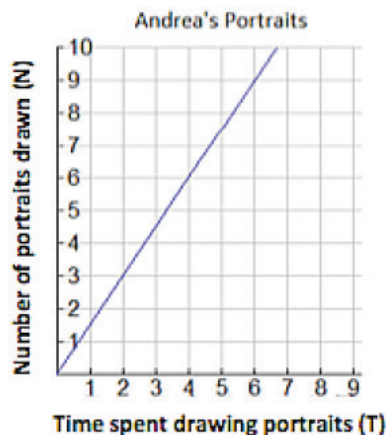
You can expect to see homework that asks your child to do the following:

- Calculate the constant of proportionality and use this value to write equations.
- Use the constant of proportionality, the unit rate, or an equation to answer questions.
- Identify the constant of proportionality on a table or graph, and/or in an equation.
- Given a context, explain the meaning of different points on a graph.

## SAMPLE PROBLEM (From Lesson 8)

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Andrea is a street artist in New Orleans. She draws caricatures (cartoon-like portraits) of tourists. People have their portraits drawn and come back later to pick them up from her. The graph below shows the relationship between the number of portraits she draws and the amount of time in hours she needs to draw the portraits.



- a. Write several ordered pairs from the graph, and explain what each ordered pair means in the context of this graph.

**The ordered pair (4, 6) means that in 4 hours, she can draw 6 portraits.**

**The ordered pair (2, 3) means that in 2 hours, she can draw 3 portraits.**

**The ordered pair (1,  $1\frac{1}{2}$ ) means that in 1 hour, she can draw  $1\frac{1}{2}$  portraits.**

**SAMPLE PROBLEM** *(continued)*

- b. Write several equations that would relate the number of portraits drawn to the time spent drawing the portraits.

*Let  $T$  represent the time in hours, and  $N$  represent the number of portraits drawn.*

$$N = \frac{3}{2}T$$

$$N = \frac{6}{4}T$$

- c. Determine the constant of proportionality, and explain what it means in this situation.

*The constant of proportionality is  $\frac{3}{2}$ , which means that Andrea can draw 3 portraits in 2 hours or can complete  $1\frac{1}{2}$  portraits in 1 hour.*

Additional sample problems with detailed answer steps are found in the *Eureka Math Homework Helpers* books. Learn more at [GreatMinds.org](http://GreatMinds.org).

**HOW YOU CAN HELP AT HOME**

You can help at home in many ways. Here are just a few tips to help you get started:

- Your child can continue to find the unit prices of various items. Encourage your child to also explain the connection between unit rate and constant of proportionality. For example, if the price is three dollars per pound, the unit rate is three. Therefore, the constant of proportionality is also three because  $3 \times (\text{number of pounds}) = \text{price}$ .
- Write an equation in the form of  $y = kx$ , where you replace  $k$  with any whole number; for example,  $y = 7x$ . Ask your child to create a table that represents a proportional relationship in which the constant of proportionality is smaller than the one in your equation. For example, if your equation was  $y = 7x$ , the constant of proportionality on the table could be any number smaller than seven. Then have your child create a graph that represents a proportional relationship in which the constant of proportionality is larger than the one in the equation; i.e., any number larger than 7.
- In preparation for Topic C, encourage your child to practice dividing fractions, using the standard

algorithm. For example:  $1\frac{2}{3} \div \frac{3}{4} = \frac{5}{3} \div \frac{3}{4} = \frac{5}{3} \times \frac{4}{3} = \frac{20}{9} = 2\frac{2}{9}$  and  $\frac{\frac{3}{5}}{\frac{1}{6}} = \frac{3}{5} \div \frac{1}{6} = \frac{3}{5} \times \frac{6}{1} = \frac{18}{5} = 3\frac{3}{5}$ .

There are many online practice sites. Please ask your child's teacher for links.

**TERMS**

**Constant of proportionality:** When two quantities (such as weight and price) are proportional, you always multiply the first quantity (weight) by the same number to get the second quantity (price). This number is called the constant of proportionality.