### GRADE 8 | MC MATH<sup>T</sup>TIPS FOR PARENTS

### **KEY CONCEPT OVERVIEW**

Topic C extends students' work with constant rate as it applies to the **slope** of a line. Students determine the slope by using any two points from the graph of a line. Students then apply the slope of the line to the **slope**-**intercept form** to find the equation of that line. For example, if the slope is 3, the slope-intercept form of the line could be y = 3x + 8. Last, students compare various proportional relationships represented in graphs, tables, equations, and descriptions.

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

- Determine whether the slope of a line is positive or negative, and then find the exact value of the slope or *y*-**intercept point**. The data used may be given in graphs, tables, equations, or descriptions.
- Confirm that the slope of a line stays the same when using two different points on the line to determine the slope.
- Using the properties of equality, transform an equation from **standard form** to slope-intercept form and vice versa.
- Given points on a line—or the graph, table, equation, or description of the line—determine one or more of the other representations (i.e., points, graph, table, equation, or description) of the line.
- Determine whether two equations result in the same line when graphed.
- Find and graph various solutions to an equation.

### **SAMPLE PROBLEMS** (From Lesson 22) \_

A faucet leaks at a constant rate of 7 gallons per hour. Suppose *y* gallons leak in *x* hours. Express the situation as a linear equation in two variables.

## $\frac{y}{x} = 7 \quad or \ y = 7x$

Another faucet leaks at a constant rate, and the table below shows the number of gallons, *y*, that leak in *x* hours.

Number of Hours	Number of Gallons
( <b>x</b> )	<b>(y</b> )
2	13
4	26
7	45.5
10	65

Determine the rate at which the second faucet leaks.

## Let m represent the rate at which this faucet leaks in gallons per hour.

$$m = \frac{(26-13)}{(4-2)}$$
  

$$m = \frac{13}{2}$$
  

$$m = 6.5$$
  
The second faucet leaks at a rate of 6.5 gallons per hour.

Which faucet has the worse leak? That is, which

faucet leaks more water over a given time interval?

# The first faucet has the worse leak because the rate is greater: 7 gallons per hour compared to 6.5 gallons per hour.

Additional sample problems with detailed answer steps are found in the Eureka Math Homework Helpers books. Learn more at Great Minds.org.

#### HOW YOU CAN HELP AT HOME

You can help at home in many ways. Here are some tips to help you get started.

- Give your child proportional relationships in different forms (e.g., an equation such as  $y = \frac{5}{2}x 6$  and a description such as "Mary types at a rate of  $3\frac{1}{3}$  words per minute."). Challenge him to determine which situation has the greater rate. (Mary has a greater rate.) Equations and constant rate descriptions like these can be found in many of the lessons in this topic.
- Use class examples to find the slope of a situation presented in different forms. Give your child two points, a table of points, a graph, an equation, or a description of a situation, and ask her to find the slope of the line that represents the situation.
- Write a two-variable equation, and ask your child to transform the equation such that it says "y =" or "p =" or that one of the variables equals the rest. You can find these examples in the lessons, or you can make up equations yourself. For example, 2x + 3y = -6 would transform to  $y = -\frac{2}{3}x 2$  when rewriting the equation in slope-intercept form, or "y =".

#### TERMS

**Intercept point:** The point (0, *b*) at which a line intersects the *y*-axis where *b* is the *y*-value of the *y*-intercept point. There is also an *x*-intercept point, (*x*, 0), where the line intersects the *x*-axis.

**Slope:** A number that describes the steepness or slant of a line. The unit rate (e.g., number of miles per hour) or rate of change (how one quantity changes in relation to another) is often interpreted as the slope of a graph. Lines that go up from left to right have a positive slope, and lines that go down from left to right have a negative slope. The slope, *m*, of a line can be found using the following equation:

 $m = \frac{\text{difference in } y \text{-values}}{\text{difference in } x \text{-values}} = \frac{p_2 - r_2}{p_1 - r_1} = \frac{y_2 - y_1}{x_2 - x_1}.$ 

**Slope-intercept form of a linear equation:** A linear equation written as y = mx + b, where *m* represents the slope of the line and *b* represents the *y*-value of the *y*-intercept point.

**Standard form of a linear equation:** The standard form of a linear equation is written as ax + by = c (e.g., 2x + 3y = 17).



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