

Lesson 5 Solving Two-Step Inequalities

Answer Key page 87

Objective

To solve a two-step inequality

Materials

• Showtime! Math Student Book page 104

Look at the inequality $\frac{c}{5} + 9 > -1$. To solve, first subtract 9 from each side of the inequality. What is $\frac{c}{5}$ plus 9 minus 9? ($\frac{c}{5}$) What is -1 minus 9? (-10) What number should each side be multiplied by? (5) Does the direction of the inequality symbol change? (no) Why not? (Each side is multiplied by a positive number.) What is 5 times $\frac{c}{5}$? (c) What is -10 times 5? (-50) What is the solution of the inequality? ($c > -50$)

Look at the inequality $-4y - 6 \geq 6$. To solve, first add 6 to each side of the inequality. What is $-4y$ minus 6 plus 6? ($-4y$) What 6 plus 6? (12) What number should each side be divided by? (-4) Does the direction of the inequality symbol change? (yes) Why? (Each side is divided by a negative number.) What is $-4y$ divided by -4 ? (y) What is 12 divided by -4 ? (-3) What is the solution to the inequality? ($y \leq -3$)

Lesson 1 Graphing Linear Equations

Answer Key page 88

Objective

To graph a linear equation

Materials

• Showtime! Math Student Book page 105

To complete the input-output table, first find the x -intercept. What value of x makes $x - 3$ equal to 0? (3) What is the ordered pair? ((3, 0)) Now find the y -intercept. When x is 0, what value is y ? (-3) What is the ordered pair? ((0, -3)) Any number can be chosen for the x -value in an input-output table. It is easier to graph integers rather than fractions or decimals, so choose x -values that

will ensure the y -values are integers. If 1 is used as the x -value, what is the ordered pair? ((1, -2))

What should be done next? (Graph the points for the ordered pairs.) Draw a line through the three points on the graph.

What is the graph of the equation? (a straight line) Because the graph is a straight line, the rule $y = x - 3$ is a linear equation.

Lesson 2 Slope of a Line

Answer Key page 88

Objective

To find the slope of a line

Materials

• Showtime! Math Student Book page 106

The slope of a line describes the steepness of the line. If a line rises from left to right, the slope is positive. If a line falls from left to right, the slope is negative. If a line is flat, then the slope of the line is 0. To find the slope of a line, first identify any two points on the line. Start with points *A* and *B*. What is the ordered pair for *A*? $(-4, 6)$ What is the ordered pair for *B*? $(2, 3)$ The next step is to find the rise. The rise is the vertical change between the two points. Use point *A* as the starting point. Do you go up or down to get to

point *B*? (down) How many do you go down? (3) So, the rise from point *A* to point *B* is -3 . Now find the run. The run is the horizontal change between the two points. Do you go to the left or to the right? (right) How many? (6) So, the run from point *A* to point *B* is 6. Now write the ratio of the rise to the run. What is the slope of the line? $(\frac{-3}{6})$ What is this written in simplest form? $(\frac{-1}{2})$

Now find the slope using points *B* and *C*. What is the ordered pair for *B*? $(2, 3)$ What is the ordered pair for *C*? $(4, 2)$ What is the rise from point *B* to point *C*? (-1) What is the run from point *B* to point *C*? (2) What is the slope of the line written in simplest form? $(\frac{-1}{2})$ Notice that the slope is the same no matter which two points on the line you use. Is the slope of this line positive, negative, or zero? (negative) How does the graph show that the slope is negative? (The line falls from left to right.)

Lesson 3 Linear Equations in Slope-Intercept Form

Answer Key page 88

Objective

To write a linear equation in slope-intercept form

Materials

• Showtime! Math Student Book page 107

What is a linear equation? (an algebraic equation which when graphed forms a straight line) **What is slope?** (the steepness of a line) **What is the y-intercept of a graph?** (the point at which the graph crosses the y-axis) **The slope-intercept form of the equation of a line is an equation of the form $y = mx + b$, where m is the slope of the line and b is the y-intercept.**

To write the equation of a line in slope-intercept form, first find the slope of the line. Look at the graph of the line. What two points are graphed? $((0, -5)$ and $(3, 1))$ Let (x_1, y_1) represent $(0, -5)$ and let (x_2, y_2) represent $(3, 1)$. Remember that the slope is the ratio of the rise to the run. Find the rise, or change in *y*, first. What is 1 minus -5 ? (6) Now find the run, or change in *x*. What is 3 minus 0? (3) What is the slope, m ? $(\frac{6}{3})$ What is the slope written in simplest form? (2)

At what *y*-value does the line cross the *y*-axis? (-5) What is the *y*-intercept, b ? (-5) Finally, substitute the values for m and b in the formula $y = mx + b$. What is the equation of the line? $(y = 2x + -5)$

Lesson 4

Open-Ended Response

Answer Key page 88 and 89

Objective

To practice an open-ended response item

Materials

• Showtime! Math Student Book pages 108 and 109

Part 1: Organize your solution: What do I know?

The first part of answering an open-ended question is to organize your solution. Read the problem. Find the given information from the problem. What number must the slope of a wheelchair ramp be less than or equal to? ($\frac{1}{12}$) What is the height of Leena's ramp? (4 feet) What is the length of the ramp? (20 feet)

What am I trying to find? Read the problem again. What does the problem ask for? (whether the slope of the ramp will be acceptable)

What steps should I use to solve the problem? Now that you have found all the given information, you can break down the problem into steps to find whether the slope of the ramp will be acceptable.

Direct students' attention to the table. **When solving a problem, you can use a table like this one to organize your work. Each row represents a step you take to solve the problem.** Direct students' attention to the first row. **Write the letter A in the first box in the first row. What is Step A?** (Write the formula for slope.) **What is the formula for slope?** ($\text{slope} = \frac{\text{rise}}{\text{run}}$) **Does the sentence in the Explain column confirm your work in the Solve column?** (yes)

Direct students' attention to the second row. **Write the letter B in the box in the second row. What is Step B?** (Identify the rise and run of the ramp.) **What is the rise?** (4 feet) **What is the run?** (20 feet)

Direct students' attention to the third row. **Write the letter C in the first box in the third row. What is Step C?** (Find the slope of the ramp.) **What is the ratio of the rise to the run written as a fraction?** ($\frac{4}{20}$) **What is the slope of the ramp written as a fraction in simplest form?** ($\frac{1}{5}$)

Direct students' attention to the fourth row. **Write the letter D in the first box in the fourth row. What is Step D?** (Compare the slope of the ramp with the greatest allowed slope.) **What is the greatest allowed slope?** ($\frac{1}{12}$) **Is $\frac{1}{5}$ greater than or less than $\frac{1}{12}$?** (greater than)

Answer the question. Answer the original question using a complete sentence. If she builds a ramp that is 20 feet long, will the ramp have an acceptable slope? (Leena's ramp will not have an acceptable slope.)

How can I show that my results are reasonable? To check for reasonableness, write the slope of the ramp and the greatest allowed slope with the same denominator. Then compare the fractions. Write the fractions using the least common denominator, 60. What is $\frac{1}{5}$ written as a fraction with a denominator of 60? ($\frac{12}{60}$) What is $\frac{1}{12}$ written as a fraction with a denominator of 60? ($\frac{5}{60}$) How does $\frac{12}{60}$ compare with $\frac{5}{60}$? ($\frac{12}{60}$ is greater than $\frac{5}{60}$.) **Is the slope of Leena's ramp greater than the greatest allowed slope?** (yes)

Part 2: Show or explain your work. Now that you are organized, the next part is to show or explain your work. Write your response to the open-ended question using math vocabulary words that describe how you got your answer.

First, answer the original question using a complete sentence. If she builds a ramp that is 20 feet long, will the ramp have an acceptable slope? (Leena's ramp will not have an acceptable

Lesson 4 (cont.) Open-Ended Response

Answer Key pages 88 and 89

slope.) **Next, describe in words how you solved the problem. To write these steps in words, use your answers from the table and finish the statement, "To solve the problem, I first" Be sure to use complete sentences. Next, use complete sentences to describe how you checked the results for reasonableness. To do this, complete the sentence, "To check my results, I"**

Part 3: Review your response. Finally, review the written response by reading through the questions in Part 3. After you have read the questions and followed the instructions, you should have a check mark; the letters *A, B, C, D,* and *R*; and underlined vocabulary words in your response.

Lesson 5 Open-Ended Response Practice

Answer Key page 89

Objective

To practice an open-ended response item

Materials

• Showtime! Math Student Book pages 110–112

As you work on Lesson 5, Part B, remember to use your work from the table to write an organized and complete explanation. The first sentence of your explanation should include the answer, followed by the steps you took to find the answer. At the end of your explanation, make sure you also explain why your answer is reasonable.