Math 8 Unit 5 worksheet: Graphing a line from its equation

Name _____ Date _____ Period _____

1. Each line is drawn by starting at its y-intercept and stepping by the slope, with the denominator of the slope as the run. Find the point you land on after the steps given, then check it by substitution.

(a) $y = 3x + 1$; 4 steps to the right

(b) $y = \frac{2}{3}x - 1$; 3 steps to the right

(c) $y = -\frac{5}{2}x + 4$; 2 steps to the left

(d) $y = -0.6x + 2$; 2 steps to the right

(e) $y = \frac{7}{4}x$; 3 steps to the left

2. A rectangle has corners (−3, −1), (5, −1), (5, 4) and (−3, 4).

(a) Write an equation for the line through each of its four sides.

(b) Give the slope of each of the four lines, or say that it has none.

(c) Which of the four lines can be written in the form $y = mx + b$?

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3. Answer these questions about the line $y = -\frac{3}{4}x + 6$ from its equation, by stepping on a grid.

(a) Where does the line cross the y-axis, and does it rise or fall from left to right?

(b) Step by the slope from the y-intercept until you reach the x-axis. How many steps does that take, and where does the line cross the x-axis?

(c) The axes split the grid into four quadrants. Which quadrant does the line never pass through? Explain using your answers to (a) and (b).

4. Mei draws a line by starting at (0, −4) and repeating the step "3 left and 2 down".

(a) Which point does she reach after three steps?

(b) Write the equation of her line in slope-intercept form, and check your point from (a) in it.

(c) Lucas also starts at (0, −4) but repeats the step "3 right and 2 up". Kofi starts at (0, −4) and repeats "2 right and 3 up". Which of them draws Mei's line? Explain.

5. Noah wants to graph $2(y - x) = 3x + 8$. He rewrites it as $y = 5x + 4$, plots (0, 4), steps 1 right and 5 up to (1, 9), and checks: 5(1) + 4 = 9. So he is sure his graph is right.

(a) Check the point (1, 9) in the original equation instead. What does this show?

(b) Find Noah's mistake. Rewrite the equation correctly, then give the y-intercept and two points found by stepping. Check one of them in the original equation.

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6. Look at the line $y = \frac{3}{5}x + \frac{2}{5}$.

(a) Explain why the y-intercept is a poor point to start stepping from.

(b) Find the one point on the line whose coordinates are whole numbers and whose x-coordinate is from 1 to 5.

(c) From that point, step by the slope once to the right and once to the left. Check one of the stepped points by substitution.

7. A research submarine is 72 meters below the surface of the sea and rises at a steady 6 meters per minute. Its height above the surface after t minutes is $h = 6t - 72$ meters, where a negative height means below the surface.

(a) Where does the graph cross the h-axis, and where does it cross the t-axis? Say what the second crossing means.

(b) After how many minutes is the submarine 30 meters below the surface?

(c) Hannah draws the graph with each square across standing for 3 minutes and each square up standing for 36 meters. Going along the line from the h-intercept to the t-axis, how many squares right and how many squares up does it move?

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