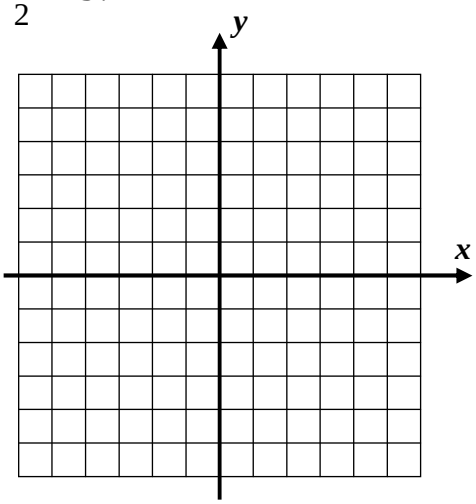
Name: _____ Date: _____

Writing Equations of Lines
Algebra 1

It is important to be able to move between the graphical and algebraic forms of a line. The following exercise begins this process.

***Exercise* #1:** Consider the linear function given by the equation $y = \frac{3}{2}x - 3$.

(a) Using your calculator to generate an *xy*-chart, plot the function on the grid at the right.



(b) Determine the slope of this line graphically.

(c) Determine the *y*-intercept of this line graphically.

THE SLOPE-INTERCEPT FORM OF A LINE

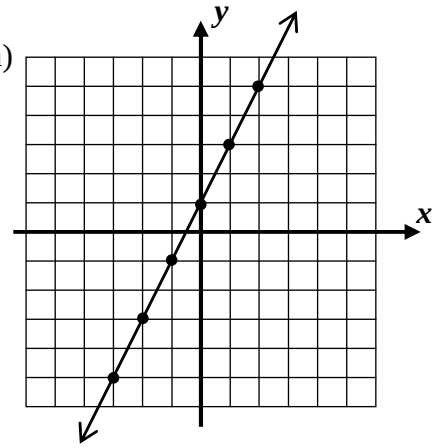
$$y = mx + b$$

$m = \text{slope}$ and $b = \text{the } y\text{-intercept}$

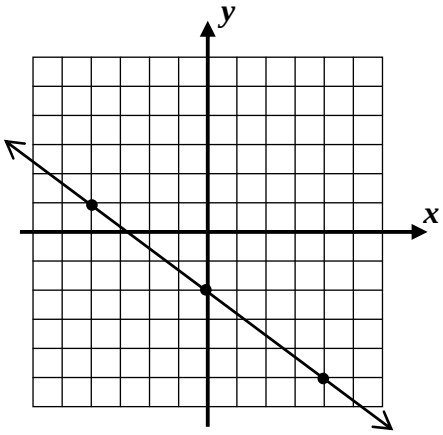
A good way to think about the *y*-intercept, ***b***, is that it is where a line ***b***egins on the *y*-axis. A good way to think about the slope, ***m***, is it gives the ***m***ovement of the line.

***Exercise* #2:** Write the equation, in $y = mx + b$ form, for each line shown below.

(a)



(b)



Equation: _____ Equation: _____

Writing Equations of Lines – We want to develop the skill of writing equations of lines, in $y = mx + b$ form, using a variety of information. In each of these problems, though, the end-goal is the same, to determine the value for the slope and the value of the *y*-intercept.

***Exercise* #3:** Write the equation of a line in $y = mx + b$ form that is parallel to the line $y = 2x + 4$ and has a *y*-intercept of -8.

***Exercise* #4:** Write the equation of the line passing through the point (1, 8) with a slope of 3.

***Exercise* #5:** Consider a line that passes through the points (4, 10) and (6, 11).

(a) Find the line's slope.

(b) Find the line's *y*-intercept algebraically.

(c) Write the equation for the line in $y = mx + b$ form.

(d) Using a table on your graphing calculator, verify that the two points given fall on this line.

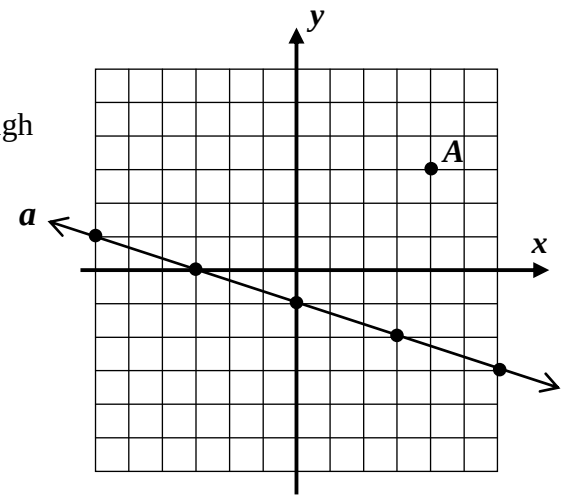
(e) Using your calculator table, determine the *y*-coordinate of this line when $x = 24$.

(f) Using your calculator table, determine the *x*-coordinate on the line when $y = 30$.

Exercise* #6:** Line ***a is shown on the grid below.

(a) On the same set of axes, sketch the line that passes through point *A*(4, 3) and is parallel to line ***a***.

(b) Write the equation of the line that you just drew.



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Writing Equations of Lines
Algebra 1 Homework

Skills

1. Write the equation of the line, in $y = mx + b$ form, for each set of information given.

(a) a slope of $\frac{2}{3}$ and a *y*-intercept of 9

(b) a slope of $-\frac{1}{2}$ and a *y*-intercept of 0

(c) a slope of 6 and a *y*-intercept of 3

(d) a slope of 0 and a *y*-intercept of 2

2. Which of the following lines is parallel to a line whose equation is $2y = 3x + 10$? Hint – Arrange this line in its $y = mx + b$ form first.

(1) $y = 2x + 5$

(2) $y = 3x + 2$

(3) $y = \frac{3}{2}x - 7$

(4) $y = \frac{2}{3}x - 6$

_____

3. Which of the following lines has a slope of 5 and a *y*-intercept of -3?

(1) $y = 5x - 3$

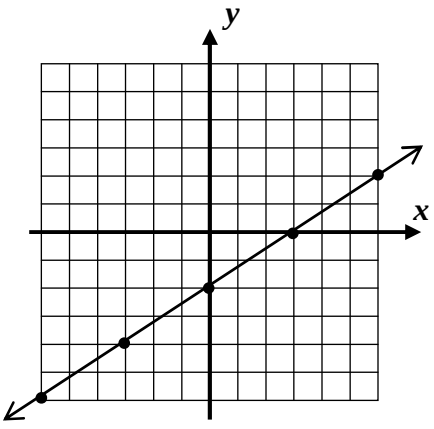
(2) $y = \frac{5}{3}x$

(3) $y = -3x + 5$

(4) $y = 3x - 5$

_____

4. Which of the following is the equation for the graph shown at the right?



(1) $y = \frac{2}{3}x + 2$

(2) $y = x - 2$

(3) $y = -\frac{3}{2}x - 2$

(4) $y = \frac{2}{3}x - 2$

5. Which of the following is the *y*-intercept of the line whose slope is 4 and which passes through the point $(8, 15)$?

(1) 15

(2) –17

(3) 8

(4) 3

_____

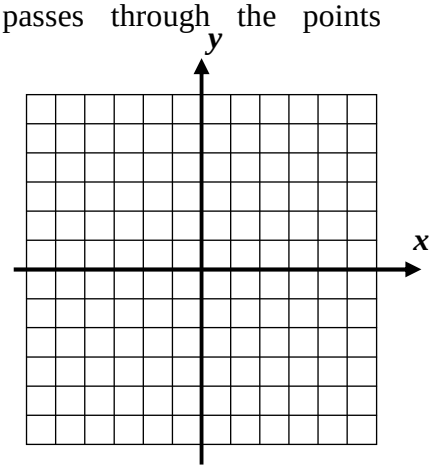
6. Which of the following lines is parallel to the line $y = -3x + 4$ and has a *y*-intercept of 10?

(1) $y = 4x + 10$ (3) $y = -3x + 10$

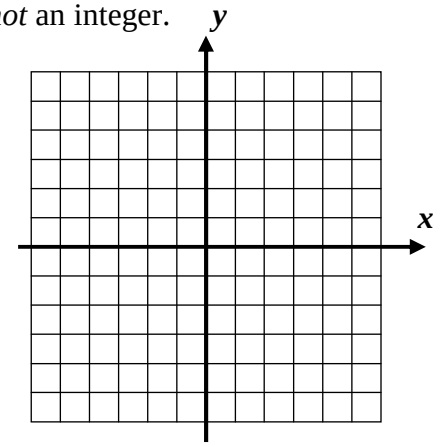
(2) $y = -3x - 10$ (4) $y = 4x + 4$

_____

7. Write the equation of the line, in $y = mx + b$ form, that passes through the points $(-4, -3)$ and $(2, 6)$. The use of the grid is optional.



8. Write the equation of the line, in $y = mx + b$ form, that passes through the points $(-1, 4)$ and $(3, 2)$. The use of the grid is optional. Beware, the *y*-intercept of this line is *not* an integer.



9. Write the equations of the lines that are parallel to the line $2y = 4x + 6$ and pass through the following points.

(a) $(0, 7)$ (b) $(5, 6)$