Name: _____ Date: _____

WRITING EQUATIONS OF LINES IN SLOPE-INTERCEPT FORM
COMMON CORE ALGEBRA I

One skill that we need to become **fluent** at in Algebra I is creating the equation of a linear function. We will concentrate on learning how to form equations in the **slope-intercept form** that we have been working with.

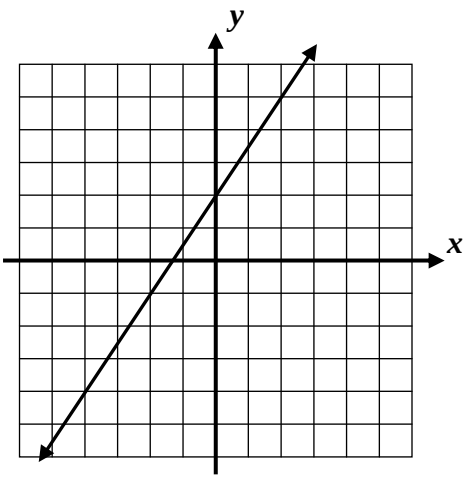
THE SLOPE-INTERCEPT FORM OF A LINEAR FUNCTION

Given a linear function, $f(x)$, it can be expressed in equation form by:

$$f(x) = y = mx + b$$

where the two **parameters** are m = average rate of change = slope = $\frac{\Delta y}{\Delta x}$ and $b = y$-intercept of the line

***Exercise* #1:** Consider the linear function whose graph is shown below.

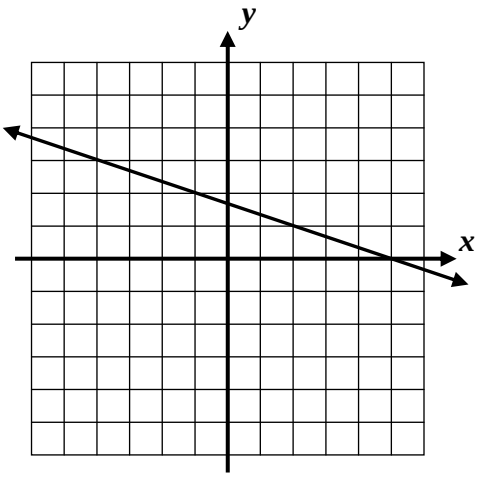


(a) Determine an equation in the form $y = mx + b$ for this line.

(b) Test your equation for the value $x = 2$.

When the *y*-intercept is an **integer**, such as in the last exercise, it is fairly easy to get the **exact relationship** between *x* and *y*. Let's try another graphical problem where the *y*-intercept is not an **integer.**

***Exercise* #2:** Find the equation of the linear function shown in slope-intercept form. Test your equation for $x = -4$.



We need to also be able to find the equation for a linear function if we know two points that lie on it. Notice that this means we have to determine the value of the **two parameters** with two pieces of information.

***Exercise* #3:** Find the equation of the line that passes through each of the following pairs of points in $y = mx + b$ form.

(a) $(2, 5)$ and $(5, 17)$

(b) $(-2, 5)$ and $(2, 3)$

(c) $(-1, 11)$ and $(4, -4)$

(d) $(3, 4)$ and $(12, 19)$

***Exercise* #4:** A car is traveling along a straight road. After one hour, the car is 72 miles from Chicago. After three hours, the car is 188 miles from Chicago. Determine an equation for the distance, *d*, the car is from Chicago after *h*-hours if the relationship between *d* and *h* is linear.

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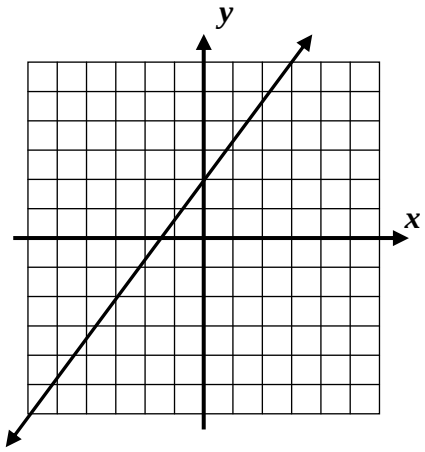
WRITING EQUATIONS IN SLOPE-INTERCEPT FORM
COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

1. Each of the following lines has a slope and *y*-intercept that can be determined by examining the graph. For each, state the slope, the *y*-intercept, and then write the equation in $y = mx + b$ form (slope-intercept form).

(a)

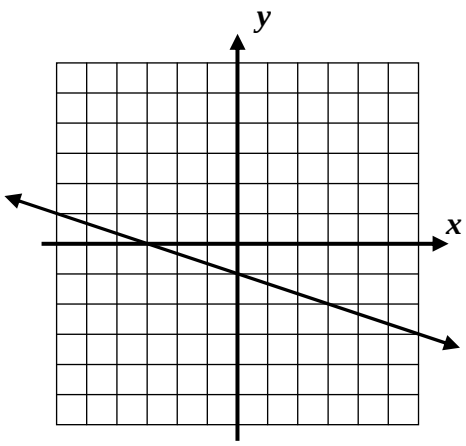


Slope: _____

y-intercept: _____

Equation: _____

(b)



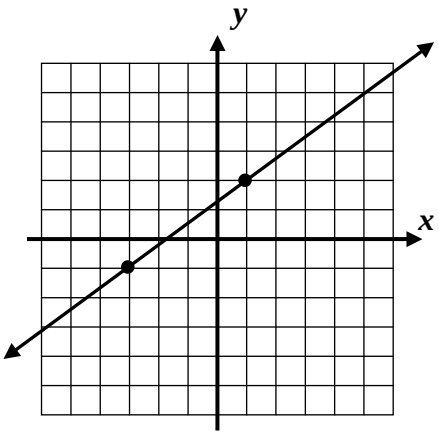
Slope: _____

y-intercept: _____

Equation: _____

2. Each of the following lines has a slope that can be determined by examining the graph. Use another point on the line to solve for the exact *y*-intercept. Then, state the equation of the line.

(a)

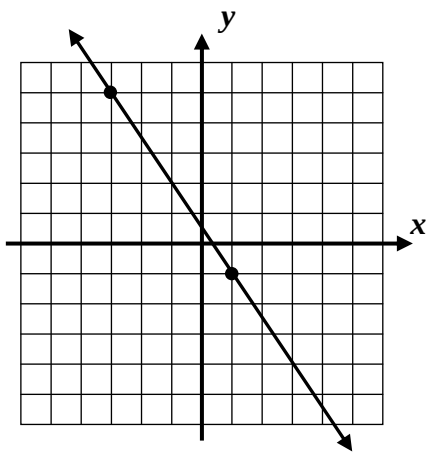


Slope: _____

Solve for *y*-intercept:

Equation: _____

(b)



Slope: _____

Solve for the *y*-intercept:

Equation: _____

3. Find the equation of the line that passes through each of the following pairs of points in $y = mx + b$ form.

(a) $(1, 7)$ and $(4, 22)$

(b) $(-2, 13)$ and $(2, 3)$

(c) $(4, 6)$ and $(10, 0)$

(d) $(0, -10)$ and $(16, 2)$

APPLICATIONS

4. A steady snow fall is coming down outside. Prestel decides to measure the depth of the snow on the ground. After 4 hours, the snow is at a depth of 9 inches an after 8 hours it is at a depth of 14 inches.

(a) Express the information given in this problem as two coordinate pairs, (h, d), where h is the number of hours and d is the depth of snow.

(b) Find the slope of the line that passes through these two points. What are its units?

(c) Find the equation of the line that passes through the two points in $d = mh + b$ form.

(d) What was the depth when the snowfall began ($h = 0$)? What would the depth be after 12 hours?