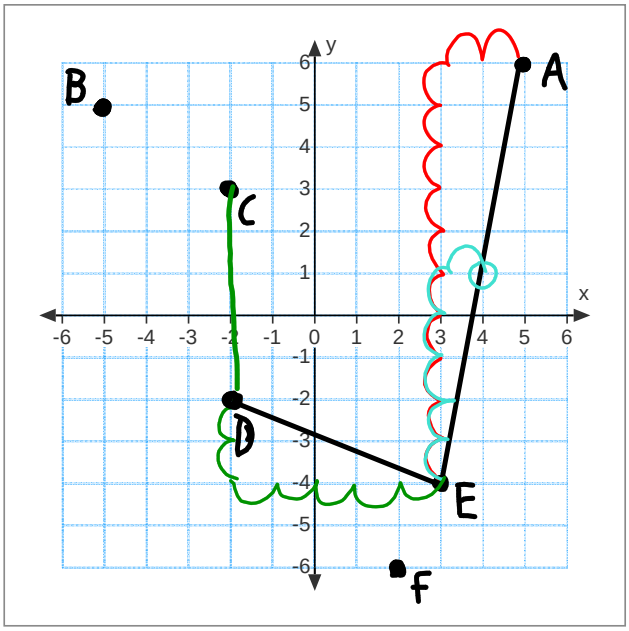


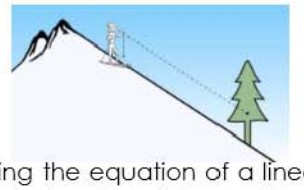
A: (5,6)
B: (-5,5)
C: (-2,3)
D: (-2,-2)
E: (3,-4)
F: (2,-6)

$\frac{\text{rise}}{\text{run}} = \frac{10}{2} = 5$

$\frac{\text{rise}}{\text{run}} = \frac{2}{-5}$

$\frac{2}{-5} \quad \frac{-2}{5}$

$-\frac{2}{5}$



Name: _____

Writing Equations of Lines in Slope-Intercept Form

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.

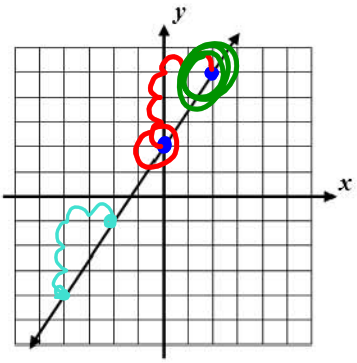
The Slope-Intercept Form of a Linear Function

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

$y = mx + b$

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.

$y = \frac{3}{2}x + 2$

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

(2, 5)

$y = \frac{3}{2}x + 2$

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

$y = 3 + 2$

$y = 5$

When you encounter a line, always know that it has a direct association to a linear equation.

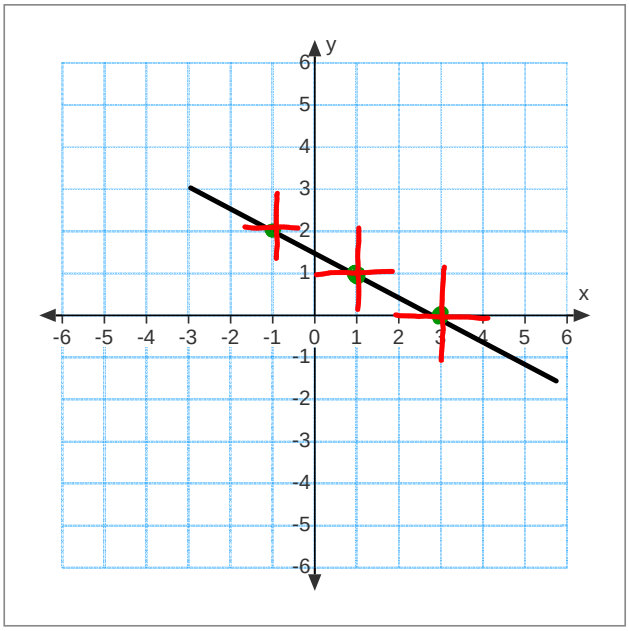
There are 3 aspects of a linear equation (in slope intercept form) that are CRUCIAL!

$y = mx + b$

S lope

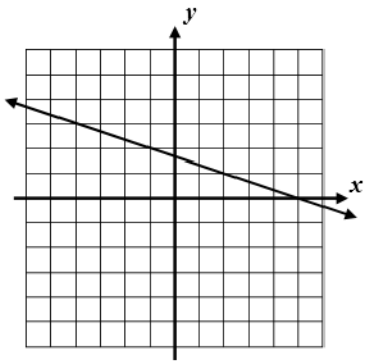
Y - Intercept

C oordinate (x, y)


y
x
6
5
4
3
2
1
-1
-2
-3
-4
-5
-6
-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

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 $(5, 17)$

$y = 4x - 3$

$y = mx + b$

$m = \frac{\Delta y}{\Delta x} = \frac{17-5}{5-2} = \frac{12}{3} = 4$

$y = 4x + b$

$5 = 4(2) + b$

$5 = 8 + b$

$-8 \quad -8$

$-3 = b$

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

(1) Find slope (m)

$\frac{\Delta y}{\Delta x} = \frac{5-3}{-2-2} = \frac{2}{-4} = -\frac{1}{2}$

(2) Solve for b

$y = mx + b$

$3 = -\frac{1}{2}(2) + b$

$3 = -1 + b$

$+1 \quad +1$

$4 = b$

$y = -\frac{1}{2}x + 4$

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

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

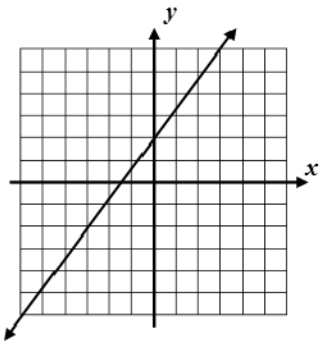
Name: _____

Writing Equations in Slope-Intercept Form
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)

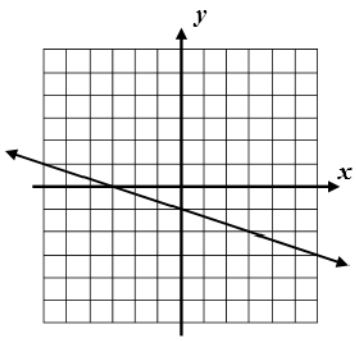


Slope: _____

y-intercept: _____

Equation: _____

(b)



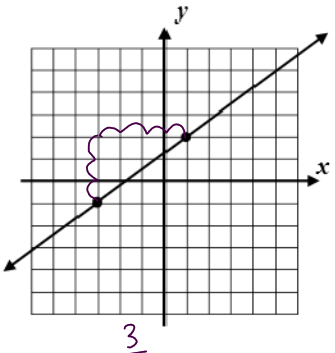
Slope: _____

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)



x y
(1, 2)

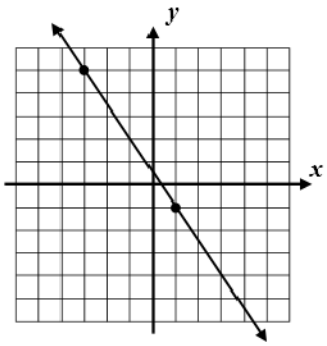
Slope: $\frac{3}{4}$

Solve for y-intercept:

$y = mx + b$
$y = \frac{3}{4}x + b$
$2 = \frac{3}{4}(1) + b$

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 $(2, 3)$

$3 - 4 = -1$

$Y = C_2$

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

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