6.1a Equation of a Line in Slope y-Intercept Form

Example 1: Complete the following chart

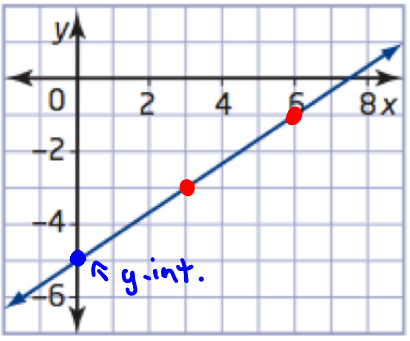
$y = mx + b$ (slope, y-int.)

Equation	Slope	y-intercept
$y = -2x - 5$	$m = -2$	$b = -5$
$y = x + 2$	$m = 1$	$b = 2$
$y = \frac{2}{5}x + 8$	$m = \frac{2}{5}$	$b = 8$
$y = -\frac{1}{2}x$	$m = -\frac{1}{2}$	$b = 0$
$y = 4$	$m = 0$	$b = 4$

$y = 0x + 4$

Example 2: Identify the slope and y-intercept of each line

a)



Slope: to find the slope use two points on the line and the formula $m = \frac{rise}{run}$ OR $m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

Point 1: $(3, -3)$ x_1, y_1

Point 2: $(6, -1)$ x_2, y_2

$m = \frac{-1-(-3)}{6-3}$

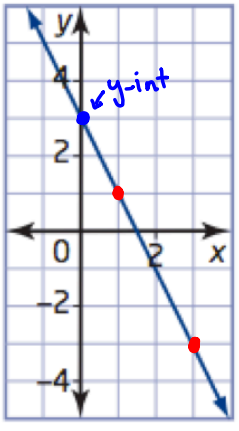
$= \frac{2}{3}$

y-intercept: you can find the y-intercept by looking at the graph and checking where the line crosses the y-axis. (When $x = 0, y = ?$)

Slope: $m = \frac{2}{3}$ **y-intercept:** $b = -5$

Equation of the line: $y = \frac{2}{3}x - 5$

b)



Slope: to find the slope use two points on the line and the formula $m = \frac{rise}{run}$ OR $m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

Point 1: $(1, 1)$ x_1, y_1

Point 2: $(3, -3)$ x_2, y_2

$m = \frac{-3-1}{3-1}$

$= \frac{-4}{2}$

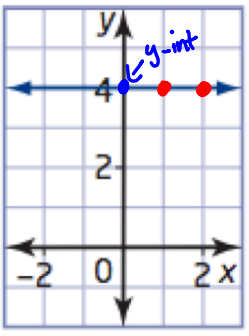
$= -2$

y-intercept: you can find the y-intercept by looking at the graph and checking where the line crosses the y-axis. (When $x = 0, y = ?$)

Slope: $m = -2$ **y-intercept:** $b = 3$

Equation of the line: $y = -2x + 3$

c)



Slope: to find the slope use two points on the line and the formula $m = \frac{rise}{run}$ OR $m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

Point 1: $(\overset{x_1}{1}, \overset{y_1}{4})$

Point 2: $(\overset{x_2}{2}, \overset{y_2}{4})$

$m = \frac{4-4}{2-1}$

$= \frac{0}{1}$

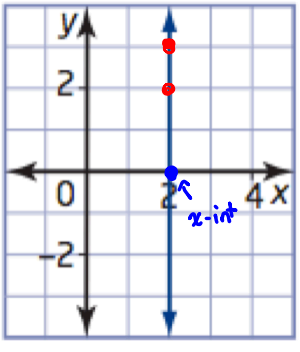
$= 0$

y-intercept: you can find the y-intercept by looking at the graph and checking where the line crosses the y-axis. (When $x = 0$, $y = ?$)

Slope: 0	**y-intercept:** 4
Equation of the line: $y = 0x + 4 \rightarrow y = 4$	

Note: all horizontal lines have a slope of 0 and an equation of the form $y = b$, where b is the y-intercept.

d)



Slope: to find the slope use two points on the line and the formula $m = \frac{rise}{run}$ OR $m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

Point 1: $(\overset{x_1}{2}, \overset{y_1}{2})$

Point 2: $(\overset{x_2}{2}, \overset{y_2}{3})$

$m = \frac{3-2}{2-2}$

$= \frac{1}{0}$

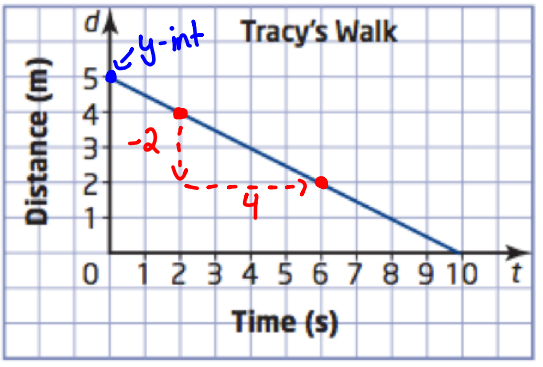
$=$ undefined

y-intercept: you can find the y-intercept by looking at the graph and checking where the line crosses the y-axis.

Slope: undefined	**y-intercept:** none
Equation of the line: $x = 2$	

Note: All vertical lines have an undefined slope and an equation of the form $x = a$, where a is the x-intercept.

Example 3: Interpreting a Linear Relation



Identify the slope and the vertical intercept of the linear relation and explain what they mean.

Slope: $m = \frac{rise}{run}$ **y-intercept:** $b = 5$

$m = \frac{-2}{4}$

$m = \frac{-1}{2}$ OR -0.5

The slope represents Tracy's speed. The negative value means that her distance from the sensor is decreasing. Tracy's speed toward the sensor was 0.5 m/s.

y-intercept:

The y-intercept of 5 means that Tracy started walking at a distance of 5 meters from the sensor.

Equation of the relation:

$$y = -\frac{1}{2}x + 5$$