

## Unit 1: Systems of Linear Equations

### Day 3: Slope and the Equation of a Line

Today we will...

1. Review the properties of equations of lines
2. Use algebra to find the equation of lines

### Slope - y-intercept form of a line:

The *slope - y-intercept* form of a linear relation is  $y = mx + b$ , where  $m$  represents the slope of the line and  $b$  represents the y-intercept.

### Standard Form:

The *standard form* of a linear relation is  $Ax + By + C = 0$ , where  $A$  is a positive integer, and  $A$  and  $B$  are not both 0.

### Slope of a line:

The slope of a line given two points on a line can be found using the formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad \text{or} \quad m = \frac{\Delta y}{\Delta x}, \quad \text{where } \Delta \text{ means "the change in"}$$

### Properties of equations of lines:

- The coordinates of every point on a line satisfy the equation of the line.
- The coordinates of any point not on a line do not satisfy the equation of a line.
- Parallel Lines have the same slope.
- Perpendicular Lines have slopes that are negative reciprocals.

Example 1: State the slope and y-intercept for each of these lines

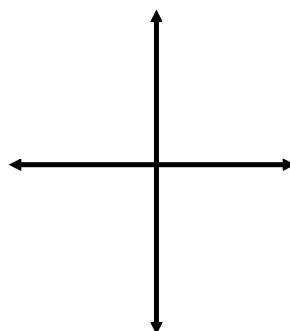
a)  $y = 5x + 3$                       b)  $y = \frac{3}{4}x - 7$                       c)  $y = -\frac{7}{6}x$

Example 2: Write an equation of a line that has:

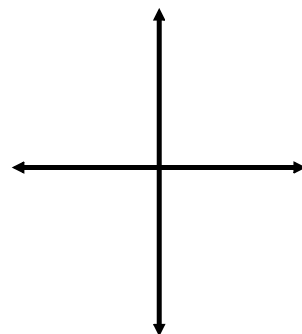
a)  $m = \frac{2}{3}, b = -2$                       b)  $m = -\frac{1}{3}, b = 5$

Example 3: Express  $3x - 5y = 12$  in  $y = mx + b$  form.

Example 4: Find the value of  $b$  if the line  $y = \frac{4}{3}x + b$  passes through  $(6, -2)$ .

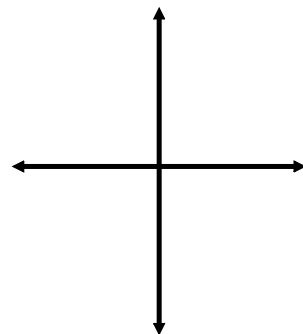


Example 5: Find the equation of the line that passes through the points  $(9, -2)$  and  $(3, 6)$ .



Example 6: Find the equation of the line which passes through (1,2) that is:

a) parallel to  $2x - y = -3$



b) perpendicular to the line  $2x - 3y = 12$

## Homework:

Page 28 #1, 2, 4ii, 5, 6  
(parts abc for each)