## 5.1: Write Linear Equations in Slope – intercept form

Goals:\*Write an equation in slope – intercept form given slope and y – int.<br/>\*Write an equation in slope – intercept form given two points<br/>\*Write an equation in slope – intercept form given two function values

**Slope** – **intercept** form:



Situation 1: Write the equation of a line in slope - intercept form if given slope and the y - intercept

Since you are told the slope and *y*-intercept, simply replace *m* with the slope and *b* with the *y*-intercept. Simplify if necessary/possible.

| Ex:                             | Ex:                           | Ex:                           |
|---------------------------------|-------------------------------|-------------------------------|
| Slope: $-2$<br>y – intercept: 5 | Slope: 8<br>y - intercept: -7 | Slope: 4<br>y – intercept: -3 |
| y = -2x + 5                     | y = 8x - 7                    | y = 4x - 3                    |

| Ex:                    | Ex:            | Ex:              |
|------------------------|----------------|------------------|
| Slope: $\frac{3}{4}$   | Slope: 0       | Slope: -1        |
| y - intercept: $-3$    | y-intercept: 5 | y - intercept: 0 |
| $y = \frac{3}{4}x - 3$ | <i>y</i> = 5   | y = -x           |

Situation 2: Write the equation of a line in slope – intercept form if given two points on the line

1. Find the slope using the formula:  $m = \frac{y_2 - y_1}{x_2 - x_1}$  Ex: (0, -5) (3, -1)  $m = \frac{4}{3}$ 

b = -5

- 2. Recall that the *y*-intercept happens when *x* is 0 (So in this case b = -5 since that is the value when x = 0)
- 3. Plug in *m* and *b* into y = mx + b  $y = \frac{4}{3}x 5$





**Ex:** (0, -2) and (8, 4)

$$m = 3$$
  

$$b = 5$$
  

$$y = 3x + 5$$

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

y = -x + 2

**Ex:** (-3, 6) and (0, 5)

1 y

**Ex:** (0, 7) and (3, 1)

$$y = -\frac{1}{3}x + 5$$
  $y = -2x + 7$ 

and b = initial value

**Ex:** A recording studio charges musicians an initial fee of \$50 to record an album. Studio time costs an additional \$35 per hour.

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x: # hours
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y: Total cost

a) Write an equation that gives the total cost to record an album as a function of studio time needed.

y = 35x + 50

b) Find the total cost to make an album that takes 10 hours to record.

y = 35(10) + 50y = 400

**Ex:** A dance studio charges \$20 to use the facility and \$25 per hour of instruction. *x*: **#** hours *y*: Total cost

a) Write an equation that gives the total cost as a function of hours of dance instruction.

y = 25x + 20

b) Find the total cost for 2 hours of dance instruction.

y = 25(2) + 20y = 70