Slope of a Line

Key Points:

- Slope is a rate of change. The slope of a linear function can be calculated by dividing the difference between y-values by the difference in corresponding x-values of any two points on the line.

- An **increasing** linear function results in a graph that **slants upward** from left to right and has a **positive slope.** A **decreasing** linear function results in a graph that **slants downward** from left to right and has a **negative slope.** A **constant** linear function results in a graph that is a **horizontal line.**

- Given two points (x_1, y_1) and (x_2, y_2) from a linear function, we can calculate and interpret the slope m according to the following:

    - Determine the units for input and output values.
    - Calculate the change of output values and change of input values.
    - Interpret the slope as the change in output values per unit of the input value, according to this equation:

$$m = \frac{change\ in\ output\ (rise)}{change\ in\ input\ (run)} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

- Given the graph of a linear function, we can write an equation to represent the function according to the following:

    - Identify two points on the line.
    - Use the two points to calculate the slope.
    - Determine where the line crosses the y-axis to identify the y-intercept by visual inspection.
    - Substitute the slope and y −intercept into the slope-intercept form of a line equation ($y = mx + b$, where *m* is the slope and *b* is the y-intercept).

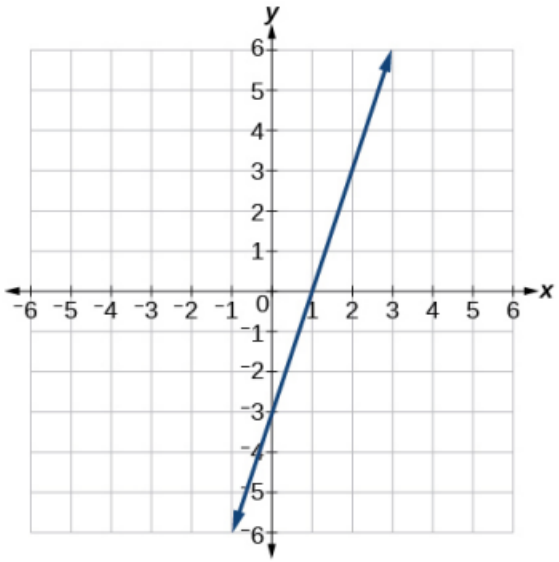
Slope of a Line Video

- **Finding a Slope of a Linear Function**
- **Writing an equation for a Linear Function from a graph of a Line**
- **Finding an equation for a Linear Function Given Two Points**

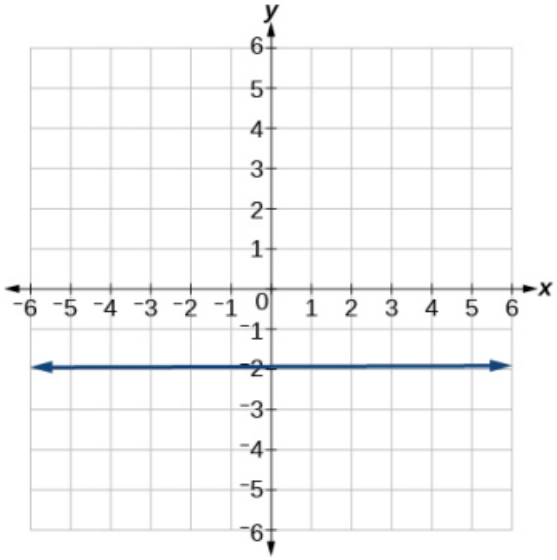
Practice Exercises

Follow the directions for each exercise below:

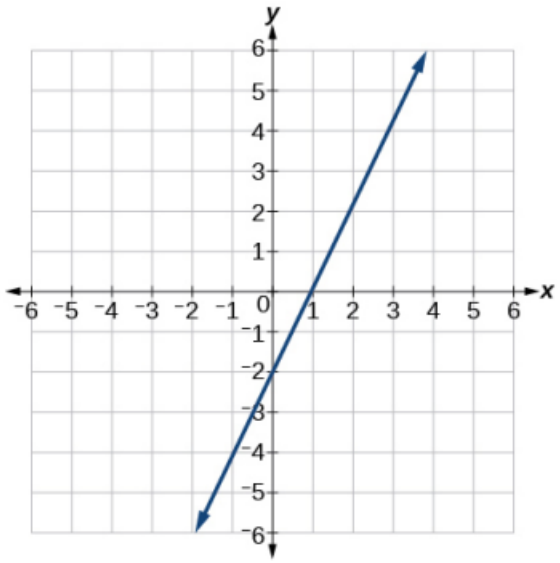
1. Find the slope of the line shown in the graph:



2. Find the slope of the line shown in the graph:



3. Write an equation in slope-intercept form for the line shown in the graph:

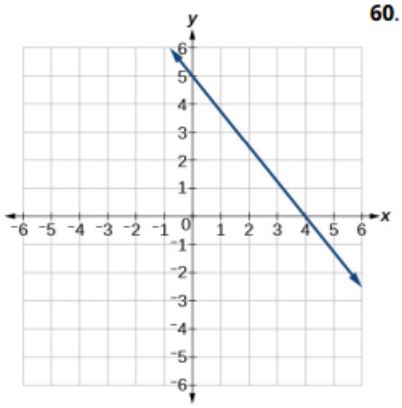


4. Find the slope of the line that passes through the two given points: $(\mathbf{1}, \mathbf{5})$, $(\mathbf{4}, \mathbf{11})$

5. Find the slope of the line that passes through the two given points:$(\mathbf{8}, -\mathbf{2})$, $(\mathbf{4}, \mathbf{6})$

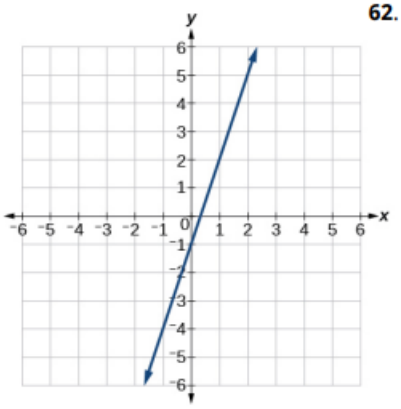
6. Write an equation for the line graphed:

60.

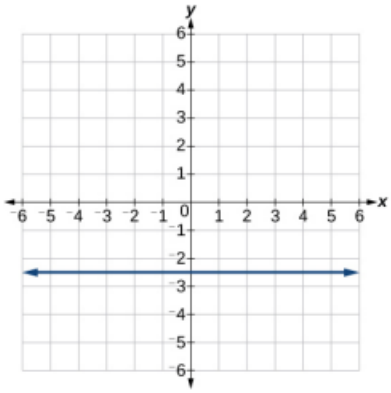


7. Write an equation for the line graphed:

62.



8. Write an equation for the line graphed:



Answers:

1. 3

2. 0

3. $y = 2x - 2$

4. 2

5. -2

6. $y = -\frac{5}{4}x + 5$

7. $y = 3x - 1$

8. $y = -2.5$