Name _____ Class _____ Date _____

3-1 Reteaching

Rate of Change and Slope

The rate of the vertical change to the horizontal change between two points on a line is called the slope of the line.

$$\textbf{slope} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}}$$

There are two special cases for slopes.

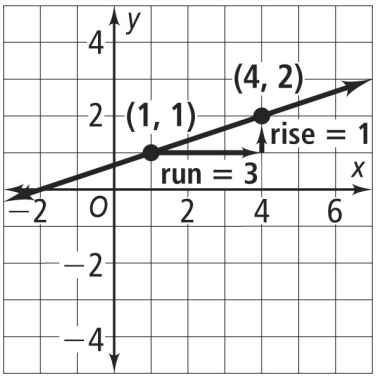
- A horizontal line has a slope of 0.
- A vertical line has an undefined slope.

Problem

What is the slope of the line?

$$\text{slope} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}}$$

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



The slope of the line is $\frac{1}{3}$.

In general, a line that slants upward from left to right has a positive slope.

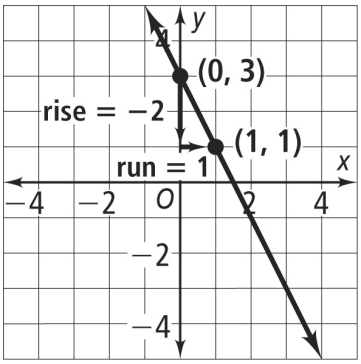
Problem

What is the slope of the line?

$$\text{slope} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}}$$

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

$$= -2$$



The slope of the line is –2.

In general, a line that slants downward from left to right has a negative slope.

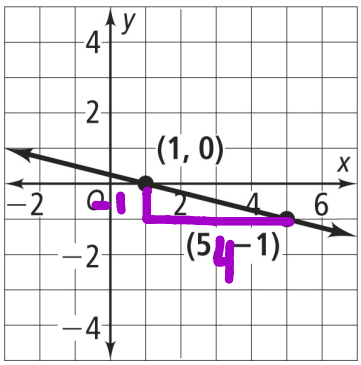
Name _____ Class _____ Date _____

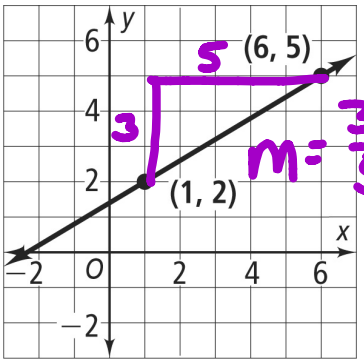
3-1 Reteaching (continued)

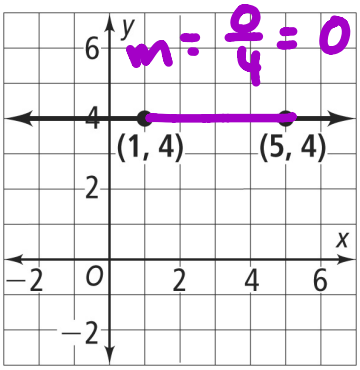
Rate of Change and Slope

Exercises

Find the slope of each line.

1. 

2. 

3. 

Suppose one point on a line has the coordinates (x_1, y_1) and another point on the same line has the coordinates (x_2, y_2). You can use the following formula to find the slope of the line.

$$\textbf{slope} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}, \text{ where } x_2 - x_1 \neq 0$$

Problem

What is the slope of the line through $R(2, 5)$ and $S(-1, 7)$?

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{7 - 5}{-1 - 2}$$
$$= \frac{2}{-3} = -\frac{2}{3}$$

Let $y_2 = 7$ and $y_1 = 5$.
Let $x_2 = -1$ and $x_1 = 2$.

Exercises

Find the slope of the line that passes through each pair of points.

4. (0, 0), (4, 5) $\frac{5-0}{4-0} = \frac{5}{4}$

5. (2, 4), (7, 8) $\frac{8-4}{7-2} = \frac{4}{5}$

6. (–2, 0), (–3, 2) $\frac{2-0}{-3-(-2)} = \frac{2}{-1} = -2$

7. (–2, –3), (1, 1) $\frac{1-(-3)}{1-(-2)} = \frac{1+3}{1+2} = \frac{4}{3}$

8. (1, 4), (2, –3) $\frac{-3-4}{2-1} = \frac{-7}{1} = -7$

9. (3, 2), (–5, 3) $\frac{3-2}{-5-3} = \frac{1}{-8} = -\frac{1}{8}$