

# 5-1 **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.

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

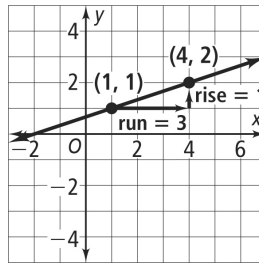
There are two special cases for slopes.

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

### Problem

**What is the slope of the line?**

$$\begin{aligned} \text{slope} &= \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}} \\ &= \frac{1}{3} \end{aligned}$$



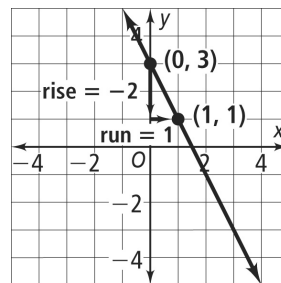
The slope of the line is  $\frac{1}{3}$ .

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

### Problem

**What is the slope of the line?**

$$\begin{aligned} \text{slope} &= \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}} \\ &= \frac{-2}{1} \\ &= -2 \end{aligned}$$



The slope of the line is  $-2$ .

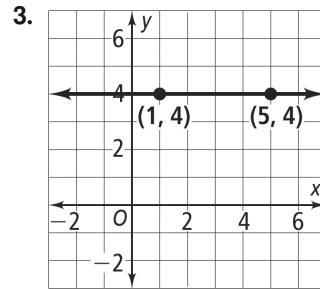
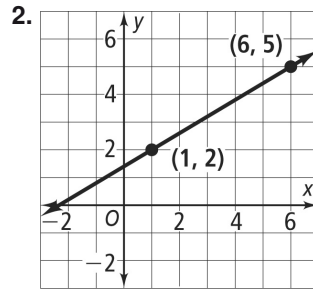
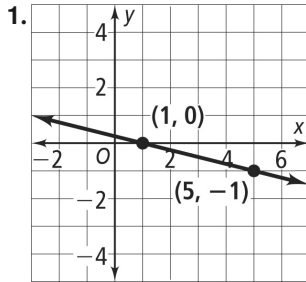
In general, a line that slants downward from left to right has a negative slope.

# 5-1 **Reteaching** (continued)

## Rate of Change and Slope

### Exercises

Find the slope of each line.



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.

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

**Problem**

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

$$\begin{aligned} \text{slope} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{7 - 5}{-1 - 2} \quad \text{Let } y_2 = 7 \text{ and } y_1 = 5. \\ &\quad \text{Let } x_2 = -1 \text{ and } x_1 = 2. \\ &= \frac{2}{-3} = -\frac{2}{3} \end{aligned}$$

### Exercises

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

- |                       |                      |                       |
|-----------------------|----------------------|-----------------------|
| 4. $(0, 0), (4, 5)$   | 5. $(2, 4), (7, 8)$  | 6. $(-2, 0), (-3, 2)$ |
| 7. $(-2, -3), (1, 1)$ | 8. $(1, 4), (2, -3)$ | 9. $(3, 2), (-5, 3)$  |