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The slope of a line is the ratio of the change in $y$ to the change in $x$ between any two points on a line. Slope indicates the steepness (or flatness) of a line, as well as its direction (up or down) left to right.

Slope is determined by the ratio $\dfrac{\text{vertical change}}{\text{horizontal change}}$ between *any* two points on a line.

For lines that go up (from left to right), the sign of the slope is positive (the change in $y$ is positive). For lines that go down (left to right), the sign of the slope is negative (the change is $y$ is negative). A horizontal line has zero slope while the slope of a vertical line is undefined.

For additional information see the Math Notes box in Lesson 7.2.4 of the *Core Connections, Course 3* text.
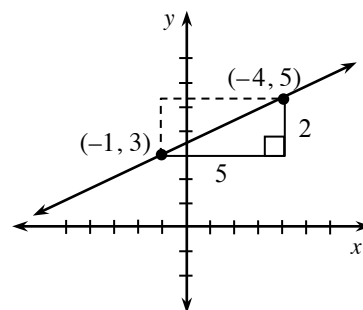
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## Example 1

Write the slope of the line containing the points (–1, 3) and (4, 5).

First graph the two points and draw the line through them.

Look for and draw a slope triangle using the two given points.

Write the ratio $\dfrac{\text{vertical change in } y}{\text{horizontal change in } x}$ using the legs of the right triangle: $\dfrac{2}{5}$ .

Assign a positive or negative value to the slope (this one is positive) depending on whether the line goes up (+) or down (–) from left to right.

## Example 2

If the points are inconvenient to graph, use a "generic slope triangle," visualizing where the points lie with respect to each other. For example, to find the slope of the line that contains the points (–21, 12) and (17, –4), sketch the graph at right to approximate the position of the two points, draw a slope triangle, find the length of the leg of each triangle, and write the ratio $\dfrac{y}{x} = \dfrac{16}{38}$ , then simplify. The slope is $-\dfrac{8}{19}$ since the change in $y$ is negative (decreasing).
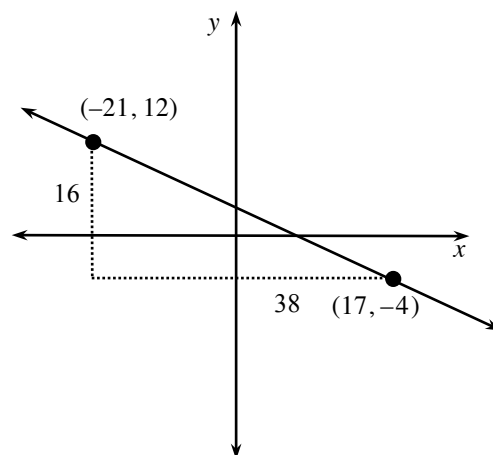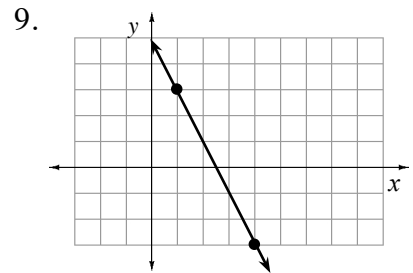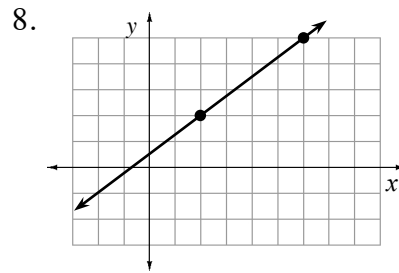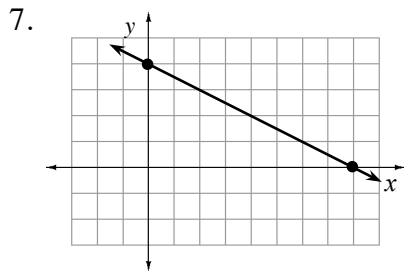
## Problems

Write the slope of the line containing each pair of points.

1.  (3, 4) and (5, 7)

2.  (5, 2) and (9, 4)

3.  (1, –3) and (–4, 7)

4.  (–2, 1) and (2, –2)

5.  (–2, 3) and (4, 3)

6.  (32, 12) and (12, 20)

Determine the slope of each line using the *highlighted points*.

7.



8.



9.



## Answers

1.  $\frac{3}{2}$

2.  $\frac{1}{2}$

3.  –2

4.  $-\frac{3}{4}$

5.  0

6.  $-\frac{2}{5}$

7.  $-\frac{1}{2}$

8.  $\frac{3}{4}$

9.  –2