

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 $\frac{\text{vertical change}}{\text{horizontal change}}$ 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 in y is negative). A horizontal line has zero slope while the slope of a vertical line is undefined.

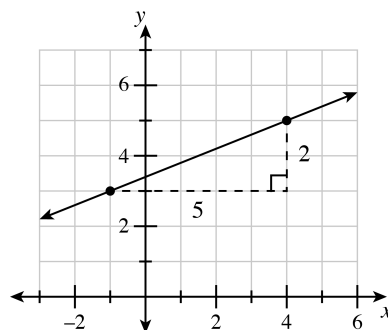
For additional information see the Math Notes box in Lesson 7.2.4 of the *Core Connections, Course 3* text.

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.

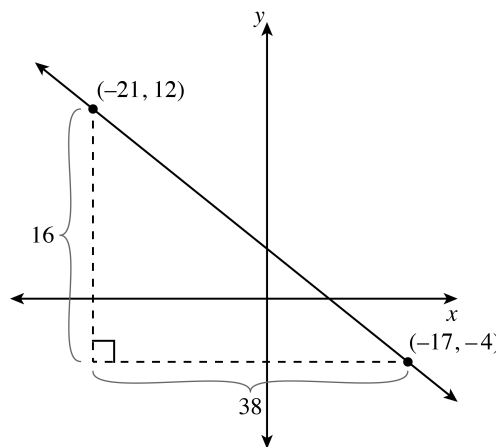


Write the ratio $\frac{\text{vertical change in } y}{\text{horizontal change in } x}$ using the legs of the right triangle: $\frac{2}{5}$.

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 $\frac{y}{x} = \frac{16}{38}$, then simplify. The slope is $-\frac{8}{19}$ since the change in y is negative (decreasing).



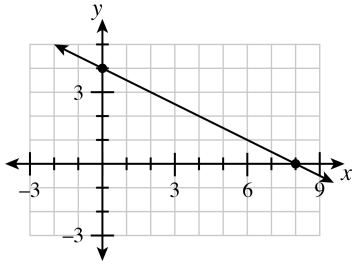
Problems

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

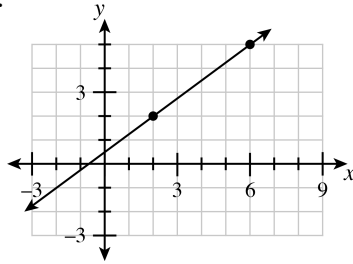
1. $(3, 4)$ and $(5, 7)$
2. $(5, 2)$ and $(9, 4)$
3. $(1, -3)$ and $(-4, 7)$
4. $(-2, 1)$ and $(2, -2)$
5. $(-2, 3)$ and $(4, 3)$
6. $(32, 12)$ and $(12, 20)$

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

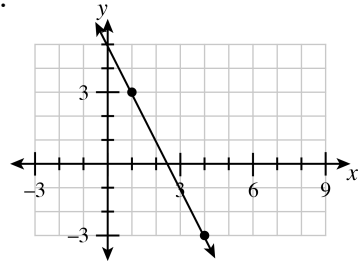
7.



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