LESSON 11.6

Slope

Goal: Find and interpret slopes of lines.

For Your Notebook

Vocabulary

Slope: The slope of a nonvertical line is the ratio of the vertical change to the horizontal change between two points on a line.

Rise: The vertical change between two points on a line.

Run: The horizontal change between two points on a line.

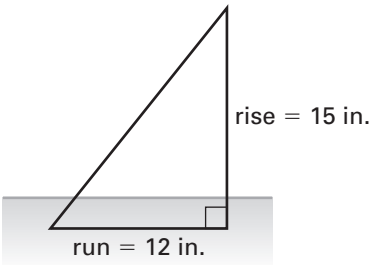
EXAMPLE 1 Finding Slope

Waterslide A waterslide rises about 15 inches vertically for every 12 inches horizontally. What is the slope of the waterslide?

Solution

The diagram shows the rise and the run of the waterslide.

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{15 in.}}{\text{12 in.}} = \frac{5}{4}$$



ANSWER The waterslide has a slope of $\frac{5}{4}$.

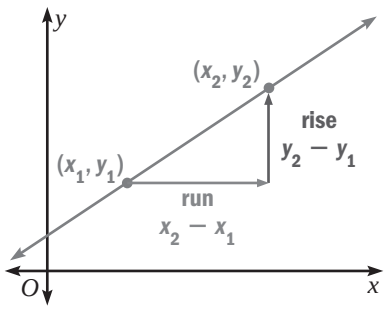
Slope of a Line

The slope m of a nonvertical line passing through the points (x_1, y_1) and (x_2, y_2) is

$$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

The rise is the change in y and the run is the change in x.

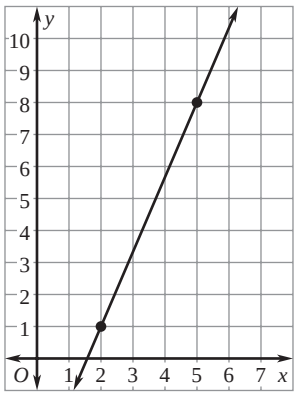
The slope of a line is the same no matter which two points you choose to use in the formula.



EXAMPLE 2 Positive and Negative Slope

Find the slope of the line.

a.



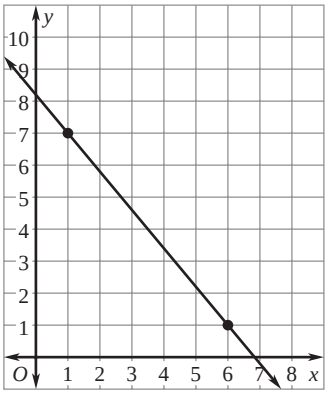
$m = \frac{\text{rise}}{\text{run}} =$ ☐

$=$ ☐

$=$ ☐

ANSWER The slope is ☐.

b.



$m = \frac{\text{rise}}{\text{run}} =$ ☐

$=$ ☐

$=$ ☐ or ☐

ANSWER The slope is ☐.

Choose which points will be (x_1, y_1) and (x_2, y_2)

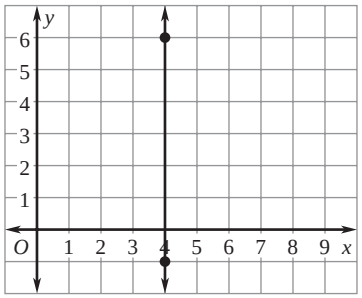
Your turn now **Find the slope of the line passing through the points.**

1. (0, 2), (5, 5)	**2.** (9, 4), (1, 10)	**3.** (1, −6), (−4, 4)

EXAMPLE 3 Zero and Undefined Slope

Find the slope of the line.

a.

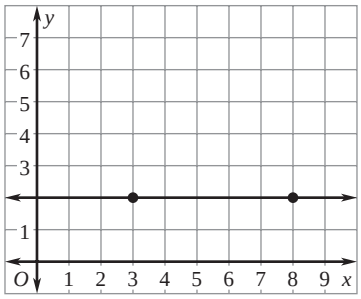


$$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - \square}{\square - x_1}$$

$$= \frac{6 - (-1)}{\square} = \square$$

ANSWER The slope is ____.

b.



$$m = \frac{\text{rise}}{\text{run}} = \square$$

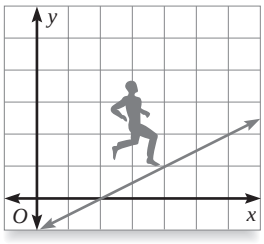
$$= \square = \square = \square$$

ANSWER The slope is ____.

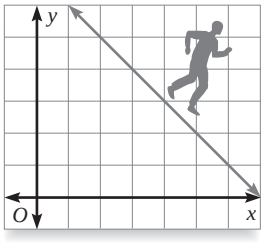
WATCH OUT!
When finding the slope of a line, make sure that you are using the x- and y-coordinates in the same order.

Summary of Slope

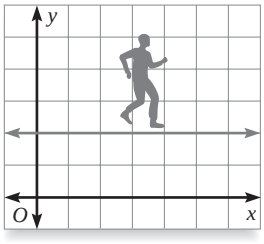
A line with ____ slope rises from left to right.



A line with ____ slope falls from left to right.



A line with ____ slope is horizontal.



A line with ____ slope is vertical.