

## Section P.4 Linear Equations in Two Variables

**Objective:** In this lesson you learned how to find and use the slopes of lines to write and graph linear equations in two variables.

Course Number

Instructor

Date

### Important Vocabulary

Define each term or concept.

**Slope**

**Parallel**

**Perpendicular**

### I. Using Slope (Pages 38–40)

The equation  $y = mx + b$  is called a **linear equation in two variables** because . . .

#### *What you should learn*

How to use slope to graph linear equations in two variables

A line whose slope is positive \_\_\_\_\_ from left to right.

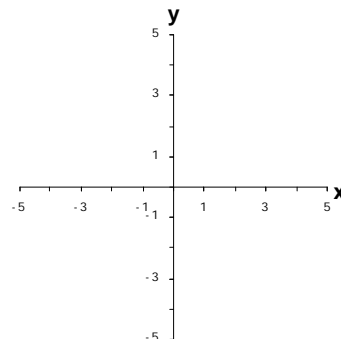
A line whose slope is negative \_\_\_\_\_ from left to right.

The **slope-intercept form** of the equation of a line is

\_\_\_\_\_, where  $m$  is the \_\_\_\_\_ and the y-intercept is (\_\_\_\_, \_\_\_\_).

To graph the line  $y = mx + b$  on the coordinate plane, . . .

**Example 1:** Explain how to graph the linear equation  $y = -2/3x - 4$ . Then sketch its graph.



The equation of a **horizontal line** is \_\_\_\_\_. The slope of a horizontal line is \_\_\_\_\_. To graph a horizontal line, . . .

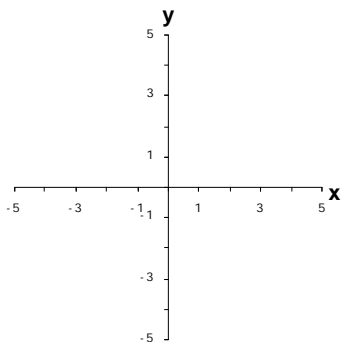
The  $y$ -coordinate of every point on the graph of a horizontal line is \_\_\_\_\_.

The equation of a **vertical line** is \_\_\_\_\_. The slope of a vertical line is \_\_\_\_\_. To graph a vertical line, . . .

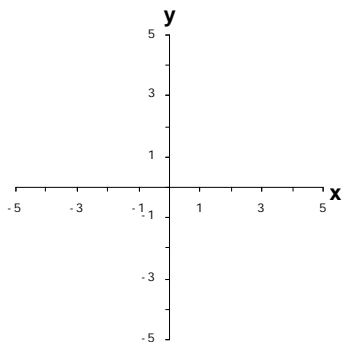
The  $x$ -coordinate of every point on the graph of a vertical line is \_\_\_\_\_.

**Example 2:** Sketch and label the graph of (a)  $y = -1$  and (b)  $x = 3$ .

(a)



(b)



## II. Finding the Slope of a Line (Pages 41–42)

The formula for the **slope** of a line passing through the points  $(x_1, y_1)$  and  $(x_2, y_2)$  is  $m = \frac{y_2 - y_1}{x_2 - x_1}$ .

To find the slope of the line through the points  $(-2, 5)$  and  $(4, -2)$ , . . .

### *What you should learn*

How to find slopes of lines

## III. Writing Linear Equations in Two Variables (Pages 43–44)

The **point-slope form** of the equation of a line is \_\_\_\_\_.

The **two-point form** of the equation of a line is \_\_\_\_\_.

### *What you should learn*

How to write linear equations in two variables

The **general form** of the equation of a line is

\_\_\_\_\_.

All equations of lines can be written in general form.

Which form of the equation of a line is most convenient when given:

- (a) the slope  $m$  and the  $y$ -intercept  $(0, b)$ ?
  
- (b) the slope  $m$  and a point  $(x_1, y_1)$  on the graph of the line?
  
- (c) two points  $(x_1, y_1)$  and  $(x_2, y_2)$  that are on the graph of the line?

For the conditions in (a), (b), and (c) above, is it possible to use only the slope-intercept form to find an equation? Explain.

Is it possible to use only the point-slope form to find an equation? Explain.

**Example 3:** Find an equation of the line that passes through the points  $(1, 5)$  and  $(-3, 7)$  using (a) the slope-intercept form and (b) the point-slope form.

#### IV. Parallel and Perpendicular Lines (Page 45)

Two lines are \_\_\_\_\_ if they do not intersect.

Two lines are \_\_\_\_\_ if they intersect at right angles.

The relationship between the slopes of two lines that are parallel is . . .

#### *What you should learn*

How to use slope to identify parallel and perpendicular lines

The relationship between the slopes of two lines that are perpendicular is . . .

A line that is parallel to a line whose slope is 2 has slope \_\_\_\_\_.

A line that is perpendicular to a line whose slope is 2 has slope \_\_\_\_\_.

### V. Applications of Slope (Pages 40 and 46)

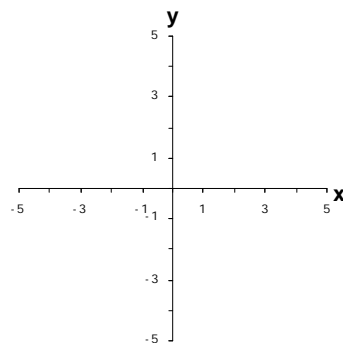
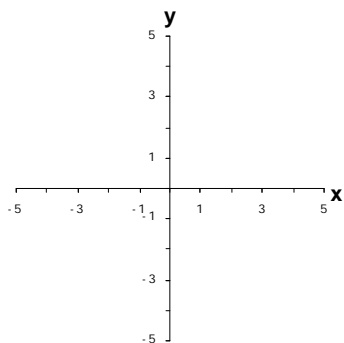
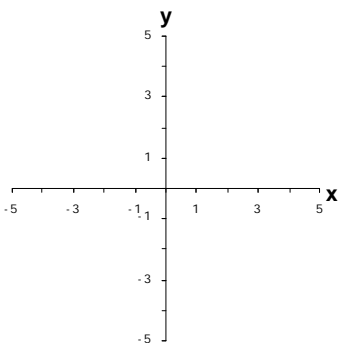
Describe a real-life situation in which slope is a ratio.

Describe a real-life situation in which slope is a rate of change.

***What you should learn***

How to use linear equations in two variables to model and solve real-life problems

### Additional notes



### Homework Assignment

Page(s)

Exercises