

## Section P.3 Lines in the Plane

**Objective:** In this lesson you learned how to find and use the slope of a line to write and graph linear equations.

Course Number

Instructor

Date

### Important Vocabulary

Define each term or concept.

**Slope**

**Parallel**

**Perpendicular**

### I. The Slope of a Line (Pages 25–26)

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

To find the slope of the line through the points  $(-2, 5)$  and  $(4, -3)$ , . . .

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

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

A line with zero slope is \_\_\_\_\_.

A line with undefined slope is \_\_\_\_\_.

#### *What you should learn*

How to find the slopes of lines

### II. The Point-Slope Form of the Equation of a Line

(Pages 27–28)

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

This form of equation is best used to find the equation of a line when . . .

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

#### *What you should learn*

How to write linear equations given points on lines and their slopes

The two-point form of equation is best used to find the equation of a line when . . .

**Example 1:** Find an equation of the line having slope  $-2$  that passes through the point  $(1, 5)$ .

The approximation method used to estimate a point between two given points is called \_\_\_\_\_. The approximation method used to estimate a point lying outside the given points is called \_\_\_\_\_.

### III. Sketching Graphs of Lines (Pages 29–30)

The **slope-intercept form** of the equation of a line is \_\_\_\_\_, where  $m$  is the \_\_\_\_\_ and the  $y$ -intercept is  $(\text{____}, \text{____})$ .

**Example 2:** Determine the slope and  $y$ -intercept of the linear equation  $2x - y = 4$ .

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

The **general form** of the equation of a line is \_\_\_\_\_.

Every line has an equation that can be written in \_\_\_\_\_.

When a graphing utility is used to sketch a straight line, the graph of the line may not visually appear to have the slope indicated by its equation because . . .

***What you should learn***  
How to use slope-intercept forms of linear equations to sketch graphs of lines

In general, two graphs of the same equation can appear to be quite different depending on . . .

**Example 3:** Use a graphing utility to graph the linear equation  $2x - y = 4$  using (a) a standard viewing window, and (b) a square window.

#### IV. Parallel and Perpendicular Lines (Pages 31–32)

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 . . .

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

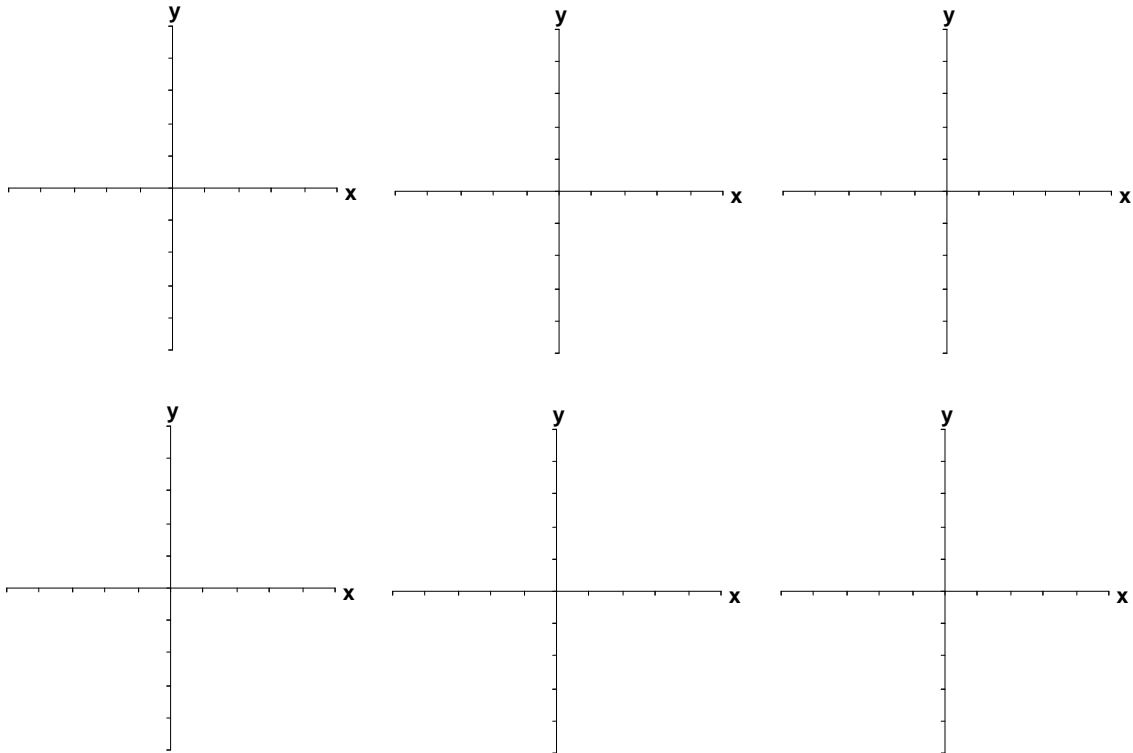
A line that is parallel to a line whose slope is 2 has slope \_\_\_\_\_.

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

**Example 4:** Use a graphing utility to graph the perpendicular lines  $y = 2x - 3$  and  $y = -0.5x + 5$  using (a) a standard viewing window, and (b) a square window.

#### *What you should learn*

How to use slope to identify parallel and perpendicular lines

**Additional notes****Homework Assignment**

Page(s)

Exercises