

## Vocabulary and Core Concept Check

Key!

- COMPLETE THE SENTENCE** Two distinct nonvertical lines that have the same slope are same.
- VOCABULARY** Two lines are perpendicular. The slope of one line is  $-\frac{5}{7}$ . What is the slope of the other line? Justify your answer.  $m = \frac{7}{5}$

In Exercises 9–12, write an equation of the line that passes through the given point and is parallel to the given line. (See Example 2.)

same slope

9.  $(-1, 3); y = 2x + 2$

⑨  $m = 2$  point  $(-1, 3)$

Point-Slope:  $y - 3 = 2(x + 1)$

$y - 3 = 2x + 2$

Slope-Intercept:  $y = 2x + 5$

In Exercises 13–18, determine which of the lines, if any, are parallel or perpendicular. Explain. (See Example 3.)

17. Line a:  $4x - 3y = 2$   $m = \frac{4}{3}$   
 Line b:  $y = \frac{4}{3}x + 2$   $m = \frac{4}{3}$   
 Line c:  $4y + 3x = 4$   $m = -\frac{3}{4}$

$-\frac{3y}{3} = \frac{-4x+2}{-3} \Rightarrow y = \frac{4}{3}x - \frac{2}{3}$   
 $\frac{4y}{4} = \frac{-3x+4}{4} \Rightarrow y = -\frac{3}{4}x + 1$

Lines a and b are parallel since they have the same slope.  
 Line c is perpendicular to lines a and b since the slopes are opp. reciprocals

In Exercises 19–22, write an equation of the line that passes through the given point and is perpendicular to the given line. (See Example 4.)

opp. reciprocal

19.  $(7, 10); y = \frac{1}{2}x - 9$

$m = -2$ : point-slope:  $y - 10 = -2(x - 7)$

$y - 10 = -2x + 14$

Slope-Int:  $y = -2x + 24$

25. **ERROR ANALYSIS** Describe and correct the error in writing an equation of the line that passes through  $(1, 3)$  and is parallel to the line  $y = \frac{1}{4}x + 2$ .

~~$y - y_1 = m(x - x_1)$   
 $y - 3 = -4(x - 1)$   
 $y - 3 = -4x + 4$   
 $y = -4x + 7$~~

They used a slope that would be perpendicular.

$y - 3 = \frac{1}{4}(x - 1)$

Slope should be the same  $m = \frac{1}{4}$

26. **ERROR ANALYSIS** Describe and correct the error in writing an equation of the line that passes through  $(4, -5)$  and is perpendicular to the line  $y = \frac{1}{3}x + 5$ .

~~$y - y_1 = m(x - x_1)$   
 $y - (-5) = 3(x - 4)$   
 $y + 5 = 3x - 12$   
 $y = 3x - 17$~~

Slope is only the reciprocal! Needs to be opposite, too!

$y + 5 = -3(x - 4)$   $m = -3$