LESSON 3.5 Study Guide
For use with pages 180–187

GOAL **Find equations of lines.**

Vocabulary

The general form of a linear equation in **slope-intercept form** is $y = mx + b$, where m is the slope and b is the y-intercept.

A linear equation written as $Ax + By = C$, where A and B are not both zero, is written in **standard form.**

EXAMPLE 1 ## Write an equation of a parallel line

Write an equation of the line passing through the point (3, 4) that is parallel to the line with the equation $y = -4x + 5$.

STEP 1 **Find** the slope m. The slope of a line parallel to $y = -4x + 5$ is the same as the given line, so the slope is -4.

STEP 2 **Find** the y-intercept b by using $m = -4$ and $(x, y) = (3, 4)$.

$y = mx + b$ Use slope-intercept form.

$4 = -4(3) + b$ Substitute for x, y, and m.

$16 = b$ Solve for b.

Because $m = -4$ and $b = 16$, an equation of the line is $y = -4x + 16$.

EXAMPLE 2 ## Write an equation of a perpendicular line

Write an equation of the line p passing through the point (6, −3) that is perpendicular to the line q with the equation $y = 4x - 7$.

STEP 1 **Find** the slope m of line p. Line q has a slope of 4.

$4 \cdot m = -1$ The product of the slopes of $\perp$ lines is -1.

$m = -\dfrac{1}{4}$ Divide each side by -2.

STEP 2 **Find** the y-intercept b by using $m = -\dfrac{1}{4}$ and $(x, y) = (8, -3)$.

$y = mx + b$ Use slope-intercept form.

$-3 = -\dfrac{1}{4}(8) + b$ Substitute for x, y, and m.

$-1 = b$ Solve for b.

Because $m = -\dfrac{1}{4}$ and $b = -1$, an equation of line p is $y = -\dfrac{1}{4}x - 1$.

LESSON 3.5

| LESSON |
| 3.5 |

Study Guide *continued*
For use with pages 180–187

Exercises for Examples 1 and 2

Write an equation of the line that passes through point *P* and is parallel to the line with the given equation.

1. $P(10, 3), y = x - 12$ **2.** $P(-5, 2), y = -x - 9$ **3.** $P(-1, 2), y = \frac{2}{3}x - 2$

Write an equation of the line that passes through point *P* and is perpendicular to the line with the given equation.

4. $P(8, 7), y = -x + 3$ **5.** $P(-4, 5), y = 2x - 6$ **6.** $P(2, -3), y = \frac{4}{7}x + 2$

EXAMPLE 3 ## Graph a line with equation in standard form

Graph $2x + 3y = 18$.

Solution

STEP 1 **Find** the intercepts.

To find the *x*-intercept, let $y = 0$.   To find the *y*-intercept, let $x = 0$.

$$2x + 3y = 18$$ $$2x + 3y = 18$$
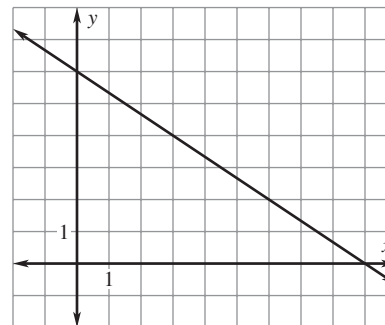
$$2x + 3(0) = 18$$ $$2(0) + 3y = 18$$

$$x = 9$$ $$y = 6$$

STEP 2 **Graph** the line.

The line intercepts the axes at $(9, 0)$ and $(0, 6)$. Graph these points, then draw a line through the points.

Exercises for Example 3

Graph the equation.

7. $5x + 2y = 20$ **8.** $x - 6y = 12$ **9.** $7x + 5y = -14$