5-4 Writing Equations in Slope-Intercept Form *(Pages 280–285)*

You now know how to write an equation for any line with a given slope and y-intercept. It is also possible to write an equation for any line with a given slope and any point on the line. In addition, since you know the slope formula, $m = \dfrac{y_2 - y_1}{x_2 - x_1}$, you can also write an equation of any line given two points.

To write an equation given the slope and one point.	Use $y = mx + b$ for the equation. Replace m with the given slope and the coordinates of the given point for x and y. Solve the equation for the y-intercept, b. Rewrite the equation with the slope for m and the y-intercept for b.
To write an equation given two points.	Use the slope formula to calculate m. Chose any of the two given points to use in place of x and y in $y = mx + b$. Replace m with the slope you just calculated. Solve for b. Rewrite the equation with the slope for m and the y-intercept for b.

Examples Write an equation in slope-intercept form from the given information.

a. The slope is 3 and the line passes through the point (5, 16).

$y = mx + b$	*Use slope-intercept form.*
$y = 3x + b$	*Replace m with the slope.*
$16 = 3 \cdot 5 + b$	*Replace x and y.*
$1 = b$	*Solve for b.*
$y = 3x + 1$	*Rewrite the equation.*

b. The line passes through the points (10, −4) and (−7, 13).

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$	*Use the slope formula.*
$m = \dfrac{13 - (-4)}{-7 - 10}$	*Substitute.*
$m = -1$	*Solve for m.*
$y = mx + b$	
$-4 = (-1)10 + b$	*Substitute m, x, and y.*
$6 = b$	*Solve for b.*
$y = -x + 6$	*Rewrite the equation.*

Practice

Write an equation in slope-intercept form from the given information.

1. $m = 3, (0, 4)$ **2.** $m = -\dfrac{3}{2}, (0, 6)$ **3.** $m = \dfrac{1}{2}, (5, 6.5)$ **4.** $m = 1, (-5, -7)$

5. $(3, -4), (-6, -1)$ **6.** $(-10, 47), (5, -13)$ **7.** $(0, -1), (3, 8)$ **8.** $(5, 8), (-3, 8)$

9. **Standardized Test Practice** Which is the correct slope-intercept equation for a line that passes through the points $(-15, -47)$ and $(-19, -59)$?

  A $y = -3x + 2$ **B** $y = 3x + 2$ **C** $y = -3x - 2$ **D** $y = 3x - 2$

Answers: **1.** $y = 3x + 4$ **2.** $y = -\dfrac{3}{2}x + 6$ **3.** $y = \dfrac{1}{2}x + 4$ **4.** $y = x - 2$ **5.** $y = \dfrac{-1}{3}x - 3$ **6.** $y = -4x + 7$ **7.** $y = 3x - 1$ **8.** $y = 8$ **9.** D