

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, $m = \frac{y_2 - y_1}{x_2 - x_1}$, 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).

$$y = mx + b \quad \text{Use slope-intercept form.}$$

$$y = 3x + b \quad \text{Replace } m \text{ with the slope.}$$

$$16 = 3 \cdot 5 + b \quad \text{Replace } x \text{ and } y.$$

$$1 = b \quad \text{Solve for } b.$$

$$y = 3x + 1 \quad \text{Rewrite the equation.}$$

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

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad \text{Use the slope formula.}$$

$$m = \frac{13 - (-4)}{-7 - 10} \quad \text{Substitute.}$$

$$m = -1 \quad \text{Solve for } m.$$

$$y = mx + b$$

$$-4 = (-1)10 + b \quad \text{Substitute } m, x, \text{ and } y.$$

$$6 = b \quad \text{Solve for } b.$$

$$y = -x + 6 \quad \text{Rewrite the equation.}$$

Practice

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

1. $m = 3, (0, 4)$
2. $m = -\frac{3}{2}, (0, 6)$
3. $m = \frac{1}{2}, (5, 6.5)$
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. $y = -\frac{2}{3}x + 6$ 3. $y = \frac{2}{1}x + 4$ 4. $y = x - 2$ 5. $y = -\frac{3}{-1}x - 3$ 6. $y = -4x + 7$ 7. $y = 3x - 1$ 8. $y = 8$ 9. D
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