4-1 Study Guide and Intervention
Writing Equations in Slope-Intercept Form

Write an Equation Given the Slope and a Point You can write an equation of a line if you are given a slope and a point other than the *y*-intercept.

Example 1: Write an equation of the line that passes through (–4, 2) with a slope of 3.

The line has slope 3. To find the *y*-intercept, replace *m* with 3 and (x, y) with (–4, 2) in the slope-intercept form. Then solve for *b*.

$y = mx + b$	Slope-intercept form
$2 = 3(-4) + b$	$m = 3$, $y = 2$, and $x = -4$
$2 = -12 + b$	Multiply.
$14 = b$	Add 12 to each side.

Therefore, the equation is $y = 3x + 14$.

Example 2: Write an equation of the line that passes through (–2, –1) with a slope of $\frac{1}{4}$.

The line has slope $\frac{1}{4}$. Replace *m* with $\frac{1}{4}$ and (x, y) with (–2, –1) in the slope-intercept form.

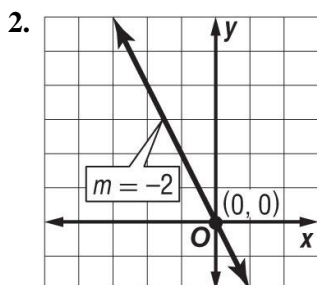|	
$y = mx + b$	Slope-intercept form
$-1 = \frac{1}{4}(-2) + b$	$m = \frac{1}{4}$, $y = -1$, and $x = -2$
$-1 = -\frac{1}{2} + b$	Multiply.
$-\frac{1}{2} = b$	Add $\frac{1}{2}$ to each side.

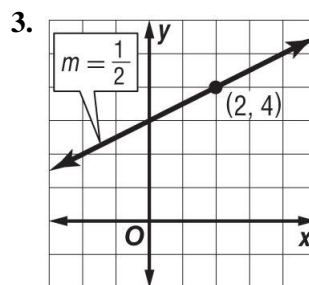Therefore, the equation is $y = \frac{1}{4}x - \frac{1}{2}$.

Exercises

Write an equation of the line that passes through the given point and has the given slope.

1.

$y = 2x - 1$

2.

$y = -2x$

3.
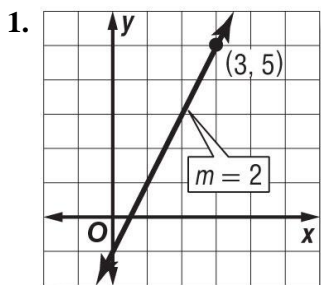
$y = \frac{1}{2}x + 3$

4. (8, 2); slope $-\frac{3}{4}$

$y = -\frac{3}{4}x + 8$

5. (–1, –3); slope 5

$y = 5x + 2$

6. (4, –5); slope $-\frac{1}{2}$

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

7. (–5, 4); slope 0

$y = 4$

8. (2, 2); slope $\frac{1}{2}$

$y = \frac{1}{2}x + 1$

9. (1, –4); slope –6

$y = -6x + 2$

10. (–3, 0), $m = 2$

$y = 2x + 6$

11. (0, 4), $m = -3$

$y = -3x + 4$

12. (0, 350), $m = \frac{1}{5}$

$y = \frac{1}{5}x + 350$

4-1 Study Guide and Intervention *(continued)*
Writing Equations in Slope-Intercept Form

Write an Equation Given Two Points If you are given two points through which a line passes, you can use them to find the slope first. Then you can use that slope and one of the points to write the equation of the line.

Example: Write an equation of the line that passes through (1, 2) and (3, –2).
Find the slope m. To find the y-intercept, replace m with its computed value and (x, y) with (1, 2) in the slope-intercept form. Then solve for b.

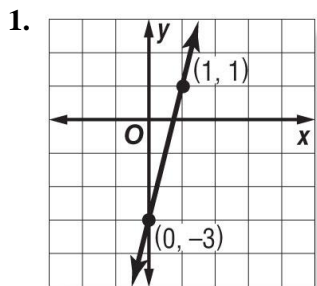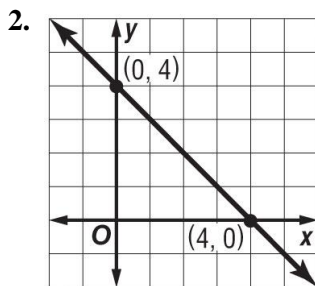|	
$m = \dfrac{y_2 - y_1}{x_2 - x_1}$	Slope formula
$m = \dfrac{-2 - 2}{3 - 1}$	$y_2 = -2, y_1 = 2, x_2 = 3, x_1 = 1$
$m = -2$	Simplify.
$y = mx + b$	Slope-intercept form
$2 = -2(1) + b$	Replace m with –2, y with 2, and x with 1.
$2 = -2 + b$	Multiply.
$4 = b$	Add 2 to each side.

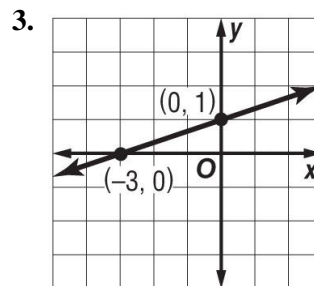Therefore, the equation is $y = -2x + 4$.

Exercises

Write an equation of the line that passes through each pair of points.

1.

$y = 4x - 3$

2.

$y = -x + 4$

3.

$y = \dfrac{1}{3}x + 1$

4. (–1, 6), (7, –10)

$y = -2x + 4$

5. (0, 2), (1, 7)

$y = 5x + 2$

6. (6, –25), (–1, 3)

$y = -4x - 1$

7. (–2, –1), (2, 11)

$y = 3x + 5$

8. (10, –1), (4, 2)

$y = -\dfrac{1}{2}x + 4$

9. (–14, –2), (7, 7)

$y = \dfrac{3}{7}x + 4$

10. (4, 0), (0, 2)

$y = -\dfrac{1}{2}x + 2$

11. (–3, 0), (0, 5)

$y = \dfrac{5}{3}x + 5$

12. (0, 16), (–10, 0)

$y = \dfrac{8}{5}x + 16$