

4-3 Study Guide and Intervention**Writing Equations in Point-Slope Form****Point-Slope Form****Point-Slope Form**

$y - y_1 = m(x - x_1)$, where (x_1, y_1) is a given point on a nonvertical line and m is the slope of the line

Example 1

Write an equation in point-slope form for the line that passes through $(6, 1)$ with a slope of $-\frac{5}{2}$.

$$y - y_1 = m(x - x_1) \quad \text{Point-slope form}$$

$$y - 1 = -\frac{5}{2}(x - 6) \quad m = -\frac{5}{2}; (x_1, y_1) = (6, 1)$$

Therefore, the equation is $y - 1 = -\frac{5}{2}(x - 6)$.

Example 2

Write an equation in point-slope form for a horizontal line that passes through $(4, -1)$.

$$y - y_1 = m(x - x_1) \quad \text{Point-slope form}$$

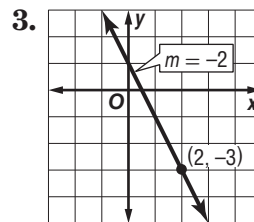
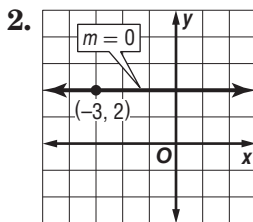
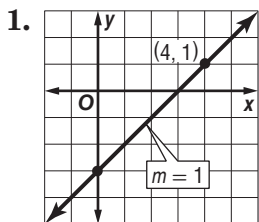
$$y - (-1) = 0(x - 4) \quad m = 0; (x_1, y_1) = (4, -1)$$

$$y + 1 = 0 \quad \text{Simplify.}$$

Therefore, the equation is $y + 1 = 0$.

Exercises

Write an equation in point-slope form for the line that passes through each point with the given slope.



4. $(2, 1), m = 4$

5. $(-7, 2), m = 6$

6. $(8, 3), m = 1$

7. $(-6, 7), m = 0$

8. $(4, 9), m = \frac{3}{4}$

9. $(-4, -5), m = -\frac{1}{2}$

10. Write an equation in point-slope form for a horizontal line that passes through $(4, -2)$.

11. Write an equation in point-slope form for a horizontal line that passes through $(-5, 6)$.

12. Write an equation in point-slope form for a horizontal line that passes through $(5, 0)$.

4-3 Study Guide and Intervention *(continued)***Writing Equations in Point-Slope Form****Forms of Linear Equations**

Slope-Intercept Form	$y = mx + b$	m = slope; b = y -intercept
Point-Slope Form	$y - y_1 = m(x - x_1)$	m = slope; (x_1, y_1) is a given point
Standard Form	$Ax + By = C$	A and B are not both zero. Usually A is nonnegative and A , B , and C are integers whose greatest common factor is 1.

Example 1 Write $y + 5 = \frac{2}{3}(x - 6)$ in standard form.

$$\begin{aligned}
 y + 5 &= \frac{2}{3}(x - 6) && \text{Original equation} \\
 3(y + 5) &= 3\left(\frac{2}{3}\right)(x - 6) && \text{Multiply each side by 3.} \\
 3y + 15 &= 2(x - 6) && \text{Distributive Property} \\
 3y + 15 &= 2x - 12 && \text{Distributive Property} \\
 3y &= 2x - 27 && \text{Subtract 15 from each side.} \\
 -2x + 3y &= -27 && \text{Add } -2x \text{ to each side.} \\
 2x - 3y &= 27 && \text{Multiply each side by } -1.
 \end{aligned}$$

Therefore, the standard form of the equation is $2x - 3y = 27$.

Example 2 Write $y - 2 = -\frac{1}{4}(x - 8)$ in slope-intercept form.

$$\begin{aligned}
 y - 2 &= -\frac{1}{4}(x - 8) && \text{Original equation} \\
 y - 2 &= -\frac{1}{4}x + 2 && \text{Distributive Property} \\
 y &= -\frac{1}{4}x + 4 && \text{Add 2 to each side.}
 \end{aligned}$$

Therefore, the slope-intercept form of the equation is $y = -\frac{1}{4}x + 4$.

Exercises

Write each equation in standard form.

1. $y + 2 = -3(x - 1)$
2. $y - 1 = -\frac{1}{3}(x - 6)$
3. $y + 2 = \frac{2}{3}(x - 9)$
4. $y + 3 = -(x - 5)$
5. $y - 4 = \frac{5}{3}(x + 3)$
6. $y + 4 = -\frac{2}{5}(x - 1)$

Write each equation in slope-intercept form.

7. $y + 4 = 4(x - 2)$
8. $y - 5 = \frac{1}{3}(x - 6)$
9. $y - 8 = -\frac{1}{4}(x + 8)$
10. $y - 6 = 3\left(x - \frac{1}{3}\right)$
11. $y + 4 = -2(x + 5)$
12. $y + \frac{5}{3} = \frac{1}{2}(x - 2)$