

Study Guide and Intervention

Alg1 7.0

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
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Example 1 Write the point-slope form of an equation for a line that passes through $(6, 1)$ and has 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 the point-slope form of an equation for a horizontal line that passes through $(4, -1)$.

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

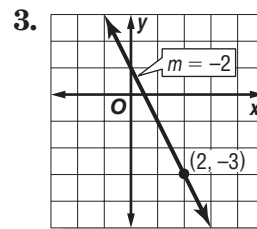
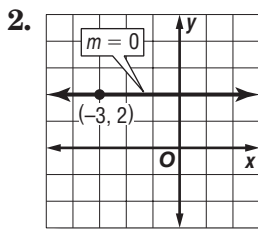
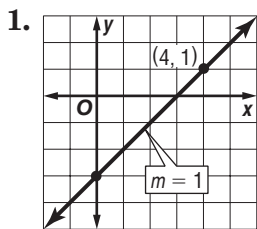
$$y - (-1) = 0(x - 4) \quad m = 0; (x_1, y_1) = (4, -1)$$

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

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

Exercises

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

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

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

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

Slope-Intercept Form	$y = mx + b$	$m = \text{slope}; b = y\text{-intercept}$
Point-Slope Form	$y - y_1 = m(x - x_1)$	$m = \text{slope}; (x_1, y_1)$ 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.

$$y + 5 = \frac{2}{3}(x - 6) \quad \text{Original equation}$$

$$3(y + 5) = 3\left(\frac{2}{3}\right)(x - 6) \quad \text{Multiply each side by 3.}$$

$$3y + 15 = 2(x - 6) \quad \text{Distributive Property}$$

$$3y + 15 = 2x - 12 \quad \text{Distributive Property}$$

$$3y = 2x - 27 \quad \text{Subtract 15 from each side.}$$

$$-2x + 3y = -27 \quad \text{Add } -2x \text{ to each side.}$$

$$2x - 3y = 27 \quad \text{Multiply each side by } -1.$$

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.

$$y - 2 = -\frac{1}{4}(x - 8) \quad \text{Original equation}$$

$$y - 2 = -\frac{1}{4}x + 2 \quad \text{Distributive Property}$$

$$y = -\frac{1}{4}x + 4 \quad \text{Add 2 to each side.}$$

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