

Lesson 6-3

Example 1

Write an equation of the line with slope of -3 and containing the point $P(-3, 4)$.

Solution

$$\begin{array}{ll}
 y - y_1 = m(x - x_1) & \text{point-slope form} \\
 y - 4 = -3(x - (-3)) & \text{Substitute } -3 \text{ for } m, -3 \text{ for } x_1, \text{ and } 4 \text{ for } y_1. \\
 y - 4 = -3(x + 3) & \text{Solve for } y. \\
 y - 4 = -3x - 9 & \\
 y = -3x - 5 & \text{slope-intercept form.}
 \end{array}$$

Example 2

Write an equation of the line that contains the points $A(2, -3)$ and $B(4, 3)$.

Solution

Given: $x_1 = 2, y_1 = -3, x_2 = 4, y_2 = 3$

Find the slope of the line: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - (-3)}{4 - 2} = \frac{6}{2} = 3$

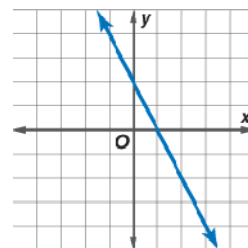
Find the equation using the point-slope form.

$$\begin{array}{ll}
 y - y_1 = m(x - x_1) & \\
 y - (-3) = 3(x - 2) & \text{Solve for } y. \\
 y + 3 = 3x - 6 & \\
 y = 3x - 9 & \text{slope-intercept form}
 \end{array}$$

An equation of the line is $y = 3x - 9$.

Example 3

PRODUCT DESIGN A technician is using a coordinate grid to design a schematic for a circuit board. A connection aligns with the line shown at the right. Write an equation of the line.

**Solution**

y-intercepts: The line intersects the y-axis at the point (0, 2).
The y-intercept is 2.

slope: Use two points on the line whose coordinates are easily determined.

Use $(x_1, y_1) = (0, 2)$ and $(x_2, y_2) = (3, -4)$.

$$m = \frac{-4 - 2}{3 - 0} = \frac{-6}{3} = -2$$

An equation of the line: $y = mx + b$
 $y = -2x + 2$ slope-intercept form

Example 4

Write an equation of a line parallel to $y = \frac{2}{3}x - 2$ containing the point $R(-2, 1)$.

Solution

$$y = \frac{2}{3}x - 2 \quad m = \frac{2}{3} \quad \text{slope of line}$$

Because parallel lines have equal slopes, $m = \frac{2}{3}$.

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

$$y - 1 = \frac{2}{3}(x - (-2)) \quad x_1 = -2, y_1 = 1$$

$$y - 1 = \frac{2}{3}x + \frac{4}{3}$$

$$y = \frac{2}{3}x + \frac{7}{3}$$

An equation of the line is $y = \frac{2}{3}x + \frac{7}{3}$.