

5.1 Write Linear Equations in Slope-Intercept Form

Goal • Write equations of lines.

Example 1 - Use slope and y-intercept to write an equation

Write an equation of the line with a slope of -4 and a y-intercept of 6.

Solution

$$y = mx + b$$

$$y = -4x + 6$$

Checkpoint Write an equation of the line with the given slope and y-intercept.

1. Slope is 8; y-intercept is -5.

$$y = 8x - 5$$

2. Slope is $\frac{2}{3}$; y-intercept is -2.

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

3. Slope is -3; y-intercept is 7.

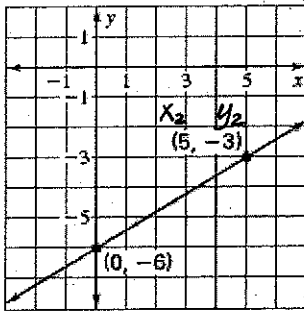
$$y = -3x + 7$$

4. Slope is $-\frac{5}{2}$; y-intercept is 9.

$$y = -\frac{5}{2}x + 9$$

Example 2 - Write an equation of a line given two points $y = mx + b$

5. Write an equation of the line shown.



x, y.

y-intercept given

$$b = -6$$

① Find slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$

$$m = \frac{-3 - (-6)}{5 - 0}$$

$$m = \frac{3}{5}$$

② Write equation: $y = \frac{3}{5}x - 6$

Example 3 - Write a linear function

Write an equation for the linear function f with the values $f(0) = 4$ and $f(2) = 12$.

Solution

Step 1 Write $f(0) = 4$ as $(0, 4)$ and $f(2) = 12$ as $(2, 12)$

Step 2 Calculate the slope of the line that passes through $(0, 4)$ and $(2, 12)$

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

$$m = \frac{12 - 4}{2 - 0}$$

$$m = \frac{8}{2} = \frac{4}{1}$$

Step 3 Write an equation of the line. The line crosses the y-axis at $(0, 4)$. So, the y-intercept is $b = 4$.

$$y = 4x + 4$$

The function is $f(x) = 4x + 4$.

Checkpoint Complete the following exercise.

6. Write an equation for the linear function with the values $f(0) = 3$ and $f(3) = 15$.

$$(0, 3) \text{ and } (3, 15) \quad b = 3$$

x_1, y_1 x_2, y_2

$$m = \frac{15 - 3}{3 - 0}$$

$$m = \frac{12}{3} = \frac{4}{1}$$

$$y = 4x + 3$$

$$f(x) = 4x + 3$$