

5.1

Write Linear Equations in Slope-Intercept Form

Goal • Write equations of lines.

Your Notes

Use the slope-intercept form ($y = mx + b$) to write an equation of a line if slope and y-intercept are given.

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

$$y = mx + b$$

$$y = -4x + 6$$

Write slope-intercept form.

Substitute -4 for m and 6 for b .

✓ **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 .

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

Your Notes

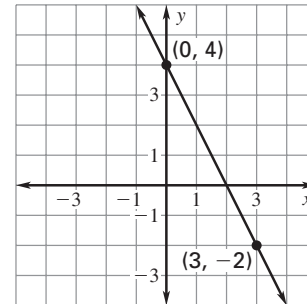
Example 2 Write an equation of a line given two points

Write an equation of the line shown.

Solution

Step 1 Calculate the slope.

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{-2}{3} - \frac{4}{0} \\ &= \frac{-6}{3} = -2 \end{aligned}$$



You can write an equation of a line if you know the y-intercept and any other point on the line.

Step 2 Write an equation of the line. The line crosses the y-axis at $(0, 4)$. So, the y-intercept is 4 .

$$y = mx + b$$

$$y = -2x + 4$$

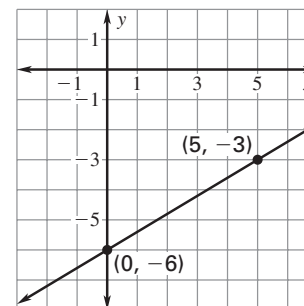
Write slope-intercept form.

Substitute -2 for m and 4 for b .

✓ **Checkpoint** Complete the following exercise.

5. Write an equation of the line shown.

$$y = \frac{3}{5}x - 6$$



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 $(2, 12)$.

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{12 - 4}{2 - 0} \\ &= \frac{8}{2} \\ &= 4 \end{aligned}$$

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

$$y = mx + b$$

Write slope-intercept form.

$$y = 4x + 4$$

Substitute 4 for m and 4 for b .

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

 **Checkpoint** Complete the following exercise.

Homework

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

$$y = 4x + 3$$