

# Maintaining Mathematical Proficiency

## Graphing Linear Functions

**Example 1** Graph  $3 + y = \frac{1}{2}x$ .

**Step 1** Rewrite the equation in slope-intercept form.

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

**Step 2** Find the slope and the y-intercept.

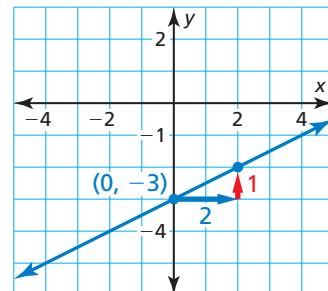
$$m = \frac{1}{2} \text{ and } b = -3$$

**Step 3** The y-intercept is  $-3$ . So, plot  $(0, -3)$ .

**Step 4** Use the slope to find another point on the line.

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{1}{2}$$

Plot the point that is **2 units right** and **1 unit up** from  $(0, -3)$ . Draw a line through the two points.



**Graph the equation.**

1.  $y + 4 = x$
2.  $6x - y = -1$
3.  $4x + 5y = 20$
4.  $-2y + 12 = -3x$

## Solving and Graphing Linear Inequalities

**Example 2** Solve  $2x - 17 \leq 8x - 5$ . Graph the solution.

$$2x - 17 \leq 8x - 5$$

Write the inequality.

$$\underline{+ 5} \quad \underline{+ 5}$$

Add 5 to each side.

$$2x - 12 \leq 8x$$

Simplify.

$$\underline{- 2x} \quad \underline{- 2x}$$

Subtract  $2x$  from each side.

$$-12 \leq 6x$$

Simplify.

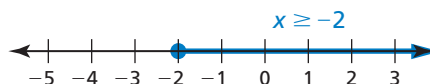
$$\underline{\frac{-12}{6}} \leq \underline{\frac{6x}{6}}$$

Divide each side by 6.

$$-2 \leq x$$

Simplify.

▶ The solution is  $x \geq -2$ .



**Solve the inequality. Graph the solution.**

5.  $m + 4 > 9$
6.  $24 \leq -6t$
7.  $2a - 5 \leq 13$
8.  $-5z + 1 < -14$
9.  $4k - 16 < k + 2$
10.  $7w + 12 \geq 2w - 3$

11. **ABSTRACT REASONING** The graphs of the linear functions  $g$  and  $h$  have different slopes. The value of both functions at  $x = a$  is  $b$ . When  $g$  and  $h$  are graphed in the same coordinate plane, what happens at the point  $(a, b)$ ?