Lesson 2-6

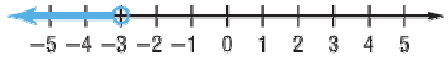
Example 1

Solve each inequality and graph its solution on a number line.

a. $2x + 4 < -2$ **b.** $15 \geq 9 - 3x$

Solution

a.
$$2x + 4 < -2$$
$$2x + 4 + (-4) < -2 + (-4)$$
$$2x < -6$$
$$\frac{1}{2}2x < \frac{1}{2}(-6)$$
$$x < -3$$



b.
$$15 \geq 9 - 3x$$
$$15 + (-9) \geq 9 + (-9) - 3x$$
$$6 \geq -3x$$
$$-\frac{1}{3}6 \leq -\frac{1}{3}(-3x)$$
$$-2 \leq x$$
$$x \geq -2$$

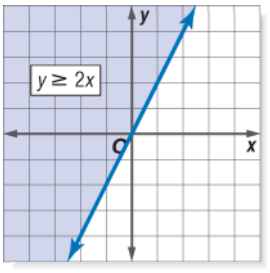
Example 2

Graph $y \geq 2x$.

Solution

The related equation is $y = 2x$.
Make a table of values that can be used to graph the boundary. Note that the boundary is part of the solution set, and is drawn as a solid line. To decide which half-plane to shade, use a test-point not on the boundary. If it is a solution, then all points on that half-plane will also be solutions; so, shade that side. If the point is not a solution, shade the half-plane that does not contain that test point.

x	*y*
-1	-2
0	0
1	2



Test Point: (2, 1)
$$y \geq 2x$$
$$1 \geq 2(2)$$
$$1 \geq 4 \text{ (false)}$$

Because 1 *is not* greater than or equal to 4, shade the half-plane that does not contain (2, 1).

Example 3

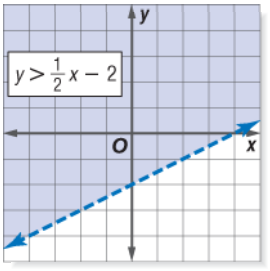
Graph $y > \frac{1}{2}x - 2$.

Solution

The related equation is $y = \frac{1}{2}x - 2$.

Make a table of values that can be used to graph the boundary. Note that the boundary is not included in the solution set, and is drawn as a broken line.

x	*y*
-2	-3
0	-2
2	-1



Test Point: (0, 0) $y > \frac{1}{2}x - 2$

$0 > \frac{1}{2}(0) - 2$

$0 > -2$

Because 0 *is* greater than -2, shade the half-plane containing (0, 0).