Extension

Use after Lesson 6.3

Solve Linear Inequalities by Graphing

TEKS A.7.A, A.7.B, A.7.C

GOAL Use graphs to solve linear inequalities.

So far in Chapter 6 you have seen how to solve linear inequalities algebraically. You can also solve linear inequalities graphically.

KEY CONCEPT *For Your Notebook*

Solving Linear Inequalities Graphically

STEP 1 **Write** the inequality in one of the following forms: $ax + b < 0$, $ax + b \leq 0$, $ax + b > 0$, or $ax + b \geq 0$.

STEP 2 **Write** the related equation $y = ax + b$.

STEP 3 **Graph** the equation $y = ax + b$.

- The solutions of $ax + b > 0$ are the x-coordinates of the points on the graph of $y = ax + b$ that lie above the x-axis.
- The solutions of $ax + b < 0$ are the x-coordinates of the points on the graph of $y = ax + b$ that lie below the x-axis.
- If the inequality symbol is $\leq$ or $\geq$, then the x-intercept of the graph is also a solution.

EXAMPLE 1 Solve an inequality graphically

Solve $3x + 2 > 8$ graphically.

Solution

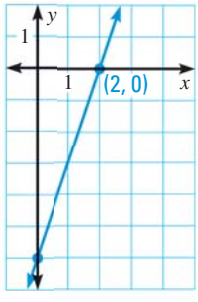
STEP 1 **Write** the inequality in the form $ax + b > 0$.

$3x + 2 > 8$ **Write original inequality.**

$3x - 6 > 0$ **Subtract 8 from each side.**

STEP 2 **Write** the related equation $y = 3x - 6$.

STEP 3 **Graph** the equation $y = 3x - 6$.



The inequality in Step 1 is in the form $ax + b > 0$, and the x-intercept of the graph in Step 3 is 2. So, $x > 2$.

▶ The solutions are all real numbers greater than 2. Check by substituting a number greater than 2 in the original inequality.

CHECK $3x + 2 > 8$ **Write original inequality.**

$3(4) + 2 \stackrel{?}{>} 8$ **Substitute 4 for x.**

$14 > 8$ ✓ **Solution checks.**