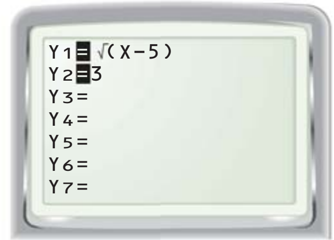
EXAMPLE 2 Solve a radical inequality using a graph

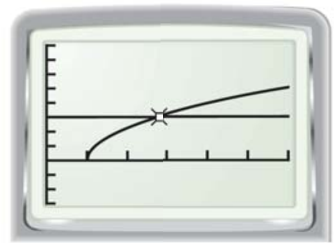
Use a graph to solve $\sqrt{x-5} > 3$.

Solution

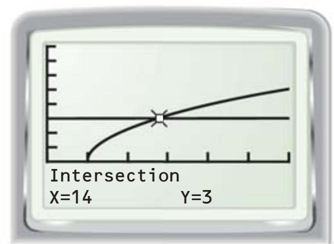
STEP 1 **Enter** the functions $y = \sqrt{x-5}$ and $y = 3$ into a graphing calculator.



STEP 2 **Graph** the functions from Step 1. Adjust the viewing window so that the x-axis shows $0 \le x \le 30$ with a scale of 5 and the y-axis shows $-3 \le y \le 8$ with a scale of 1.



STEP 3 **Identity** the x-values for which the graph of $y = \sqrt{x-5}$ lies above the graph of $y = 3$. You can use the *intersect* feature to show that the graphs intersect when $x = 14$. The graph of $y = \sqrt{x-5}$ lies above the graph of $y = 3$ when $x > 14$.



INTERPRET DOMAIN
In Example 2, note that the domain of $y = \sqrt{x-5}$ is $x \ge 5$. Therefore, the domain does not affect the solution.

▶ The solution of the inequality is $x > 14$.

PRACTICE

EXAMPLE 1
on p. 462
for Exs. 1–6

Use a table to solve the inequality.

1. $2\sqrt{x} - 5 \ge 3$ **2.** $\sqrt{x-4} \le 5$ **3.** $4\sqrt{x} + 1 \le 9$

4. $\sqrt{x+7} \ge 3$ **5.** $\sqrt{x} + \sqrt{x+3} \ge 3$ **6.** $\sqrt{x} + \sqrt{x-5} \le 5$

EXAMPLE 2
on p. 463
for Exs. 7–12

Use a graph to solve the inequality.

7. $2\sqrt{x} + 3 \le 8$ **8.** $\sqrt{x+3} \ge 2.6$ **9.** $7\sqrt{x} + 1 < 9$

10. $4\sqrt{3x-7} > 7.8$ **11.** $\sqrt{x} - \sqrt{x+5} < -1$ **12.** $\sqrt{x+2} + \sqrt{x-1} \le 9$

13. **SAILBOAT RACE** In order to compete in the America's Cup sailboat race, a boat must satisfy the rule

$$\ell + 1.25\sqrt{s} - 9.8\sqrt[3]{d} \le 16$$

where ℓ is the length (in meters) of the boat, s is the area (in square meters) of the sails, and d is the volume (in cubic meters) of water displaced by the boat. A boat has a length of 20 meters and displaces 27 cubic meters of water. What is the maximum allowable value for s?