EXAMPLE 2 Solve a radical equation

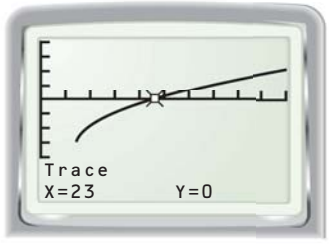
Solve $4\sqrt{x-7}+12=28$.

Solution

$4\sqrt{x-7}+12=28$	**Write original equation.**
$4\sqrt{x-7}=16$	**Subtract 12 from each side.**
$\sqrt{x-7}=4$	**Divide each side by 4.**
$(\sqrt{x-7})^2=4^2$	**Square each side.**
$x-7=16$	**Simplify.**
$x=23$	**Add 7 to each side.**

▶ The solution is 23.

CHECK To check the solution using a graphing calculator, first rewrite the equation so that one side is 0: $4\sqrt{x-7}-16=0$. Then graph the related equation $y=4\sqrt{x-7}-16$. You can see that the graph crosses the x-axis at $x=23$.



EXAMPLE 3 Solve an equation with radicals on both sides

Solve $\sqrt{3x-17}=\sqrt{x+21}$.

Solution

$\sqrt{3x-17}=\sqrt{x+21}$	**Write original equation.**
$(\sqrt{3x-17})^2=(\sqrt{x+21})^2$	**Square each side.**
$3x-17=x+21$	**Simplify.**
$2x-17=21$	**Subtract x from each side.**
$2x=38$	**Add 17 to each side.**
$x=19$	**Divide each side by 2.**

▶ The solution is 19. Check the solution.

SOLVE EQUATIONS
To solve a radical equation that contains two radical expressions, be sure that each side of the equation has only one radical expression before squaring each side.

GUIDED PRACTICE for Examples 2 and 3

Solve the equation.

2. $\sqrt{x-5}+7=12$ **3.** $\sqrt{x+4}=\sqrt{2x-1}$ **4.** $\sqrt{4x-3}-\sqrt{x}=0$

EXTRANEOUS SOLUTIONS Squaring both sides of the equation $a=b$ can result in a solution of $a^2=b^2$ that is *not* a solution of the original equation. Such a solution is called an **extraneous solution.** When you square both sides of an equation, check each solution in the original equation to be sure there are no extraneous solutions.