EXAMPLE 6 Solve a real-world problem

MICROPHONE SALES For the period 1988–2002, the amount of sales y (in millions of dollars) of microphones in the United States can be modeled by the function $y = 93\sqrt{x + 2.2}$ where x is the number of years since 1988. Graph the function on a graphing calculator. In what year were microphone sales about \$325 million?

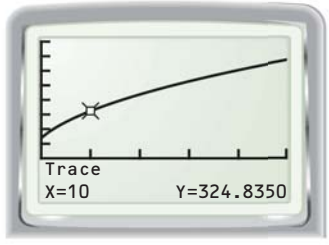
ANOTHER WAY

You can graph $y = 93\sqrt{x + 2.2}$ and $y = 325$. The x-coordinate of the point where the graphs intersect represents the year in which sales were about \$325 million.

Solution

The graph of the function is shown.

Using the *trace* feature, you can see that $y \approx 325$ when $x = 10$. So, microphone sales were about \$325 million 10 years after 1988, or in 1998.



GUIDED PRACTICE for Example 6

7. **MICROPHONE SALES** Use the function in Example 6 to find the year in which microphone sales were about \$250 million.

11.1 EXERCISES

HOMEWORK KEY

= **WORKED-OUT SOLUTIONS** on p. WS1 for Exs. 7, 23, and 45

= **TAKS PRACTICE AND REASONING** Exs. 15, 29, 39, 41, 48, 50, and 51

SKILL PRACTICE

1. **VOCABULARY** Copy and complete: A function containing a radical expression with the independent variable in the radicand is called a(n) ___?___.

2. **WRITING** Is the graph of $y = 1.25\sqrt{x}$ a vertical stretch or a vertical shrink of the graph of $y = \sqrt{x}$? *Explain* your answer.

EXAMPLES 1 and 2 on pp. 710–711 for Exs. 3–16

GRAPHING FUNCTIONS **Graph the function and identify its domain and range. Compare the graph with the graph of $y = \sqrt{x}$.**

3. $y = 4\sqrt{x}$
4. $y = 5\sqrt{x}$
5. $y = 0.5\sqrt{x}$
6. $y = 0.25\sqrt{x}$
7. $y = \frac{3}{2}\sqrt{x}$
8. $y = \frac{1}{3}\sqrt{x}$
9. $y = -3\sqrt{x}$
10. $y = -6\sqrt{x}$
11. $y = -0.8\sqrt{x}$
12. $y = -0.75\sqrt{x}$
13. $y = -\frac{1}{4}\sqrt{x}$
14. $y = -\frac{5}{2}\sqrt{x}$

15. **TAKS REASONING** The graph of which function is a vertical shrink of the graph of $y = \sqrt{x}$?

(A) $y = -5\sqrt{x}$ (B) $y = -\sqrt{x}$ (C) $y = \frac{1}{2}\sqrt{x}$ (D) $y = 8\sqrt{x}$

16. **WRITING** The range of the function $y = a\sqrt{x}$ is $y \leq 0$. What can you conclude about the value of a? How do you know?