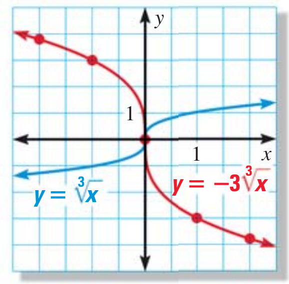
EXAMPLE 2 Graph a cube root function

Graph $y = -3\sqrt[3]{x}$, and state the domain and range. Compare the graph with the graph of $y = \sqrt[3]{x}$.

Solution

Make a table of values and sketch the graph.

x	−2	−1	0	1	2
y	3.78	3	0	−3	−3.78



The domain and range are all real numbers.

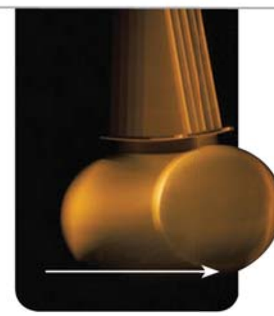
The graph of $y = -3\sqrt[3]{x}$ is a vertical stretch of the graph of $y = \sqrt[3]{x}$ by a factor of 3 followed by a reflection in the x-axis.

REVIEW STRETCHES AND SHRINKS
For help with vertical stretches and shrinks, see p. 123.

TAKS

EXAMPLE 3 TAKS REASONING: Multi-Step Problem

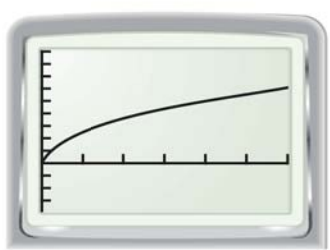
PENDULUMS The *period* of a pendulum is the time the pendulum takes to complete one back-and-forth swing. The period T (in seconds) can be modeled by $T = 1.11\sqrt{\ell}$ where ℓ is the pendulum's length (in feet).



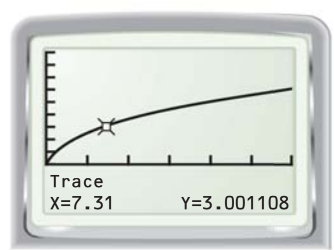
- Use a graphing calculator to graph the model.
- How long is a pendulum with a period of 3 seconds?

Solution

STEP 1 **Graph** the model. Enter the equation $y = 1.11\sqrt{x}$. The graph is shown below.



STEP 2 **Use** the *trace* feature to find the value of x when $y = 3$. The graph shows $x \approx 7.3$.



▶ A pendulum with a period of 3 seconds is about 7.3 feet long.

✓ GUIDED PRACTICE for Examples 1, 2, and 3

Graph the function. Then state the domain and range.

1. $y = -3\sqrt{x}$ **2.** $f(x) = \frac{1}{4}\sqrt{x}$ **3.** $y = -\frac{1}{2}\sqrt[3]{x}$ **4.** $g(x) = 4\sqrt[3]{x}$

5. **WHAT IF?** Use the model in Example 3 to find the length of a pendulum with a period of 1 second.