EXAMPLE 4 TAKS PRACTICE: Multiple Choice

What are the solutions of the equation $\frac{1}{7}(z-2)^2 = 6$?

Ⓐ $-44, 40$ Ⓑ $2 - 7\sqrt{6}, 2 + 7\sqrt{6}$

Ⓒ $2 - \sqrt{42}, 2 + \sqrt{42}$ Ⓓ $2 - \frac{\sqrt{42}}{7}, 2 + \frac{\sqrt{42}}{7}$

Solution

$\frac{1}{7}(z-2)^2 = 6$ **Write original equation.**

$(z-2)^2 = 42$ **Multiply each side by 7.**

$z - 2 = \pm\sqrt{42}$ **Take square roots of each side.**

$z = 2 \pm \sqrt{42}$ **Add 2 to each side.**

The solutions are $2 + \sqrt{42}$ and $2 - \sqrt{42}$.

▶ The correct answer is C. Ⓐ Ⓑ Ⓒ Ⓓ

GUIDED PRACTICE for Examples 2, 3, and 4

Simplify the expression.

9. $\sqrt{\frac{6}{5}}$ **10.** $\sqrt{\frac{9}{8}}$ **11.** $\sqrt{\frac{17}{12}}$ **12.** $\sqrt{\frac{19}{21}}$

13. $\frac{-6}{7 - \sqrt{5}}$ **14.** $\frac{2}{4 + \sqrt{11}}$ **15.** $\frac{-1}{9 + \sqrt{7}}$ **16.** $\frac{4}{8 - \sqrt{3}}$

Solve the equation.

17. $5x^2 = 80$ **18.** $z^2 - 7 = 29$ **19.** $3(x-2)^2 = 40$

MODELING DROPPED OBJECTS When an object is dropped, its height h (in feet) above the ground after t seconds can be modeled by the function

$$h = -16t^2 + h_0$$

where h_0 is the object's initial height (in feet). The graph of $h = -16t^2 + 200$, representing the height of an object dropped from an initial height of 200 feet, is shown at the right.

The model $h = -16t^2 + h_0$ assumes that the force of air resistance on the object is negligible. Also, this model works only on Earth. For planets with stronger or weaker gravity, different models are used (see Exercise 39).