EXAMPLE 5 **Model a dropped object with a quadratic function**

SCIENCE COMPETITION For a science competition, students must design a container that prevents an egg from breaking when dropped from a height of 50 feet. How long does the container take to hit the ground?

Solution

$h = -16t^2 + h_0$	**Write height function.**
$0 = -16t^2 + 50$	**Substitute 0 for h and 50 for h_0.**
$-50 = -16t^2$	**Subtract 50 from each side.**
$\dfrac{50}{16} = t^2$	**Divide each side by −16.**
$\pm\sqrt{\dfrac{50}{16}} = t$	**Take square roots of each side.**
$\pm 1.8 \approx t$	**Use a calculator.**

▶ Reject the negative solution, −1.8, because time must be positive. The container will fall for about 1.8 seconds before it hits the ground.
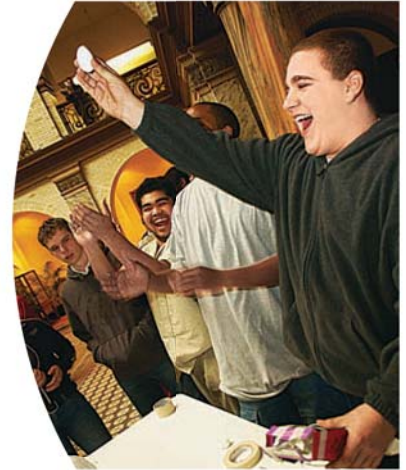
After a successful egg drop

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✓ **GUIDED PRACTICE** **for Example 5**

20. **WHAT IF?** In Example 5, suppose the egg container is dropped from a height of 30 feet. How long does the container take to hit the ground?

4.5 **EXERCISES**

SKILL PRACTICE

1. **VOCABULARY** In the expression $\sqrt{72}$, what is 72 called?

2. **WRITING** *Explain* what it means to "rationalize the denominator" of a quotient containing square roots.

EXAMPLES 1 and 2
on pp. 266–267
for Exs. 3–20

SIMPLIFYING RADICAL EXPRESSIONS Simplify the expression.

3. $\sqrt{28}$

4. $\sqrt{192}$

5. $\sqrt{150}$

6. $\sqrt{3} \cdot \sqrt{27}$

7. $4\sqrt{6} \cdot \sqrt{6}$

8. $5\sqrt{24} \cdot 3\sqrt{10}$

9. $\sqrt{\dfrac{5}{16}}$

10. $\sqrt{\dfrac{35}{36}}$

11. $\dfrac{8}{\sqrt{3}}$

12. $\dfrac{7}{\sqrt{12}}$

13. $\sqrt{\dfrac{18}{11}}$

14. $\sqrt{\dfrac{13}{28}}$

15. $\dfrac{2}{1 - \sqrt{3}}$

16. $\dfrac{1}{5 + \sqrt{6}}$

17. $\dfrac{\sqrt{2}}{4 + \sqrt{5}}$

18. $\dfrac{3 + \sqrt{7}}{2 - \sqrt{10}}$