

## Study Guide

**Solving Equations by Factoring**

Factoring can be used to solve many kinds of problems.

**Example:** A rocket is fired with an initial velocity of 2288 feet per second. How many seconds will it take for the rocket to hit the ground?

**Explore** Use the formula  $h = vt - 16t^2$ .

**Plan** Substitute the appropriate values into the formula.

**Solve**  $0 = 2288t - 16t^2$   
 $16t = 0$  or  $143 - t = 0$       **Zero product property**  
 $t = 0$                        $143 = t$

**Examine** An answer of 0 seconds is not a reasonable answer, so use only the value 143. The rocket returns to the ground in 143 seconds.

**Solve each equation. Check your solutions.**

1.  $n^2 - 16 = 0$

2.  $x^2 + 10x + 25 = 0$

3.  $9x^2 + x = 0$

4.  $x^2 = 24 - 10x$

5.  $x^3 - 18x = 7x^2$

6.  $x^3 - 36x = 9x^2$

**For each problem below, define a variable. Then use an equation to solve the problem. Disregard any unreasonable solutions.**

7. The difference of the squares of two consecutive odd integers is 24. Find the integers.

8. The length of a Charlotte, North Carolina, conservatory garden is 20 yards greater than its width. The area is 300 square yards. What are the dimensions?

**Use the formula  $h = vt - 16t^2$  to solve each problem.**

9. A punter can kick a football with an initial velocity of 48 feet per second. How many seconds will it take the ball to return to the ground?

10. If a rocket is launched from Houston, Texas, with an initial velocity of 1600 feet per second, when will the rocket be 14,400 feet high?