NAME _____ DATE _____

11-4

Solving Quadratic Equations by Factoring (Pages 474–477)

You can use the Zero Product Property to solve quadratic equations by factoring.

Zero Product Property	For all numbers a and b, if $ab = 0$, then $a = 0$, $b = 0$, or both a and b equal 0.

EXAMPLES

A Solve $7a(a + 7) = 0$. Check your solution.

$7a(a + 7) = 0$

$7a = 0$ or $a + 7 = 0$ *Zero Product Property*

$a = 0$ $a = -7$

Check your solution by substituting 0 and −7 for a in the original equation.

$7a(a + 7) = 0$ or $7a(a + 7) = 0$

$7(0)(0 + 7) \stackrel{?}{=} 0$ $7(-7)(-7 + 7) \stackrel{?}{=} 0$

$0(7) \stackrel{?}{=} 0$ $-49(0) \stackrel{?}{=} 0$

$0 = 0$ ✓ $0 = 0$ ✓

The solutions are 0 and −7.

B Solve $x^2 + 64 = 16x$. Check your solution.

$x^2 + 64 = 16x$

$x^2 - 16x + 64 = 0$ *Rewrite the equation.*

$(x - 8)(x - 8) = 0$ *Factor.*

$x - 8 = 0$ or $x - 8 = 0$

$x = 8$ $x = 8$

Check. $x^2 + 64 = 16x$

$8^2 + 64 \stackrel{?}{=} 16(8)$

$64 + 64 \stackrel{?}{=} 128$

$128 = 128$ ✓

The solution is 8.

Try These Together

Solve each equation. Check your solution.

1. $a^2 + 9a + 20 = 0$ **2.** $x^2 = 16x$ **3.** $b^2 = 10b$

HINT: Remember that you may have more than one solution.

PRACTICE

Solve each equation. Check your solution.

4. $6x(x - 5) = 0$ **5.** $(z - 10)(z + 10) = 0$ **6.** $(3a + 6)(a - 7) = 0$

7. $z^2 + 11z + 24 = 0$ **8.** $k^2 - 9k + 18 = 0$ **9.** $x^2 - 4x - 21 = 0$

10. $x^2 - 11x + 24 = 0$ **11.** $y^2 - 7y = -12$ **12.** $5g + 6 = -g^2$

For each problem, define a variable. Then use an equation to solve the problem.

13. The length of a rectangle is 5 inches longer than the width. The area is 66 square inches. Find the dimensions of the rectangle.

14. Find two integers whose difference is 9 and whose product is 36.

15. **Standardized Test Practice** Solve the equation $(k - 15)(k + 8) = 0$.

A $-15, 8$ **B** $-15, -8$ **C** $8, 15$ **D** $-8, 15$

Answers: **1.** −4, −5 **2.** 0, 16 **3.** 0, 10 **4.** 0, 5 **5.** −10, 10 **6.** −2, 7 **7.** −8, −3 **8.** 6, 3 **9.** −3, 7 **10.** 3, 8 **11.** 3, 4 **12.** −2, −3 **13.** $\ell = 11$ in.; $w = 6$ in. **14.** 3, 12; −12, −3 **15.** D