

10-6

NAME _____ DATE _____

Solving Equations by Factoring

(Pages 594–600)

You can use the zero product property to solve 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 $x^2 + 64 = 16x$.

$$\begin{aligned} x^2 + 64 &= 16x && \text{Rewrite the equation.} \\ x^2 - 16x + 64 &= 0 && \text{Factor the perfect square} \\ &&& \text{trinomial.} \end{aligned}$$

$$\begin{aligned} (x - 8)(x - 8) &= 0 \\ x - 8 = 0 &\text{ or } x - 8 = 0 \\ x = 8 &\qquad\qquad x = 8 \end{aligned}$$

The solution set is $\{8\}$.**B** Solve $12y^3 - 11y^2 = 15y$

$$\begin{aligned} 12y^3 - 11y^2 - 15y &= 0 && \text{Rewrite the equation.} \\ y(12y^2 - 11y - 15) &= 0 && \text{Factor the GCF, } y^2. \\ y(4y + 3)(3y - 5) &= 0 \end{aligned}$$

$$\begin{aligned} y = 0 &\text{ or } 4y + 3 = 0 &\text{ or } 3y - 5 = 0 \\ 4y = -3 &\qquad\qquad 3y = 5 \\ y = -\frac{3}{4} &\qquad\qquad y = \frac{5}{3} \end{aligned}$$

The solution set is $\{-\frac{3}{4}, 0, \frac{5}{3}\}$.

Try These Together

Solve each equation. Check each 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, so record your solutions as a solution set.

PRACTICE

Solve each equation. Check each solution.

4. $y^2 - 7y = -12$

5. $(z - 10)(z + 10) = 0$

6. $(3a + 5)(2a - 7) = 0$

7. $z^2 + 11z + 24 = 0$

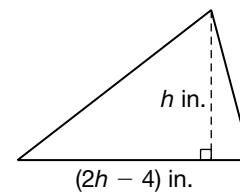
8. $k^2 - 9k + 18 = 0$

9. $x^2 - 4x - 21 = 0$

10. $x^2 - 11x + 24 = 0$

11. $2x^3 - 11x^2 = 6x$

12. $5g + 6 = -g^2$

13. Geometry The triangle at the right has an area of 63 square inches. Find the height h of the triangle.(Hint: Area of triangle = $\frac{1}{2}bh$)**14. Standardized Test Practice** Solve the equation $k(k - 15)(k + 8) = 0$.

A $\{-15, 8\}$

B $\{-15, 0, 8\}$

C $\{0, 8, 15\}$

D $\{-8, 0, 15\}$

Answers: 1. $\{-4, -5\}$ 2. $\{0, 16\}$ 3. $\{0, 10\}$ 4. $\{3, 4\}$ 5. $\{-10, 10\}$ 6. $\{-\frac{3}{5}, \frac{2}{7}\}$ 7. $\{-8, -3\}$ 8. $\{6, 3\}$ 9. $\{-3, 7\}$ 10. $\{3, 8\}$ 11. $\{-\frac{2}{1}, 0, 6\}$ 12. $\{-2, -3\}$ 13. 9 in. 14. D