Chapter 8

8-7 Study Guide and Intervention (continued)

Solving $ax^2 + bx + c = 0$

Solve Equations by Factoring  
Factoring and the Zero Product Property can be used to solve some equations of the form $ax^2 + bx + c = 0$.

Example 1  
Solve $12x^2 + 3x = 2 - 2x$. Check your solutions.

$12x^2 + 3x = 2 - 2x$  
Original equation
$(3x + 2)(4x - 1) = 0$  
Rewrite equation so that one side equals 0.
$3x + 2 = 0$ or $4x - 1 = 0$  
Factor the left side.
$x = -\frac{2}{3}$ or $x = \frac{1}{4}$  
Zero Product Property

Solve each equation.

The solution set is $\left\{ -\frac{2}{3}, \frac{1}{4} \right\}$.
Since $12\left(-\frac{2}{3}\right)^2 + 3\left(-\frac{2}{3}\right) = 2 - 2\left(-\frac{2}{3}\right)$ and $12\left(\frac{1}{4}\right)^2 + 3\left(\frac{1}{4}\right) = 2 - 2\left(\frac{1}{4}\right)$, the solutions check.

Exercises

Solve each equation. Check the solutions.

1. $8x^2 + 2x - 3 = 0$  
   $\left\{ -\frac{3}{4}, 1 \right\}$
2. $3x^2 - 2x - 5 = 0$  
   $\left\{ -1, \frac{5}{3} \right\}$
3. $2x^2 - 13x - 7 = 0$  
   $\left\{ -\frac{7}{2}, 7 \right\}$
4. $4x^2 = x + 3$  
   $\left\{ -\frac{3}{2}, 1 \right\}$
5. $5x^2 - 13x + 10 = 0$  
   $\left\{ -\frac{2}{5}, 5 \right\}$
6. $6x^2 - 11x - 10 = 0$  
   $\left\{ -\frac{5}{3}, 2 \right\}$
7. $2x^2 + 40 = -11k$  
   $\left\{ -\frac{5}{2}, \frac{5}{2} \right\}$
8. $2x^2 - 21p - 40 = 0$  
   $\left\{ -\frac{5}{2}, \frac{5}{2} \right\}$
9. $9x^2 - 18x + 9x = 0$  
   $\left\{ -\frac{7}{3}, \frac{7}{3} \right\}$
10. $12x^2 - 15 = -8x$  
    $\left\{ -\frac{5}{3}, \frac{5}{3} \right\}$
11. $7x^2 - 65a = 18$  
    $\left\{ -\frac{2}{7}, \frac{2}{9} \right\}$
12. $16y^2 - 2y - 3 = 0$  
    $\left\{ -\frac{1}{2}, \frac{3}{2} \right\}$
13. $8x^2 + 5x + 3 + 7x$  
    $\left\{ -\frac{1}{2}, \frac{3}{2} \right\}$
14. $4x^2 - 15a + 5 = 15$  
    $\left\{ -\frac{1}{2}, \frac{3}{2} \right\}$
15. $3b^2 - 18b = 10b - 49$  
    $\left\{ -\frac{7}{3}, \frac{7}{3} \right\}$

16. The difference of the squares of two consecutive odd integers is 24. Find the integers.
   $-5, -7$ and $5, 7$

17. GEOMETRY 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?
   $30$ yd by $10$ yd

18. GEOMETRY A rectangle with an area of 24 square inches is formed by cutting strips of equal width from a rectangular piece of paper. Find the dimensions of the new rectangle if the original rectangle measures 8 inches by 6 inches.
   $6$ in. by $4$ in.