Name _____ Date _____ Class _____

LESSON 5-3

Practice B

Solving Quadratic Equations by Graphing and Factoring

Find the zeros of each function by using a graph and a table.

1. $f(x) = x^2 + 5x + 6$

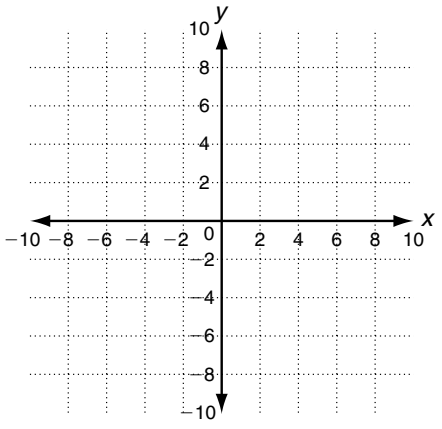
x	-4	-3	-2	-1	0
$f(x)$					

_____

2. $g(x) = -x^2 + 4x + 5$

x	-2	0	2	4	6
$f(x)$					

_____



Find the zeros of each function by factoring.

3. $h(x) = -x^2 - 6x - 9$ _____

4. $f(x) = 2x^2 + 9x + 4$ _____

5. $g(x) = x^2 + x - 20$ _____

Find the roots of each equation by factoring.

6. $12x = 9x^2 + 4$ _____

7. $16x^2 = 9$ _____

Write a quadratic function in standard form for each given set of zeros.

8. -2 and 7 _____

9. 1 and -8 _____

Solve.

10. The quadratic function that approximates the height of a javelin throw is $h(t) = -0.08t^2 + 4.48$, where t is the time in seconds after it is thrown and h is the javelin's height in feet. How long will it take for the javelin to hit the ground? _____

LESSON 5-3

Practice A

Solving Quadratic Equations by Graphing and Factoring

Tell whether each statement is true or false.

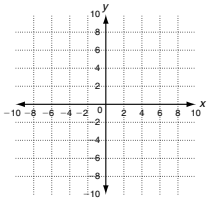
1. Quadratic functions have only one zero. — False
2. A zero of a function is the value of x that makes $f(x) = 0$. — True
3. The points $(0, 2)$ and $(0, 5)$ could be the zeros of a given quadratic function. — False

Find the zeros of $f(x) = x^2 - x - 6$ by using a table and a graph.

4. In what direction does the parabola open? — Upward

x	-2	-1	0	2	4
$f(x)$	0	-4	-6	-4	6

5. Find the y-intercept. — -6
6. Find the vertex. — $(0.5, -6.25)$
7. Plot the vertex and the y-intercept. Complete the table and use the values to draw the graph.
8. What are the zeros of the function? — -2 and 3



Find the zeros of each function by factoring.

9. $f(x) = x^2 - 3x - 10$
   - **a.** Set the function equal to 0. $x^2 - 3x - 10 = \underline{0}$
   - **b.** Factor. $(x + \underline{2})(x - \underline{5}) = \underline{0}$
   - **c.** Set each factor equal to 0. $(x + \underline{2}) = \underline{0}$ or $(x - \underline{5}) = \underline{0}$
   - **d.** Solve each equation for x. $x = \underline{-2}$ or $x = \underline{5}$
10. $f(x) = x^2 - 1$ — $1, -1$

Solve.

11. A quadratic function has zeros equal to 1 and 2.
    - **a.** What is the factored form of the function? — $(x - 1)(x - 2)$
    - **b.** Multiply the factors to give the quadratic function. — $x^2 - 3x + 2$

LESSON 5-3

Practice B

Solving Quadratic Equations by Graphing and Factoring

Find the zeros of each function by using a graph and a table.

1. $f(x) = x^2 + 5x + 6$

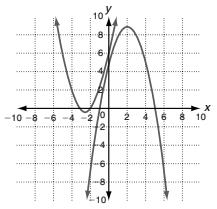
x	-4	-3	-2	-1	0
$f(x)$	2	0	0	2	6

-2 and -3

2. $g(x) = -x^2 + 4x + 5$

x	-2	0	2	4	6
$f(x)$	-7	5	9	5	-7

-1 and 5



Find the zeros of each function by factoring.

3. $h(x) = -x^2 - 6x - 9$ — -3
4. $f(x) = 2x^2 + 9x + 4$ — $-0.5, -4$
5. $g(x) = x^2 + x - 20$ — $-5, 4$

Find the roots of each equation by factoring.

6. $12x = 9x^2 + 4$ — $\frac{2}{3}$
7. $16x^2 = 9$ — $-0.75, 0.75$

Write a quadratic function in standard form for each given set of zeros.

8. -2 and 7 — $f(x) = x^2 - 5x - 14$
9. 1 and -8 — $f(x) = x^2 + 7x - 8$

Solve.

10. The quadratic function that approximates the height of a javelin throw is $h(t) = -0.08t^2 + 4.48$, where t is the time in seconds after it is thrown and h is the javelin's height in feet. How long will it take for the javelin to hit the ground? — About 7.5 s

LESSON 5-3

Practice C

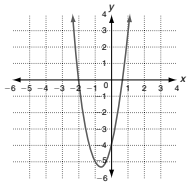
Solving Quadratic Equations by Graphing and Factoring

Find the zeros or roots of each function or equation.

1. $f(x) = -x^2 - 11x - 30$ — $-6, -5$
2. $g(x) = 2x^2 - 25x + 12$ — $0.5, 12$
3. $36x^2 = 4$ — $-\frac{1}{3}, \frac{1}{3}$
4. $56x = 8x^2 + 98$ — 3.5

Solve.

5. Find the zeros of $h(x) = 3x^2 + 4x - 4$ by graphing. — $-2, \frac{2}{3}$



6. Write a quadratic function in standard form with zeros 6 and -1. — $f(x) = x^2 - 5x - 6$
7. Write an equation in standard form with roots 3, -2, and 5. — $f(x) = x^3 - 6x^2 - x + 30$
8. Write a quadratic function with two zeros that have a sum of 3. — For roots 2 and 1: $f(x) = x^2 - 3x + 2$
9. Write a quadratic equation with just one nonzero root. — $f(x) = x^2 - 4x$

Solve.

10. **a.** Marilyn hit a golf ball on the ground with her driver. Use the general function for a projectile to write a function that shows the height in feet of her golf ball as a function of time. The ball was hit with an initial vertical velocity of 100 feet per second. — $h(t) = -16t^2 + 100t$
    - **b.** How long will Marilyn's golf ball stay in the air? — 6.25 s

LESSON 5-3

Reteach

Solving Quadratic Equations by Graphing and Factoring

Solve the equation $ax^2 + bx + c = 0$ to find the roots of the equation.

Find the roots of $x^2 + 2x - 15 = 0$ to find the zeros of $f(x) = x^2 + 2x - 15$.

$x^2 + 2x - 15 = 0$

$(x + 5)(x - 3) = 0$ — Factor, then multiply to check.

$(x + 5) = 0$ or $(x - 3) = 0$ — Solve each equation for x. Set each factor equal to 0.

$x = -5$ or $x = 3$

To check the roots, substitute each root into the original equation:

Equation:	$x^2 + 2x - 15 = 0$	$x^2 + 2x - 15 = 0$
Root:	$x = -5$	$x = 3$
Check:	$(-5)^2 + 2(-5) - 15$	$(3)^2 + 2(3) - 15$
	$25 - 10 - 15 = 0$ ✓	$9 + 6 - 15 = 0$ ✓

The **roots** of $x^2 + 2x - 15 = 0$ are -5 and 3.

The **zeros** of $f(x) = x^2 + 2x - 15$ are -5 and 3. — The roots of the equation are the zeros of the function.

Find the zeros of each function by factoring. Set the function equal to 0, factor, set each factor equal to 0, and then solve each equation.

1. $f(x) = 4x^2 - 24x$

   $4x^2 - 24x = 0$

   $4x(x - \underline{6}) = 0$

   $\underline{4x} = 0$ or $x - \underline{6} = 0$

   $x = 0$ or $x = 6$

2. $f(x) = x^2 + 4x + 3$

   $x^2 + 4x + 3 = 0$

   $(x + \underline{3})(x + \underline{1}) = 0$

   $x + \underline{3} = 0$ or $x + \underline{1} = 0$

   $x = -3$ or $x = -1$

3. $f(x) = x^2 - 5x + 4$

   $x^2 - 5x + 4 = 0$

   $(x - 4)(x - 1) = 0$

   $x - 4 = 0$ or $x - 1 = 0$

   $x = 4$ or $x = 1$

4. $f(x) = 3x^2 + 12x$

   $3x^2 + 12x = 0$

   $3x(x + 4) = 0$

   $3x = 0$ or $x + 4 = 0$

   $x = 0$ or $x = -4$