



UNDERSTAND

15. **Reason** One solution of a quadratic equation is 8. What do you know about the quadratic equation? What are two ways you would know if a quadratic equation could have this solution?
16. **Communicate Precisely** Write a quadratic equation for each condition below. Explain your reasoning.
- The equation has solutions that are opposites.
 - The equation has one solution.
17. **Error Analysis** Describe and correct the error a student made in factoring.

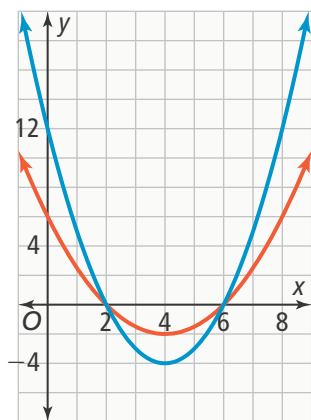
$$x^2 + 2x - 3 = 5$$

$$(x - 1)(x + 3) = 5$$

$$x - 1 = 5 \text{ or } x + 3 = 5$$

$$x = 6 \text{ or } x = 2$$

18. **Make Sense and Persevere** Explain how you would factor $2x^2 + 8x + 6 = 0$.
19. **Higher Order Thinking** Both parabolas are graphs of quadratic functions.



- Write the factored form of the equation related to one of the functions. Which curve is related to your function?
- Use a constant factor to find the equation related to the other function.
- What relationship do you see between the two functions? How are these reflected in the constant?

PRACTICE

Solve each equation. SEE EXAMPLE 1

20. $(x - 5)(x + 2) = 0$ 21. $(2x - 5)(7x + 2) = 0$
22. $3(x + 2)(x - 2) = 0$ 23. $(3x - 8)^2 = 0$

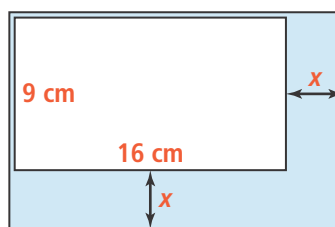
Solve each equation by factoring.

SEE EXAMPLES 2 AND 3

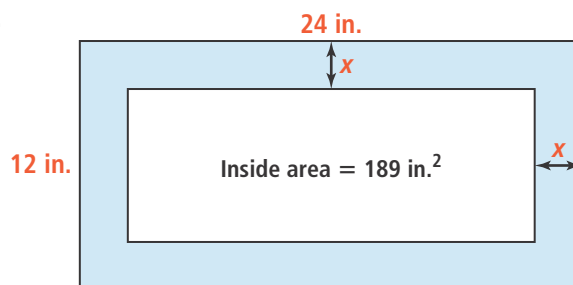
24. $x^2 + 2x + 1 = 0$ 25. $x^2 - 5x - 14 = 0$
26. $x^2 + 7x = 0$ 27. $2x^2 - 5x + 2 = 0$
28. $2x^2 + 3x = 5$ 29. $5x^2 + 16x = -3$

Write an equation to represent the shaded area. Then find the value of x . SEE EXAMPLE 3

30. Total area = 198 cm^2



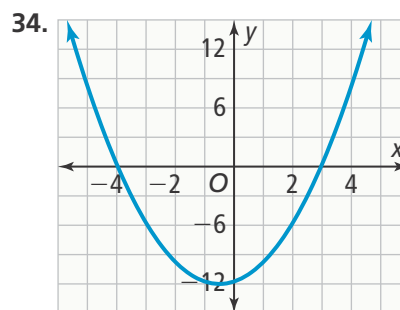
- 31.



Factor, find the coordinates of the vertex of the related function, then graph. SEE EXAMPLE 4

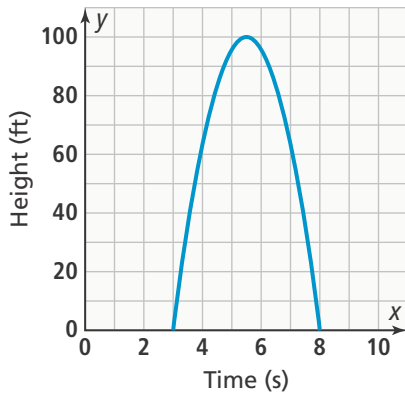
32. $x^2 - 2x - 63 = 0$ 33. $x^2 + 16x + 63 = 0$

Write the factored form for the quadratic function. SEE EXAMPLE 5

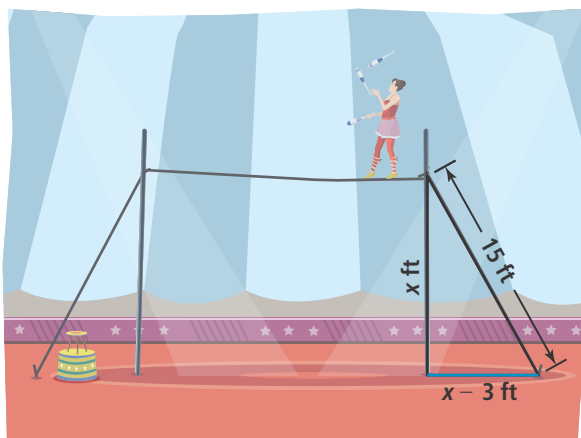


APPLY

35. **Mathematical Connections** A streamer is launched 3 s after a fuse is lit and lands 8 s after it is lit.



- What is a quadratic equation in factored form that models the situation?
 - What is the vertex of the function related to your equation? How does this compare with the vertex of the graph?
 - What can you multiply your factored form by to get the function for the graph? Explain your answer.
36. **Use Structure** A 15 ft long cable is connected from a hook to the top of a pole that has an unknown height. The distance from the hook to the base of the pole is 3 ft shorter than the height of the pole.

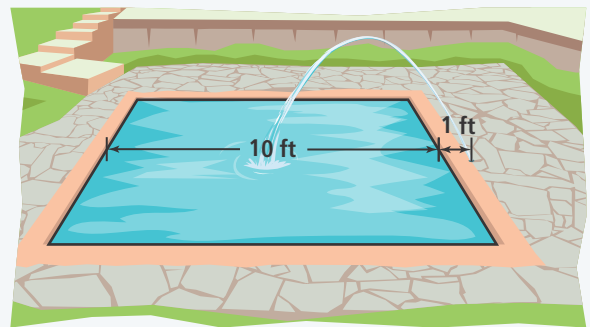


- What can you use to find the height of the pole?
- Write and solve a quadratic equation to find the height of the pole.
- How far is the hook from the base of the pole?

ASSESSMENT PRACTICE

37. Match each equation with one or more factors of its standard form.
- | | |
|-----------------------|-------------|
| I. $x^2 + 6x = -8$ | A. $2x - 3$ |
| II. $2x^2 + x = 6$ | B. $x + 4$ |
| III. $x^2 + 2x = 8$ | C. $x - 4$ |
| IV. $2x^2 + 5x = 12$ | D. $x + 2$ |
| V. $2x^2 - 11x = -12$ | E. $x - 2$ |
38. **SAT/ACT** A quadratic equation of the form $x^2 + bx + c = 0$ has a solution of -2 . Its related function has a vertex at $(2.5, -20.25)$. What is the other solution to the equation?
- -11
 - -4.5
 - 0.5
 - 7
 - 9

39. **Performance Task** An engineer is designing a water fountain that starts 1 ft off of the edge of a 10 ft wide pool. The water from the fountain needs to project into the center of the pool. The path of the water from the fountain is in the shape of a parabola.



- Part A** Let the the point $(1, 0)$ be the location of the starting point of the water. Write a quadratic equation to model the path of the water.
- Part B** What is the maximum height of the water? Use your equation from Part A.
- Part C** What is the equation for the path of the water if the maximum height of the water must be 4 ft?