PRACTICE & PROBLEM SOLVING

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Practice Tutorial

Additional Exercises Available Online

UNDERSTAND

12. Communicate Precisely Consider the quadratic equation $x^2 + 2x - 24 = 0$.

a. How could you solve the equation using a graph? Explain.

b. How could you solve the equation using a table? Explain.

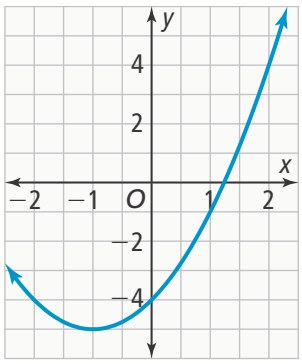
13. Generalize For an equation of the form $ax^2 + bx + c = 0$, where the graph crosses the y-axis once and does not intersect the x-axis. Describe the solution(s) of the equation.

14. Error Analysis Describe and correct the error a student made in stating the number of solutions of a quadratic equation. Explain.

> A quadratic equation has either two solutions or no solution. ✗

15. Higher Order Thinking Infinitely many quadratic equations of the form $ax^2 + bx + c = 0$ can have the same two solutions. Sketch the graphs of two quadratic functions on the same grid to show how this could be true.

16. Communicate Precisely How many zeros does the function shown have? Explain.

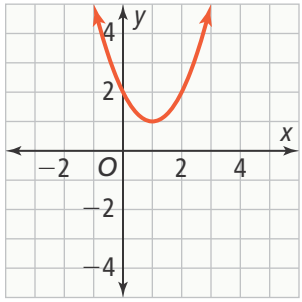


17. Mathematical Connections If a quadratic function has a maximum value that is greater than 0, how many zeros does the function have? Explain.

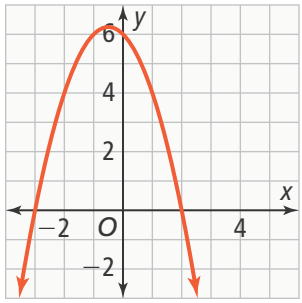
PRACTICE

Use each graph to find the solution of the related equation. SEE EXAMPLE 1

18. $x^2 - 2x + 2 = 0$



19. $-x^2 - x + 6 = 0$



Solve each quadratic equation by graphing the related function. Round approximate solutions to the nearest tenth. SEE EXAMPLES 1 AND 3

20. $x^2 - 121 = 0$

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

22. $x^2 + 3x + 7 = 0$

23. $x^2 - 5x = 0$

24. $-x^2 + 6x + 7 = 0$

25. $-x^2 + 8x - 7 = 0$

26. $x^2 - 2 = 0$

27. $2x^2 - 11x + 12 = 0$

28. $-3x^2 + 5x + 7 = 0$

29. $-16x^2 + 70 = 0$

Find the solutions for each equation using a table. Round approximate solutions to the nearest tenth. SEE EXAMPLE 2

30. $x^2 - 16 = 0$

31. $x^2 + 8x + 16 = 0$

32. $x^2 + 3x + 1 = 0$

33. $x^2 + 4x + 6 = 0$

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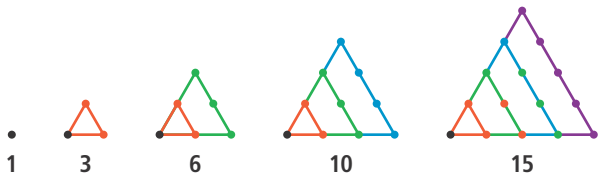
APPLY

34. Model With Mathematics A small company shows the profits from their business with the function $P(x) = -0.01x^2 + 60x + 500$, where x is the number of units they sell and P is the profit in dollars.

a. How many units are sold by the company to earn the maximum profit?

b. How many units are sold when the company starts showing a loss?

35. Make Sense and Persevere A pattern of triangular numbers is shown. The first is 1, the second is 3, the third is 6, and so on.



The formula $0.5n^2 + 0.5n$ can be used to find the nth triangular number. Is 50 a triangular number? Explain.

36. Make Sense and Persevere The equation $-16x^2 + 10x + 15 = 0$ represents the height, in feet, of a flotation device above the water after x seconds. The linear term represents the initial velocity. The constant term represents the initial height.

a. If the initial velocity is 0, when should the flotation device land in the water?

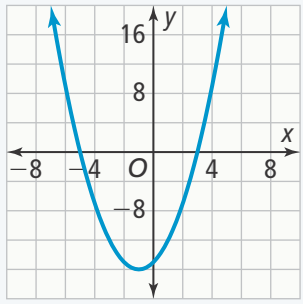
b. If the initial height is 0, when does the flotation device land in the water?

ASSESSMENT PRACTICE

37. Does each quadratic equation have two solutions? Select *Yes* or *No*.

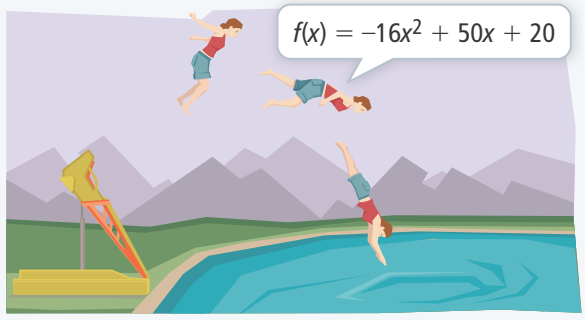
	Yes	No
$0 = 2x^2 + 1$	❑	❑
$0 = 2x^2 + 5x + 1$	❑	❑
$0 = 2x^2 + 5x$	❑	❑
$0 = 4x^2 - 4x + 1$	❑	❑
$0 = 4x^2 - 4x - 1$	❑	❑

38. SAT/ACT What are the solutions of $x^2 + 2x - 15 = 0$ using the graph shown?



Ⓐ $-3, 3$ Ⓑ $-5, 3$
Ⓒ $-8, 5$ Ⓓ $-16, 0$

39. Performance Task A human catapult is used to launch a person into a lake. The height, in feet, of the person is modeled as shown, where x is the time in seconds from the launch.



Part A What equation can you use to find when the person touches the lake? Find the solution.

Part B Are your solutions the same for the equation and problem? Why or why not?

Part C What is the greatest height reached?

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