4.4 Exercises

Dynamic Solutions available at *BigIdeasMath.com*

Vocabulary and Core Concept Check

1. **COMPLETE THE SENTENCE** When a, b, and c are real numbers such that $a \neq 0$, the solutions of the quadratic equation $ax^2 + bx + c = 0$ are $x =$ _____.

2. **COMPLETE THE SENTENCE** You can use the _____ of a quadratic equation to determine the number and type of solutions of the equation.

3. **WRITING** Describe the number and type of solutions when the value of the discriminant is negative.

4. **WRITING** Which two methods can you use to solve *any* quadratic equation? Explain when you might prefer to use one method over the other.

Monitoring Progress and Modeling with Mathematics

In Exercises 5–18, solve the equation using the Quadratic Formula. Use a graphing calculator to check your solution(s). *(See Examples 1, 2, and 3.)*

5. $x^2 - 4x + 3 = 0$
6. $3x^2 + 6x + 3 = 0$
7. $x^2 + 6x + 15 = 0$
8. $6x^2 - 2x + 1 = 0$
9. $x^2 - 14x = -49$
10. $2x^2 + 4x = 30$
11. $3x^2 + 5 = -2x$
12. $-3x = 2x^2 - 4$
13. $-10x = -25 - x^2$
14. $-5x^2 - 6 = -4x$
15. $-4x^2 + 3x = -5$
16. $x^2 + 121 = -22x$
17. $-z^2 = -12z + 6$
18. $-7w + 6 = -4w^2$

In Exercises 19–26, find the discriminant of the quadratic equation and describe the number and type of solutions of the equation. *(See Example 4.)*

19. $x^2 + 12x + 36 = 0$
20. $x^2 - x + 6 = 0$
21. $4n^2 - 4n - 24 = 0$
22. $-x^2 + 2x + 12 = 0$
23. $4x^2 = 5x - 10$
24. $-18p = p^2 + 81$
25. $24x = -48 - 3x^2$
26. $-2x^2 - 6 = x$

27. **USING EQUATIONS** What are the complex solutions of the equation $2x^2 - 16x + 50 = 0$?

Ⓐ $4 + 3i, 4 - 3i$ Ⓑ $4 + 12i, 4 - 12i$

Ⓒ $16 + 3i, 16 - 3i$ Ⓓ $16 + 12i, 16 - 12i$

28. **USING EQUATIONS** Determine the number and type of solutions to the equation $x^2 + 7x = -11$.

Ⓐ two real solutions

Ⓑ one real solution

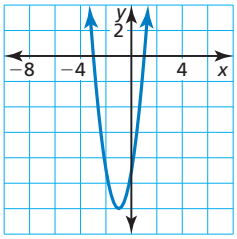
Ⓒ two imaginary solutions

Ⓓ one imaginary solution

ANALYZING EQUATIONS In Exercises 29–32, use the discriminant to match each quadratic equation with the correct graph of the related function. Explain your reasoning.

29. $x^2 - 6x + 25 = 0$
30. $2x^2 - 20x + 50 = 0$
31. $3x^2 + 6x - 9 = 0$
32. $5x^2 - 10x - 35 = 0$

A.



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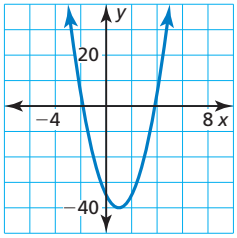

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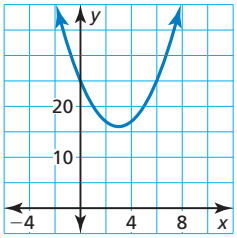

D.