

Communicate Your Understanding

- C1** Minh has been asked to solve a quadratic equation of the form $ax^2 + bx + c = 0$, but he is unclear whether he should factor, complete the square, use the quadratic formula, or use a graphing calculator. What advice would you give him? Explain.
- C2** While many techniques can be used to solve a quadratic equation of the form $ax^2 + bx = 0$, what is the easiest technique to use? Why?
- C3** Deepi wants to determine how many x-intercepts a quadratic function has. How can she find the number of x-intercepts for the function without graphing? Justify your reasoning.

A Practise

For help with questions 1 to 3, refer to Example 1.

1. Solve each quadratic equation by factoring.

- a) $x^2 + 2x - 3 = 0$
- b) $x^2 + 3x - 10 = 0$
- c) $4x^2 - 36 = 0$
- d) $6x^2 - 14x + 8 = 0$
- e) $15x^2 - 8x + 1 = 0$
- f) $6x^2 + 19x + 10 = 0$

2. Check your answers to question 1 using a graphing calculator or by substituting each solution back into the original equation.

3. Solve each quadratic equation using the quadratic formula. Give exact answers.

- a) $2x^2 - 17x + 27 = 0$
- b) $-4x^2 + 3x + 8 = 0$
- c) $-x^2 - x + 7 = 0$
- d) $x^2 + 6x - 4 = 0$
- e) $3x^2 + x - 11 = 0$
- f) $-\frac{1}{2}x^2 + 4x - 1 = 0$

For help with question 4, refer to Example 2.

- 4. Use Technology** Use a graphing calculator to graph a related function to determine the number of roots for each quadratic equation.

- a) $3x^2 - 4x + 5 = 0$
- b) $8x^2 - 20x + 12.5 = 0$
- c) $-x^2 + 2x + 5 = 0$
- d) $\frac{3}{4}x^2 - 5x + 2 = 0$

For help with question 5, refer to Example 3.

5. Determine the exact values of the x-intercepts of each quadratic function.

- a) $f(x) = 6x^2 + 3x - 2$
- b) $f(x) = -\frac{1}{3}x^2 + 4x - 8$
- c) $f(x) = \frac{3}{4}x^2 - 2x - 7$
- d) $f(x) = \frac{1}{4}x^2 - 2x + 4$

For help with question 6, refer to Example 4.

6. Use the discriminant to determine the number of roots for each quadratic equation.

- a) $x^2 - 5x + 4 = 0$
- b) $3x^2 + 4x + \frac{4}{3} = 0$
- c) $2x^2 - 8x + 9 = 0$
- d) $-2x^2 + 0.75x + 5 = 0$

B Connect and Apply

7. Which method would you use to solve each equation? Justify your choice. Then, solve. Do any of your answers suggest that you might have used another method? Explain.

- a) $2x^2 - 5x - 12 = 0$
- b) $x^2 - 25 = 0$
- c) $2x^2 + 3x - 1 = 0$
- d) $\frac{1}{2}x^2 + 4x = 0$
- e) $3x^2 - 4x + 2 = 0$
- f) $x^2 - 4x + 4 = 0$
- g) $0.57x^2 - 3.7x - 2.5 = 0$
- h) $9x^2 - 24x + 16 = 0$