

Challenge: Skills and Applications

For use with pages 730–736

1. Solve the equation $x^2 - 8x = c$ for x by completing the square.
2. For what values of c does the equation from Exercise 1 have no solution?
3. Solve the equation $3x^2 - 5x = 3c$ for x by completing the square.
4. For what values of c does the equation from Exercise 3 have no solution?
5. Solve the equation $ax^2 - 6x = 4$ for x by completing the square.
6. For what values of a does the equation from Exercise 5 have no solution?
7. Solve the equation $x^2 - bx = -7$ for x by completing the square.
8. For what values of b does the equation from Exercise 7 have no solution?

In Exercises 9–11, use the following information.

The path of a pole vaulter making a jump is given by

$$y = -16x^2 + 8x + 16,$$

where y is the height of the pole vaulter in feet x seconds after the jump starts.

9. Write the equation in the form $y = a(x - h)^2 + k$.
10. What is the value of h in the equation from Exercise 9 and what does it mean in this situation?
11. What is the value of k in the equation from Exercise 9 and what does it mean in this situation?