7 Chapter Self-Test

1. Sketch each of the following quadratic functions. Explain why you chose the method you used.

a) $f(x) = x^2 - 8x + 12$

b) $f(x) = -2(x + 1)(x - 5)$

c) $f(x) = 0.5(x + 2)^2 - 7$

d) $f(x) = -2x^2 - 8x$

2. Determine the y-intercepts, x-intercepts, equation of the axis of symmetry, and vertex of the parabola that is defined by each quadratic function.

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

b) $y = (2x - 3)(x + 4)$

3. Workers who were improving a section of highway near Rogers Pass, British Columbia, used dynamite to remove a rock obstruction. When the rock shattered, the height of one piece of rock, $h(t)$, in feet, could be modelled by the function

$$h(t) = -16t^2 + 160t$$

where t represents the time, in seconds, after the blast.

a) How long was the piece of rock in the air?

b) How high was the piece of rock after 2 s?

c) What was the maximum height of the piece of rock?

4. A parabola has a y-intercept of -4 and a vertex at $(3, -7)$. Determine the equation of the parabola in standard form.

5. Dimples the Clown has been charging $260 to perform at a children's party. He thinks that each raise of $80 in the charge for a party will result in one fewer booking per month. Dimples performs at 20 children's parties each month at his current price. How much should he charge to maximize his monthly revenue?

The Yukon Bridge spans the Tutshi River in northern British Columbia. To build the Yukon Bridge, engineers had to rig a temporary skyline. This skyline was used to transfer drilling equipment and to anchor rods to the far side of the river. A helicopter was used to install the support towers on the far side of the river.

6. Solve by factoring. Verify each solution.

a) $x^2 + 11x + 24 = 0$

b) $8a^2 + 31a - 4 = 0$

c) $5c = c^2 - 6$

d) $25x^2 + 10x + 5 = 5x^2 - 3x + 3$

7. Solve by using the quadratic formula.

a) $x^2 + 5x - 8 = 0$

b) $4x^2 - 12x - 3 = 0$

c) $0.25x^2 - 0.3x + 0.09 = 0$

d) $5x^2 + 6x + 7 = 0$

8. The Yukon Bridge is a suspension bridge with a parabolic shape. Its height, $h(w)$, in metres, can be represented by the equation

$$h(w) = 0.005\,066w^2 - 0.284\,698w$$

where the height is 0 m at the endpoints and w is the length of a straight line from one endpoint to the other.

a) Determine the length of line w.

b) What is the maximum drop in height from line w to the bridge?

***WHAT** DO You Think Now?* Revisit **What Do You Think?** on page 357. How have your answers and explanations changed?