Name: _____   Date: _____

Chapter 1 Test

For questions 1 to 3, choose the best answer.

1. Which relation is not a function?
   A $\{(1, 1), (1, 2), (1, 3), (1, 4), (1, 5)\}$
   B $y = 3x - 9$
   C $y = 3 - x^2$
   D $y = 2x - 2$

2. Which set of numbers best represents the range of the parabola given by $f(x) = -4(x + 1)^2 - 5$?
   A any real number less than or equal to –5
   B $\{y \in \mathbf{R} \mid y \geq 5\}$
   C $\{y \in \mathbf{R} \mid y \leq -1\}$
   D $\{y \in \mathbf{R} \mid y \geq 1\}$

3. Which statement is not true for the parabola given by $h(t) = -3(t - 10)^2 + 20$?
   A It passes through the point (8, 8).
   B It opens downward.
   C Its vertex is located at (20, 10).
   D The range is any real number less than or equal to 20.

4. Write the domain and range of each function. Sketch a graph to help.
   a) $y = x - 1$ b) $y = 4x^2 + 3$

5. Write the equation for the graph resulting from each transformation.
   a) The graph of $f(x) = x^2$ is translated 2 units left.
   b) The graph of $h(t) = t^2$ is translated 3 units up.
   c) The graph of $A(r) = \pi r^2$ is translated 1 unit left.
   d) The graph of $f(x) = 2x^2$ is translated 1 unit down.

6. Write the coordinates of the vertex in each graph.
   a) $f(x) = x^2 - 6$
   b) $g(x) = (x - 2)^2 + 10$
   c) $h(x) = -(x + 1)^2$
   d) $t(x) = 2(x + 1)^2 + 10$

7. Write an equation for the parabola that satisfies each set of conditions.
   a) vertex (2, 2)
      congruent in shape to the graph of $y = x^2$
      range: $\{y \in \mathbf{R} \mid y \geq 2\}$
   b) vertex (–2, 4)
      opens downward
      x-intercepts: 0 and –4

8. Describe the graph of each function in terms of transformations on the graph of $y = x^2$.
   a) $y = x^2 + 4$
   b) $y = (x - 3)^2 - 4$
   c) $y = 6(x + 1)^2 - 2$
   d) $y = (x + 8)^2 + 1$

9. A parabola is modelled by the function $g(x) = (x - 2)^2 - 3$.
   a) Sketch the parabola. Label the vertex, axis of symmetry, and two other points.
   b) Write the domain and range of the function.

10. The graph of the function $f(x) = x^2$ is stretched vertically and then translated 2 units to the left and 4 units down. The y-intercept of the resulting graph is 8. Find an equation for the function after these transformations.