Name: _____ Date: _____

Unit 2 Test

Multiple Choice

For #1 to 7, choose the best answer.

1. Which statement is true regarding transformations of the graph of $y = x^2$ to the graph of $y = -(x + 1)^2 + 4$.

   A There is a reflection in the x-axis, a vertical translation 4 units up and a horizontal translation of 1 unit left.

   B There is a vertical stretch by a factor of 2 and a vertical translation of 4 units up.

   C There is a reflection in the x-axis and a horizontal translation of 1 unit right.

   D There is a vertical stretch by a factor of $\frac{1}{2}$ and a reflection in the y-axis.

2. When comparing the graphs of $y = ax^2$ and $y = (ax)^2$, $a \neq 0$, which of the following statements is true?

   A When $a = -2$, both graphs are drawn in the same quadrant.

   B When $a > 1$, the graph of $y = ax^2$ will be wider than the graph of $y = (ax)^2$.

   C The graphs will be identical when $a = -1$.

   D The graphs will never be congruent.

3. A quadratic function has a vertex at $(6, -2)$. If the value of a is negative when the equation is in the form $y = ax^2 + bx + c$, then its graph will have

   A two x-intercepts

   B one x-intercept

   C no x-intercepts

   D a minimum value of -2

4. A quadratic function $y = ax^2 + bx + c$ has its vertex at a point above the x-axis. If $a > 0$, then the value of the discriminant is

   A positive

   B negative

   C 0

   D 1

5. A rectangular field bordering a river is to be enclosed with 600 m of fencing. No fence is needed along the riverbank. What equation represents the maximum area enclosed by the fence?

   A $A = -x^2 + 600x$

   B $A = -2x^2 + 600x$

   C $A = -x^2 + 300x$

   D $A = -2x^2 + 300x$

6. Which quadratic equation has roots of -2 and 3?

   A $x^2 - x - 6 = 0$

   B $x^2 + x + 6 = 0$

   C $x^2 - x + 6 = 0$

   D $x^2 + x - 6 = 0$

7. What are the roots of the equation $x^2 + 8x + 10 = 0$?

   A $-4 \pm \sqrt{13}$

   B $-4 \pm \sqrt{6}$

   C $-8 \pm \sqrt{18}$

   D $-8 \pm \sqrt{6}$

Numerical Response

Complete the statements in #8 to 10.

8. Consider the quadratic equation
   $10x^2 - 27x + 14 = 0$. The largest root
   of the equation is ☐.

9. The value of a that causes $ax^2 - 2x - 3 = 0$
   to have a double root is ☐.

10. When the graph of the quadratic function
    $y = -x^2 + 6x - 13$ is translated two units to
    the right, the x-coordinate of the vertex will
    be ☐.

Written Response

11. A specific quadratic function has a range
    described by $\{y \mid y \geq -7, y \in R\}$ and has
    x-intercepts at 2 and 5.
    a) Identify the following characteristics of
       the graph:
       • equation of the axis of
          symmetry _____
       • vertex _____
       • direction of opening _____
       • domain _____
       • coordinates of the y-intercept_____
    b) Write the equation of the quadratic
       function in the form $y = a(x - p)^2 + q$.

12. Determine the following characteristics of
    the quadratic function $y = 4x^2 - 8x + 1$.
    Use this information to sketch the graph.
    • vertex _____
    • domain _____
    • range _____
    • direction of opening _____
    • axis of symmetry _____
    • x-intercepts _____
    • y-intercepts _____

13. Devin is playing for his high-school
    basketball team. He shoots the ball in an
    attempt to score a 3-point basket. The path
    of the ball can be modelled by the equation
    $h(d) = -0.067d^2 + 0.67d + 2$, where
    h represents the height of the basketball in
    metres, and d represents the horizontal
    distance travelled by the ball in metres.
    a) From what height does Devin release the
       basketball?
    b) What is the ball's maximum height?
    c) The height of the rim on the backboard is
       3.05 m. If Devin scores, how far is he
       standing from the backboard?