**Test 2** **Name: _____**

**Score: _____**

- MUST SHOW WORK TO GET FULL CREDIT (NO WORK = NO CREDIT, PARTIAL WORK = PARTIAL CREDIT).
- SIMPLIFY ALL ANSWERS.

1. (7 points) Apply the following transformations to the function $y = \sqrt{x}$ in the order listed below. **At each step, write down the function and draw the graph**. In each graph, find and plot AT LEAST THREE KEY points. BE SURE TO SHOW THE OVERALL SHAPE OF THE GRAPH.

a) Shift down 5 units

b) Reflect about the x-axis

c) Shift right 3 units.

2. (7 points) CAREFULLY draw the graph of the function. SHOW AT LEAST THREE KEY points. BE SURE TO SHOW THE OVERALL SHAPE OF THE GRAPH. Find the domain and range.

NOTE: Just draw ONE graph. You do NOT have to draw several graphs.

$-(x+2)^3+5$

3. (7 points)

Determine whether the given function is linear or nonlinear. If it is linear, determine the equation of the line.

| x | y |
|---|---|
| −2 | −8 |
| −1 | −5 |
| 0 | −2 |
| 1 | 1 |
| 2 | 4 |

4. (7 points)

Suppose that the quantity supplied S and quantity demanded D of T-shirts at a concert are given by the following functions where p is the price.

$S(p) = -300 + 50p$

$D(p) = 960 - 55p$

a) Find the equilibrium price (round to the nearest dollar) and the equilibrium quantity (round to the nreaest whole number).

b) Determine the prices for which the quantity demanded is greater than the quantity supplied.

c)What will eventually happen to the price in the above situation?

5. (7 points)

Find the zeros of the quadratic function by factoring. What are the x-intercepts of the graph of the function?

$g(x) = 3x^2 - 7x - 6$

6. (7 points)

Find the zeros of the following quadratic function by completing the square. What are the x-intercepts of the graph of the function?

$$F(x) = 2x^2 + x - \frac{1}{4}$$

7. (7 points)

Find the zeros, if any, of the quadratic function using the quadratic formula. What are the x-intercepts, if any, of the graph of the function?

$$f(x) = 8x^2 - 3 + 4x$$

8. (7 points)

Solve $f(x) = g(x)$. What are the points of intersection of the graphs of the two functions?

$$f(x) = -3x^2 + 10$$
$$g(x) = 7x + 12$$

9 . (7 points) Solve the absolute value inequality $|3t - 2| - 5 \leq 1$

10. (7 points)

Determine, without graphing, whether the given quadratic function has a maximum value or a minimum value and then find the value.

$$f(x) = 2x^2 + 20x - 5$$

11. (7 points)

A ball is thrown vertically upward from the top of a building 160 feet tall with an initial velocity of 48 feet per second. The distance s (in feet) of the ball from the ground after t seconds is $s(t) = 160 + 48t - 16t^2$.

(a) After how many seconds does the ball strike the ground?

(b) After how many seconds will the ball pass the top of the building on its way down?

12. (8 points) Complete the square of the given quadratic expression. Find the vertex and intercepts in exact form and rounded to 2 decimal places. Then use these points to graph the function. Find the domain and range.

$$f(x) = -2x^2 + 8x - 5$$

13. (8 points)

Use the rational zeros theorem to find all the real zeros of the polynomial function. Use the zeros to factor f over the real numbers.

$$f(x) = x^3 + 6x^2 - 9x - 14$$

14. (7 points) Northwest Molded molds plastic handles which cost $0.70 per handle to mold. The total cost to mold 100 handles is $7,201. The company sells the handles for $3.70 each. How many handles must be molded and sold to break even?