College Algebra - Test 1 **Name:** _____

1. (6 points) Suppose $g(x) = \left\{ \begin{array}{ll} -3x & \text{if } x < 0 \\ \sqrt{16 - x^2} & \text{if } 0 \leq x < 4 \\ (x-4)^2 & \text{if } x \geq 4 \end{array} \right\}$.

   Evaluate the piecewise defined function at the values indicated below.

   (a) $g(-1)$ (a) _____

   (b) $g(-3)$ (b) _____

   (c) $g(0)$ (c) _____

   (d) $g(4)$ (d) _____

   (e) $g(6)$ (e) _____

   (f) $g(8)$ (f) _____

2. (4 points) Sketch the graph of the piecewise function defined above.

3. (5 points) Write the domain of $f(x) = \dfrac{1}{4 - x}$ using interval notation.

3. _____

4. (5 points) Write the domain of $f(x) = \sqrt{2x + 3}$ using interval notation.

4. _____

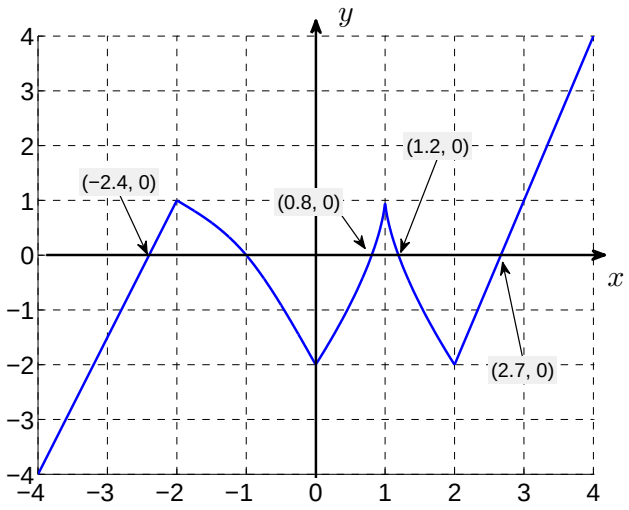
5. (5 points) Find f/g and its domain. $f(x) = \sqrt{25 - x^2}$ and $g(x) = \sqrt{2 + x}$

5. _____

6. (5 points) Find the average rate of change of $f(x) = 2x^2 - 3x$ from $x_1 = 2$ to $x_2 = 3$

6. _____

7. (12 points) The graph of a function f is given. **Assume the entire graph of f is shown in the figure.**



(a) Find all ***local*** and absolute maximum and minimum values of the function and the value of x at which each occurs.

(b) State the x intervals for which $f(x) > 0$.

(c) State the x intervals for which $f(x) < 0$.

(d) Find the x intervals on which the function is ***increasing***.

(e) Find the x intervals on which the function is ***decreasing***.

(f) Find $f(4)$. (f) _____

(g) Find $f(-1)$. (g) _____

Directions: Sketch the graph of the function, not by plotting points, but by starting with the graph of a standard function and applying transformations. Label at least 3 points on your final graph.

8. (5 points) $h(x) = -3\sqrt{x-4} + 1$

Find $f \circ g$ its domain.

9. (5 points) $f(x) = \dfrac{2}{1-x}$ and $g(x) = 2 + 7x$.

10. (5 points) Find the inverse function of $f(x) = \dfrac{2x}{x+3}$

10. _____

11. (3 points) Find the vertex of $g(x) = -3(x+4)^2 - 7$. Does f open up or down?

11. _____

12. (3 points) What is the range of $g(x) = 3(x-5)^2 + 7$?

12. _____

Express the quadratic function in standard (vertex) form.

13. (5 points) $g(x) = 2x^2 + 4x - 7$

13. _____