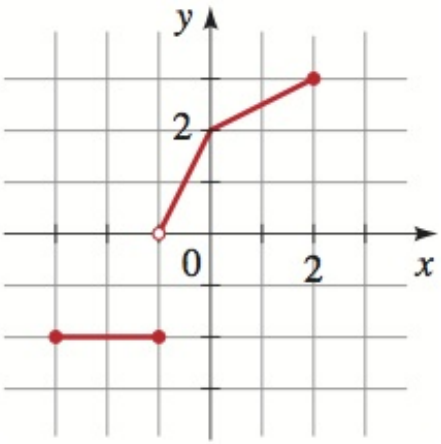
**Name:**_____ **10/28/2015**

**Math 195 Precalculus** **Quiz 2**

Please show all work and **box your final answers**. Calculators are not allowed and cellphones should be put away. Good luck!

1. Determine if the following graph is the graph of a function. If it is not, explain why. If it is, explain why and find its domain and range.




2. (8 points) Given $f(x) = x^2 - 3x + 2$, rewrite $\dfrac{f(x+h) - f(x)}{h}$ as a simplified polynomial.

3. Find the average rate of change of the function $f(x) = \dfrac{2}{x+1}$ over the interval $[0, h]$.

4. (8 points) Sketch the graph of $y = -\sqrt{x-4} + 2$.

5. (8 points) Consider the following functions.

$$f(x) = \frac{1}{x-a} + a, \qquad g(x) = x^2 - 2x, \qquad h(x) = 4x + 1$$

(a) Find $(f \circ f)(x)$, i.e. $f(f(x))$.

(b) Find $(g \circ h)(2)$, i.e. $g(h(2))$.

6. (8 points) Let $f$ be the one-to-one function defined by $f(x) = \dfrac{3x+2}{2x-1}$.

(a) Find $f^{-1}(x)$.

(b) Find the range of $f$. (Hint: The range of $f$ is equal to the domain of $f^{-1}$.)

7. **This is a bonus question. You will be rewarded for a correct answer, and not penalized for an incorrect answer.**

   (a) (4 points) Suppose you start with the graph of the equation $y = \sqrt{x^3 + 1}$ and then apply the following transformations in the following order.

   1. Move the graph 3 units to the left.
   2. Reflect the graph through the $y$-axis.
   3. Move the graph 2 units down.

   What is the equation of the resulting graph? **Do not sketch the graph.**

   (b) (4 points) Now suppose you start with the same graph of the same equation $y = \sqrt{x^3 + 1}$ and you apply the same transformations but in a different order.

   1. Reflect the graph through the $y$-axis.
   2. Move the graph 3 units to the left.
   3. Move the graph 2 units down.

   Now what is the equation of the resulting graph? **Do not sketch the graph.**