Name:_____ **6/30/2016**

Math 195-1XD **Exam 2**

Directions Answer all questions in the space provided. Show all work and box your final answers. Answers with no work shown will not receive full credit. Answers do not need to be simplified unless specifically stated. Good luck!

1. (10 points) Find the domain of $f(x) = \dfrac{\sqrt{x-1}}{5x^3 - 35x^2 + 60x}$.

2. (10 points) Let $f(x) = x^2 + 2x + 1$. Find and simplify $\dfrac{f(a+h) - f(a)}{h}$.

3. (10 points) Find the average rate of change of $g(t) = 2t^2 - t$ between $t = 3$ and $t = 6$.

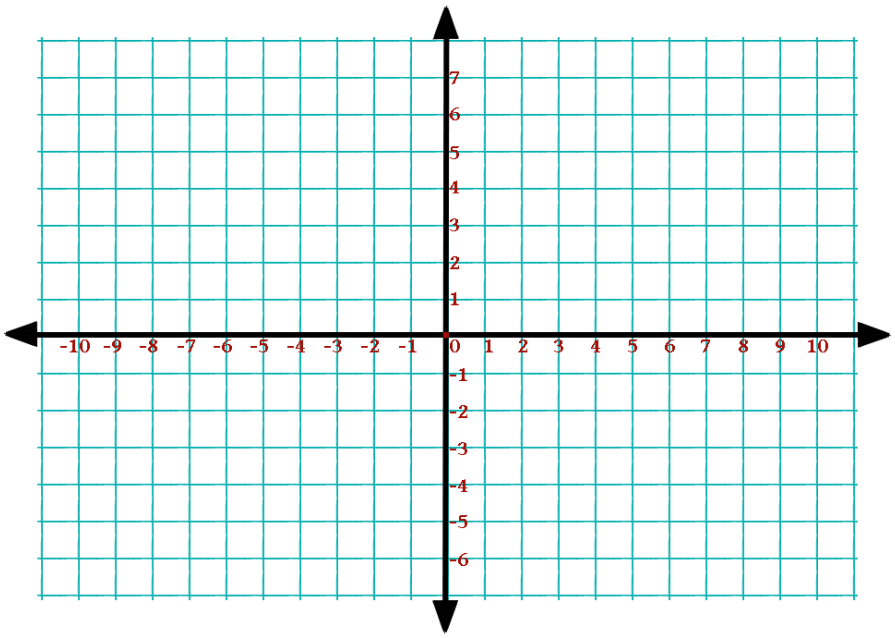
4. Let f and g be defined as follows.

$$f(x) = \frac{x}{x+1}, \qquad g(x) = \frac{1}{x}$$

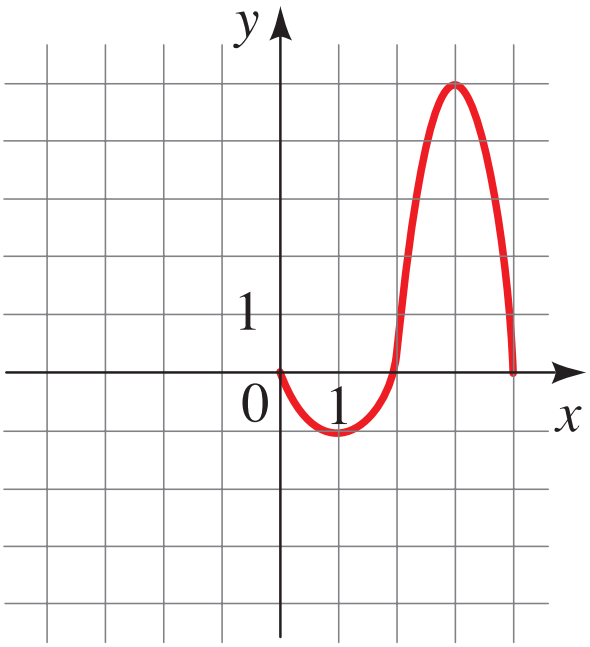
(a) (7 points) Find $(f \circ g)(x)$ and state its domain.

(b) (7 points) Find $(f \circ f)(x)$ and state its domain.

5. (10 points) Sketch the graph of $f(x) = 2 - \sqrt{x+1}$ on the coordinate plane below. Label all x-intercepts and y-intercepts, and two additional points on the graph.



6. The graph of $f(x)$ is shown below.
   (a) (7 points) Label all local maximums and minimums of f with their coordinates.
   (b) (7 points) On the same coordinate plane, sketch and label the graphs $y = f(-x)$ and $y = -f(-x)$.



7. (10 points) Let f be the one-to-one function $f(x) = \dfrac{3-4x}{8x-1}$. Find $f^{-1}(x)$.

8. (10 points) Find the maximum or minimum value of the function $q(x) = 24x + 100 - 6x^2$.

9. (10 points) Sketch the graph of $P(x) = x^3(x+2)(x-3)^2$ on the coordinate plane below. Clearly show the end behavior of the graph, and label all x-intercepts and y-intercepts.