Math 156 PRECALCULUS
Fall 2015

Quiz 5 – Version Retake

Tuesday, October 20, 2015

Name:_____

This quiz has 6 problems worth a total of 30 points. It is TWO SIDED.

1. A pump empties a 2000 gallon pool at a rate of 5 cubic feet per second. Initially pool is full.

   (a) (3 points) Find a linear function V that models the volume of water in the pool at any time t.

   (b) (3 points) How long does it take to completely empty?

2. (3 points each) For each function below, sketch the graph. (For people with limited art skills, like me, you are welcome to augment your picture with an explanation of the standard function you are transforming and how you are transforming it. For example, one might write, "This is the parabola $y = x^2$ translated 2 units to the left and stretched horizontally by a factor of 3.")

   (a) $y = 4 - (x + 1)^2$

   (b) $y = \sqrt[3]{x - 2}$

3. (4 points) Express the function $H(x) = \frac{4}{1+x^3}$ in the form $f \circ g$ in a nontrivial way. (That is, you are not allowed to choose $f(x) = x$ or $g(x) = x$.

4. (4 points) For $f(x) = \sqrt{x-4}$ and $g(x) = x^2 + x + 1$, find $(g \circ f)(x)$ and its domain.

5. (4 points) (i) Explain, in your own words, what it means for a function to be one-to-one. (ii) Determine if the function $f(x) = \frac{1}{x^2}$ is one-to-one and show your answer is correct.

6. (3 points each) Find the inverse of the functions below:

   (a) $f(x) = \sqrt{6 + 7x}$

   (b) $g(x) = x^2 + x$ for $x \geq -1/2$