MATH 110-001 HOMEWORK 1
Due date: Friday, September 29, 2017

Hand in full solutions to the questions below. Make sure you justify all your work and include complete arguments and explanations. Your answers must be clear and neatly written, as well as legible (no tiny drawings or micro-handwritting please!). Your answers must be stapled, with your name and student number at the top of each page.

1. Find the domain of the following functions, and write it in interval notation.

   a) $f(x) = \dfrac{x^2 - 4}{e^{2x}\sqrt{x^2 - 9}}$

   b) $f(x) = \dfrac{e^{2x}\sqrt{x^2 - 9}}{x^2 - 4}$

   c) $h(t) = t^{-\frac{2}{3}}$

   d) $h(t) = \sqrt{6 + t - t^2}$

2. For the functions

   $$f(x) = \sqrt{x} \qquad g(x) = \sqrt[3]{1 - x} \qquad h(x) = \dfrac{x}{|x|}$$

   a) Find $f \circ g$ and its domain
   b) Find $g \circ f$ and its domain
   c) Sketch a graph for h(x)
   d) Find the domain and range of h(x)

3. For the functions $f(x) = \sqrt{x + 1}$ and $g(x) = -3x + 7$
   a) Make a sketch of both functions on the same graph
   b) Find the intersection of the two functions
   c) Find the equation of the line connecting the intersection point and the y-intercept of $f(x)$

4. For the functions below

   $$f(x) = \dfrac{1 + 10x}{4 - 3x}$$

   a) Calculate $f^{-1}(x)$
   b) Calculate $f^{-1}(f(x))$
   c) Calculate $f(f^{-1}(x))$
   d) What do you observe?

Bonus Question: Find the center and radius of the circle which goes through (1,4), (2,2), (8,2).