Written assignment 0, MATH2144

on inverse functions

due the 29^{th} of August

- 1. Let $c(z) = \frac{2 \cdot z + 1}{z + 1}$. Calculate the inverse of c.
- 2. Suppose $f: [0, \infty) \to [0, \infty)$, and suppose that $f(x) = x^2$.
 - (a) What is the domain of f?
 - (b) What is its range?
 - (c) Is f invertible? Justify your answer.
- 3. Let the functions f, g, and h be defined as follows:

$$f(x) = x^{3} + x, \qquad g(x) = \frac{1}{x^{3} + x},$$
$$h(x) = \sqrt[3]{\frac{x}{2} + \sqrt{\frac{x^{2}}{4} + \frac{1}{27}}} + \sqrt[3]{\frac{x}{2} - \sqrt{\frac{x^{2}}{4} + \frac{1}{27}}}.$$

- (a) Use a computer algebra system or graphing calculator to sketch graphs of f, g, and h around x = 0.
- (b) Do the graphs suggest that f and g are inverse functions? What about g and h? What about f and h? Justify your answers briefly.

N.B.: In question 3a, provide either a copy of the sketches by hand, or a printout of the results from the computer/calculator.

N.B.: In question 3a, make sure your axes have the same scale!