Math 1161: Written Homework 2 Name: _____ .# _____

Due 19 September 2017 in recitation. TA: _____ Time: _____

Instructions. You may discuss this assignment with others, but you must submit your own write-up. Write clearly and legibly. All functions herein are real-valued functions of a single real variable.

1. (3pts) Using **only the definition of the limit** prove that

$$\lim_{x \to -1} -3x - 1 = 2$$

2. (3pts) Give an explicit example of a function f and a function g such that f is continuous at $g(3)$ and the composition $f \circ g$ is continuous at 3 but g is **not** continuous at 3.

3. (3pts) Using **only the definition of the derivative** compute

$$\frac{d}{dx} x^{\frac{3}{2}}$$

4. (3pts) Find the largest intervals on which the function

$$f(x) = \sqrt{|x^3 - 1| - 1}$$

is continuous.

5. (3pts) Compute the following derivatives using any method you like

(a) $\frac{d}{dx}(\pi^2 + 4x^5 - e^3)$

(b) $\frac{d^2}{dx^2}(\pi^2 + 4x^5 - e^3)$

(c) $\frac{d^2}{dx^2}(a \sin x + b \cos x)$