

Math 1161: Written Homework 2

Name: _____ .# _____

Due Tuesday, September 18, 2018 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

$$\lim_{x \rightarrow -2} -3x^2 - 4x = -4$$

2. (3pts) Using **only the definition of the derivative** compute

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

3. (3pts) Give an explicit example of a function f and a function g such that f is continuous at $g(4)$ and the composition $f \circ g$ is continuous at 4 but g is **not** continuous at 4.

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

$$f(x) = \sqrt{|x^3 - 4| - 4}$$

is continuous. Insure that your intervals include endpoints if appropriate.

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

(a) $\frac{d}{dx}(\pi^3 + 3x^7 - e^6)$

(b) $\frac{d^2}{dx^2}(\pi^3 + 3x^7 - e^6)$

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