Discussion Problems **Name:** _____

Worksheet 2: Intermediate Value Theorem

Math 408C:

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Problem 1. Below is a table of values of the displacement of a particle (m) at a specified time (s). What is the average speed between t =0 and t=6? What about the average speed at t=2 and t=4? What about the instantaneous speed at t=4?

Problem 2. Use the intermediate value theorem to prove that the equation $\sin(\ln(x^2+2)) = 6x^2$ has at least one solution between 0 and 1. Why can the intermediate value theorem be used in this case?

Problem 3. Let the piecewise function f(x) be defined as:

$$\begin{cases} f(x) = e^x + 1 & x < 0 \\ f(x) = 2x^2 + 3x + b & x \geq 0 \end{cases}$$

Find b so that f(x) is continuous for all x.

Problem 4. Consider a function $f(x) = \frac{5x-2}{1-2x}$. Recognize this? Find:

(a)

$$\lim_{x \to 1/2^+} [f(x)]$$

.

(b)

$$\lim_{x \to 1/2^-} [f(x)]$$

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