MATH 1080, SPRING 2006, HW SET 6

You need to show all your work and explain with following the guideline described in the class webpage to get the full credit. And please staple your HW papers.

HW 6 Due on Thursday 03/02/06

Before doing this HW, memorize all definitions and go over examples given in class and read the textbook. Also go over the proofs of Intermediate value theorem, Rolle's theorem, and the Mean Value theorem.

1. Find a number c guaranteed by the Mean Value Theorem for $f(x) = x^2 + x$ on $[-2, 2]$.

2. Find a number c guaranteed by the Mean Value Theorem for $f(x) = \dfrac{1}{x} + 1$ on $[1, 3]$.

3. Show that the equation $x - \cos x = 0$ has at least one real solution between $x = 0$ and $x = \dfrac{\pi}{2}$ by mentioning which theorem you apply.

4. Show that $f(x) = \dfrac{2}{x} - 3$ is decreasing on $[-2, -1]$.

5. If $f'(x) = g'(x)$ for all x between 1 and 5, and $f(2) = 1, g(2) = 4$, then find $f(3) - g(3)$ and $f(4) - g(4)$.

6. If $f'(x) = 0$ for all x in $(1, 4)$ and $f(2) = 4$, then find a formula for $f(x)$ on $[1, 4]$ by using the Mean Value Theorem.

7. For the equation $4x^3 + 2x - 1 = 0$,

(1) show that it has a real solution between 0 and 1 by mentioning which theorem you apply.

(2) show that it has exactly one and only one real solution by mentioning which theorem you apply.

Date: February 22, 2006.