Study Guide for First Calculus II Exam

March 2, 2012

The first exam will cover material from the following sections from Stewart's text (7e): 4.3 and 6.1 – 6.6 and 6.8.

Note that old exams are posted on the course webpage. The exam from 2006 contains problems about 'function growth' for which you are not responsible.

1 Computing Limits, Differentiation and Integration Exercises = 60 percent

- Exponential Growth/Decay problem
- Apply FTC(I) to find a derivative
- Use logarithmic differentiation
- Know how to differentiate $\ln u$, e^u, a^u, $\log_a u$, where u is a function of x. Am I missing any???
- Know how to evaluate integrals of the form $\int a^u du$, $\int \frac{du}{u}$, $\int e^u$ where u is function of x.
- Apply L'Hospital's rule
- Know 7 different indeterminate form, and know how to handle each.

2 Definitions and Theorem Statements = 20 percent

- one-to-one function
- inverse function
- L'Hopital's Rule
- Fundamental Theorem of Calculus (Part I)

- Fundamental Theorem of Calculus (Part II)
- Definition of $\ln x$ as the area under a curve
- Mean Value Theorem
- Mean Value Theorem for Integrals
- Limit definition of derivative
- Integral definition of the number e
- Theorem 7 of Section 7.1
- others???

3 Theory = 20 percent

Be able to apply definitions and theorems. Possible problems include:

- Be able to prove the differentiation formula for the inverse trigonometric functions: $\sin^{-1} x, \cos^{-1} x, \tan^{-1} x$.
- Proof of FTC Part I
- Proof of (simple form) of L'Hopital's Rule
- Proof of Mean Value Theorem for Integrals