# Study Guide for Second Calculus II Exam

## March 19, 2012

The second exam will cover material from the following sections from Stewart's text (7e): 7.1, 7.2, 7.3, 7.4, 7.5 and 7.8. For the exam you will be provided with the trigonometric identities found on page 500, as well as the addition and subtraction formulas, double-angle formulas and half-angle formulas found on the inside front cover of the text.

This exam will be more technique than theory. However, please try to be mindful of my writing expectations. When it is appropriate you should give a written justification of your computations, steps, etc.

# 1  Problems of Integration $\sim$ 90 percent

- Be able to use the following techniques of integration:

    1. Integration by parts
    2. $u$-substitution
    3. Trigonometric substitution (make sure you remember to restrict the domain in the appropriate way)
    4. Partial fraction decomposition

- Formulas you should know off the top of your head (and many of which we have proved) are listed on pages 519 and 487 (except for those dealing with hyperbolic trigonometric functions).

- Determine whether a given improper integral of Type 1 or Type II converges or diverges.

# 2  Proofs / Theory / Definitions $\sim$ 10 percent

- Prove the reduction formula for $\int \sin^n x \, dx$, $\int \cos^n x \, dx$ and $\int \tan^n x \, dx$, where $n$ is a positive integer.

- Know definitions of a convergent and divergent improper integral.

- Be able to apply the Direct Comparison Test.