

Calculus III
MA 1023–D 2000

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Stratton Hall, Room 202A

WELCOME!

TOPICS

- Business: Course Goals
- An Improper Integral
- How do you spell L'Hôpital?

GOALS:

Upon successful completion of this course, you will be able to do the following:

1. evaluate the main types of indeterminate forms
2. evaluate the two main types of improper integrals

3. construct Taylor polynomials to approximate a function and estimate the error made in the approximation
4. compute numerical approximations for integrals, along with error estimates for the approximation
5. solve nonlinear equations using the bisection method, Newton's method, and the method of successive approximations
6. give a precise definition for convergence for sequences and series of numbers
7. use at least three methods to test convergence for an infinite series
8. construct Taylor series and determine the convergence set for the series

9. perform basic calculations (derivatives and integrals) using polar coordinates
10. perform basic vector calculations in two dimensions
11. find tangent and normal vectors to parametric curves
12. compute acceleration and curvature for parametric curves

To pass the course, you must demonstrate that you have mastered each and every outcome listed above.

GRADE SCHEMES

- Final Exam 100 points
- Homework and Quizzes 100 points
- Computer Labs 100 points
- _____
- Total 300 points

VISIT THE WEB SOON

- Syllabus and Basic Rules
- Recommended Problems
- Lecture Slides (postscript)
- Other Stuff

FIRST EXAMPLE:

Evaluate

$$\int_0^{\infty} x e^{-2x} dx$$

Keep Going

SUMMARY:

The Key Steps Were:

- Truncate
- Evaluate the PROPER integral
- Evaluate a Limit

What is an Indeterminate Form?

- “0/0” = what?
- “ ∞/∞ ” = what?
- “ $0 \cdot \infty$ ” = what?
- “ 0^0 ” = what?

$$0/0 = x \quad \text{means} \quad x \cdot 0 = 0$$

A FEW EXAMPLES:

- $\lim_{x \rightarrow \infty} x e^{-2x} = ???$

- $\lim_{\theta \rightarrow 0} \frac{\sin(\theta)}{\theta} = ???$

A FEW MORE EXAMPLES:

Conference #1: Tomorrow!

- Conference lead by a PEER learning assistant (PLA)
- Course business will be done in conference.
- Some topics will be discussed **ONLY** in conference

Homework Set #1:

HW Set #1 is due Tuesday ... *at the start of lecture* ...

Section 9.1: Problems 3, 8, 13, 23

Section 9.2: Problems 2, 15, 30, 43