Lecture #1: (03/16/2000)

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Calculus III MA 1023-D 2000

Professor Art Heinricher Stratton Hall, Room 202A

WELCOME!

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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

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- 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.

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GRADE SCHEMES

VISIT THE WEB SOON

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

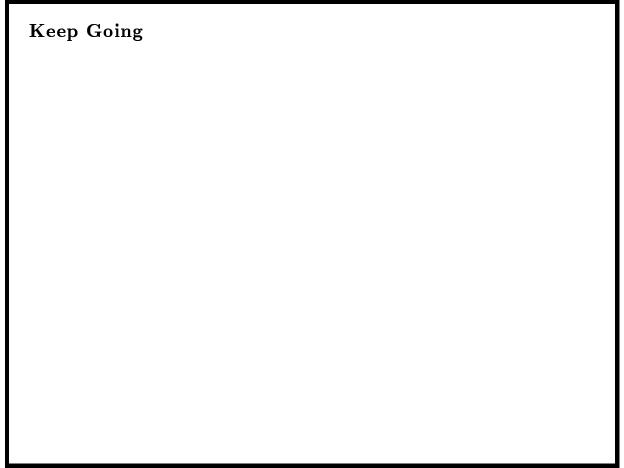
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FIRST EXAMPLE:

Evaluate

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

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SUMMARY:

The Key Steps Were:

- Truncate
- $\bullet~$ Evaluate the PROPER integral
- Evaluate a Limit

What is an Indeterminate Form?

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

$$0/0 = x$$
 means $x \cdot 0 = 0$

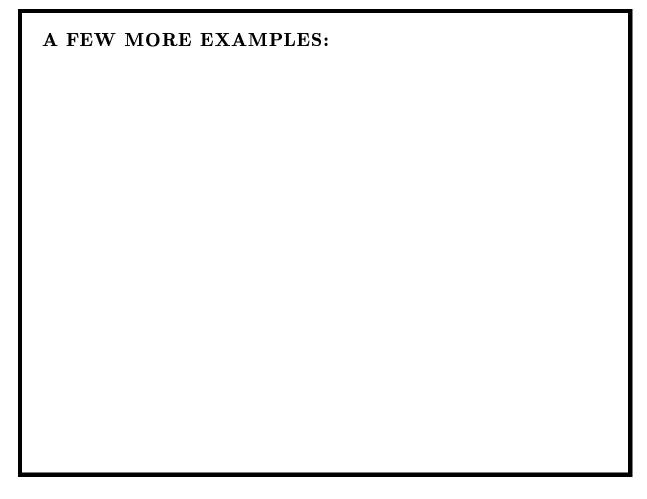
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A FEW EXAMPLES:

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

• $\lim_{\theta \to 0} \frac{\sin(\theta)}{\theta} = ???$



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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