Math 165- Calculus I with Labs 1
Fall 2003

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Text: Single Variable Calculus: Concepts and Contexts by James Stewart, 2nd edition, Brooks/Cole, 2001.

Syllabus

Brief Course Description

Calculus is the study of change and motion. After a quick review of the major types of basic functions, students will explore, analyze, and apply the mathematical concepts of limit, continuity, and derivative. A brief introduction to integration will be included at the end of the semester. We will use the rule of four, studying the subject from graphical, analytical, numerical, and verbal viewpoints.

Required Course Materials

Graph paper, ruler, sharpener or extra pencils, colored pencils.
The CD-Rom that accompanies your text (*Tools for Enriching Calculus*) will be used for the lab component of the course – it will provide interactive exercises, which will form a part of home assignments. It also contains Homework Hints for representative problems.

Recommended Course Materials

You may opt to buy the student solution manual (worked out solutions of odd problems) at the bookstore. A copy will also be available for in-room use in the math conference room (upstairs Regis).

Course Objectives

- To acquire understanding of the major concepts of differential calculus.
- To develop the ability to approach calculus topics from graphical, numerical, and symbolic points of view.
- To engage in mathematical reasoning.
- To learn to read mathematics and to become independent learners of mathematics.
- To develop the ability to create mathematical models and use these models to solve problems.
- To learn to apply the derivative concept and use the basic techniques of differentiation.

Learning Strategies

All new material will be introduced in class first. We will discuss it and work through a few examples. Your active involvement is crucial: you are encouraged to participate in the discussion and contribute ideas.

The next stage will be your work at home with your class notes and the textbook. Please read both your notes and the assigned textbook material making sure you understand everything, study all the examples, and then do the assigned problems. If something is unclear, formulate it as a question for the next class. Group work is a wonderful tool to use at this stage. (However, all the work you submit should be your own. If you work in a group,

make sure you put aside any notes and write the solution in your own words, the way you understand it.)

At the beginning of each class, we will discuss the assignment from the previous class meeting and address all concerns and uncertainties. Please do not leave anything unclear: we can only move forward successfully if we have no hazy areas left behind. All questions are always welcome: before, during, or after the class.

Course Requirements

- You are expected to attend all classes, to be on time for classes, and to come prepared. Please do the assigned reading, study the examples, solve the assigned problems, and formulate questions to raise in class. Never leave anything unclear.
- Each homework assignment will consist of two parts: A and B. Part A (on the newest material) will be discussed at the next class meeting. Please complete it in writing and be ready with your questions. Part B (on the previous portion of the material) will be collected for grading at the beginning of the class meeting following the class in which the problems were assigned. Homework may not be handed in late. If you cannot avoid an absence, please make sure that a friend, roommate, of classmate will deliver your homework to class.
- There will be a short written quiz approximately once a week.
- We will have a mid-term exam on October 14. It will be a written test given in class.
- We will have our final exam on Tuesday, December 9 (2 – 4 pm). It will be a cumulative written test.

Grading Method

Written homework assignments: 20%
Quizzes: 20%
Mid-term exam: 30%
Final exam: 30%

Classroom Policies

- Students are expected to attend all classes and to be on time for classes. In case of an illness or an emergency that will require missing a class, please contact me – if at all possible, before the class. Let me know of any anticipated absences as early as possible.
- Your questions are always welcome – before, during, or after the class. You can also make an appointment with me, individually or in groups, by phone or by e-mail. Please do not hesitate to contact me whenever you need some help.
- If, at any point, you have concerns about the course or your personal progress – please talk with me immediately, after the class or via e-mail or phone. We can certainly deal successfully with all such problems – if we do it promptly, before they have a chance to become “chronic”. If you don’t say anything – I will assume you are happy with the course and your progress.

Tentative Course Outline (please expect adjustments)

Week 1 8/26, 8/28	Representing a function. Coordinate geometry.	Section 1.1 Appendix B

Week 2 9/2, 9/4	Mathematical models. Trigonometry.	Section 1.2 Appendix C
Week 3 9/9, 9/11	New functions from old. Graphing calculators. Exponential functions.	Sections 1.3, 1.4, 1.5
Week 4 9/16, 9/18	Inverse functions and logarithms. Parametric curves. Tangent and velocity.	Sections 1.6, 1.7, 2.1
Week 5 9/23, 9/25	The limit of a function. Calculating limits using the limit laws.	Sections 2.2, 2.3
Week 6 9/30, 10/2	Continuity. Limits at infinity. Rates of change.	Sections 2.4, 2.5, 2.6
Week 7 10/7, 10/9	Derivatives. The derivative as a function.	Sections 2.7, 2.8
Week 8 10/14, 10/16	**Mid-term (10/14).** What the derivative says about the function.	Section 2.10
Week 9 10/21, 10/23	Derivatives of polynomial and exponential Functions. The product and quotient rules.	Sections 3.1, 3.2
Week 10 10/28, 10/30	Derivatives of trigonometric functions. The chain rule.	Sections 3.4, 3.5
Week 11 11/4, 11/6	Derivatives of logarithmic functions. Differentials.	Sections 3.7, 3.8
Week 12 11/11, 11/13	Related rates. Maximum and minimum values.	Sections 4.1, 4.2
Week 13 11/18, 11/20	Derivatives and the shapes of curves. Indeterminate forms and l'Hospital's rule.	Sections 4.3, 4.5
Week 14 11/25	Optimization. **Thanksgiving break!**	Section 4.6
Week 15 12/2, 12/4	Introduction to integration.	Sections 5.1, 5.2

December 9 – Final exam.