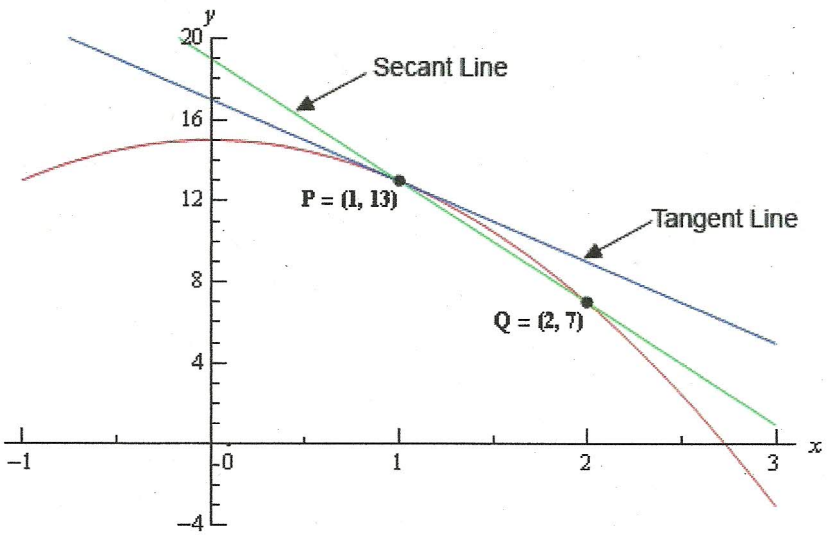
Mathematics 110
Calculus I with Precalculus
Spring, 2014
Senior Lecturer: Mrs. Susan Riner

Tangent Line Problem



Gottfried Whilhem Leibniz (1646-1716)
The imaginary number is a fine and wonderful recourse of the divine spirit, almost an amphibian between being and not being.

Philip J. Davis
One of the endlessly alluring aspects of mathematics is that its thorniest paradoxes have a way of blooming into beautiful theories.

Jules Henri Poincaré (1854-1912)
Mathematics is the art of giving the same name to different things.

Havelock Ellis
It is here [in mathematics] that the artist has the fullest scope of his imagination.

Francois le Lionnais
"Who has not been amazed to learn that the function, $y = e^x$, like a phoenix rising from its own ashes, is its own derivative?"

Charles Hermite
"I recoil with dismay and horror at this lamentable plague of functions which do not have derivatives.

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Textbook: James Stewart, Single Variable Calculus, Early Transcendental Functions, 7th edition. Reading the text before coming to class is a very useful habit.

Course Description: Mathematics 110 provides students with an integrative approach to Calculus I that includes the necessary precalculus topics: review of algebra; functions; trigonometric, inverse trigonometric, logarithmic, and exponential functions. Calculus topics include limits, continuity, the definition of the derivative, differentiation, extrema, the Intermediate Value Theorem, antiderivatives, and optimization problems.

Course Goals: Upon successful completion of Math 110, student will:

1. Be able to perform complex algebraic manipulations.
2. Be able to graph and compute with algebraic and transcendental functions.
3. Understand conceptually limits and their relationship to the graph of a function.
4. Understand conceptually the derivative and its relationship to the concept of "rate of change".
5. Be able to calculate derivatives and to evaluate limits.
6. Be well-prepared for Math 111.

Gateway Tests: In order to pass this course, the student must pass the Gateway Test covering algebra, graphs, logarithmic functions, exponential functions, and trigonometry. The student will be given three opportunities to pass the Gateway test.

Tests: Four tests will be given outside the regular class time. No calculators are allowed on tests.

Final Examination: A cumulative final exam will be given at the time scheduled by the registrar.

Test Attendance: Students are expected to take tests at the scheduled times. The instructor will handle any conflicts, problems, or emergencies on an individual basis. If a student has an excuse deemed legitimate by the instructor, arrangements will be made for the student to take a test prior to the testing time. There will be no make-up tests given after the testing time. Any student who needs special accommodations must provide documentation several days in advance of the needed accommodation in order for appropriate arrangements to be made.

Calculators: Calculators will not be allowed on tests or quizzes.

Homework: Daily homework assignments are for the student's benefit. The most important factor contributing to success in Math 110 is the regular and successful (exercises correctly done with a degree of confidence) completion of the exercises. Daily practice is recommended with a minimum of 6-8 hours of study each week. The goal is that the student be able to solve problems in good style, unaided by books, notes, tutors, or calculator and *to understand the reasoning behind the solution method.*

Quizzes/Group Work: Quizzes and group work will be assigned throughout the semester.

Evaluation: The following written work will provide the basis of the student's evaluation:

Gateway Test	100 points
Problem Sets/Quizzes	200 points
Tests (4 @ 100 points)	400 points
Final Exam	200 points
Total	900 points

In general, letter grades will be determined as follows:

A:	90% and above
B:	80 – 89%
C:	70 – 79%
D:	60 – 69%
F:	Less than 60%

Grades of A-, B+, B-, C+, C-, D+ may be assigned for sums of points near the above cut-off scores in total points.

Written Work: Express your thoughts in complete sentences; e.g. 2+3 = 5, where 2+3 is the subject, "=" is the verb, and "5" is the predicate. Use mathematical symbols wherever appropriate and make your work neat and legible. Pay attention to the way problems are solved in class and in the textbook and duplicate those methods. You will more clearly understand the concepts if your work is done neatly, logically, step by step.

Tutoring/Supplemental Instruction: Tutoring will be available in the Mathematics Center, and a schedule will be posted. The supplemental instructor (SI) will be announced. The SI will schedule a weekly evening study session to help students with material covered in class.

Blackboard: The student is responsible for obtaining the handouts and information posted on Blackboard. Handouts include information and exercises to supplement the textbook as well as answer keys, solutions, and test review materials.

Class Attendance: The student is responsible for the course material discussed in class and for any announced changes to this syllabus. Therefore, the student is expected to attend all classes. Entering class late by ten or more minutes is considered an absence.

Religious Holiday Observance: Any conflicts between the course schedule and religious holy days may be negotiated in advance by the student with the instructor.

Test preparation: Here are some criteria for "studying hard" and "being prepared" for a test:

- Attend class. One can hardly claim to be prepared to take a test if one does not attend.
- Be well rested. A tired brain is not reliable, especially if a test demands thinking. Studying all night is not preparing for the test. Plan to be prepared.
- No questions when the test starts. You know you are ready when you are comfortable bringing only your pencils to the test.
- Be ready to take the test the day before it is given. That is, the night before is literally review and running through the material, just to hone your memory and confirm your understanding of the material.

Accomplishing these things is not easy. Intelligent and efficient study habits are very important. The trick is not to get behind and to keep working at it. Tests are performances, similar to those by athletes, musicians, and dancers. Prepare for them in similar ways. Begin practicing for them weeks in advance. When you are ready for and receptive to advice, your instructor, your adviser, and the counseling center are willing to help you.

Practice and insight: Gauss said the purpose of calculation is insight. Insight is an understanding into why things work the way they do. This should be the goal of working out problems. Know why each step is correct and why each step was the right step to take. This is more than knowing that each step is correct. This is like the three wheres of grammar: where you came from; where you are; and where you are going. You need to achieve the intended insight from doing your homework and other studying.

Hard work and the difficulty of the calculus: In general the student will need to study six to eight good hours per week exclusive of the time spent on review for tests. "Difficult" is rarely an appropriate description of a problem. Either you can solve the problem or you cannot solve it. When you can solve it, it is not difficult but "easy." When you cannot solve it, it is also not difficult but "impossible." What is difficult is **learning** — learning how to solve the problem, learning how to figure out how to solve the problem, learning how to learn. These are increasingly higher levels of learning. Learning
calculus is hard. It takes work: reading, asking the right questions, and, most of all, solving problems.

THE HONOR CODE OF OXFORD COLLEGE APPLIES TO ALL WORK SUBMITTED FOR CREDIT IN THIS COURSE. WHEN YOU WRITE YOUR NAME ON SUCH WORK, YOU ARE PLEDGING THAT THE WORK WAS DONE IN ACCORDANCE WITH THE RULES STIPULATED ON THE WORK OR IN THIS SYLLABUS AND THAT YOU HAVE WITNESSED NO HONOR CODE VIOLATIONS IN THE CONDUCT OF THE GIVEN ASSIGNMENT.

Note: Student work submitted as part of this course may be reviewed by Oxford College and Emory College faculty and staff for the purposes of improving instruction and enhancing Emory education.

Math 110
Spring, 2014

Topics and Proposed Course Calendar

Wed.	Jan. 15	Introduction to Calculus Algebra Review
Fri.	Jan. 17	Algebra Review, Handout A
Wed.	Jan. 22	Handout A 1.1– Functions
Fri.	Jan. 24	Review of Graphing, Handout B
Mon.	Jan. 27	Handout B 1.2 - Graphing
Wed.	Jan. 29	1.3, 1.6 - Combining functions, transformations, inverse functions
Fri.	Jan, 31	NTF Part A – Trigonometric Functions, Appendix D
Mon.	Feb. 3	NTF Part B – Trigonometric Identities, Appendix D
Wed.	Feb. 5	Review

****Thursday, February 6 Test 1 8:00 a.m.**

Fri.	Feb. 7	NTF Part C – Trigonometric Graphs, Appendix D
Mon.	Feb. 10	NTF Part D – Trigonometric Equations, Appendix D
Wed.	Feb. 12	Binomial Theorem
Fri.	Feb. 14	2.1 – Velocity and Calculus
Mon.	Feb. 17	2.2 - The limit of a function, infinite limits
Wed.	Feb. 19	2.3 – Calculating limits
Fri.	Feb. 21	2.5 – Continuity
Mon.	Feb. 24	2.5 – Continuity, continued
Wed.	Feb. 26	Review

****Thursday, February 27 Test 2 8:00 a.m.**

Fri.	Feb. 28	NTF Part F – Exponential and Logarithmic Functions
Mon.	Mar. 3	NTF Part G – Exponential and Logarithmic Functions
Wed.	Mar. 5	2.6 – Limits at Infinity
Fri.	Mar. 7	2.7 – The derivative
		March 10 – 14 Spring Break
Mon.	Mar. 17	2.8 – The derivative as a function
Wed.	Mar. 19	3.1 – Derivatives of polynomial and exponential functions
Fri.	Mar. 21	3.2 – Product and quotient rules
Mon.	Mar. 24	3.3 – Derivatives of trigonometric functions
Wed.	Mar. 26	Review

****Thursday, March 27 Test 3 8:00 a.m.**

Fri.	Mar. 28	3.4 – The Chain Rule
Mon.	Mar. 31	3.6 – Derivatives of logarithmic functions
Wed.	Apr. 2	Working with derivatives
Fri.	Apr 4	NTF Part E – Inverse Trigonometric Functions
Mon.	Apr. 7	4.1 – Maximum and Minimum Values
Wed.	Apr. 9	4.3 – Increasing/decreasing test
Fri.	Apr. 11	4.7 – Optimization Problems
Mon.	Apr. 14	4.9 – Antiderivatives
Wed.	Apr. 16	5.5 – Antiderivatives (1^{st} part)
Fri.	Apr. 18	**No Class**
Mon.	Apr. 21	5.5 – Antiderivatives (1^{st} part)
Wed.	Apr. 23	Review

****Thursday, April 24 Test 4 8:00 a.m.**

Fri.	Apr. 25	Summation - Appendix E and Handout
Mon.	Apr. 28	Review