

Mathematics 110A
Fall, 2011

Instructors: Drs. Ricardo Conceição & Michael Rogers.

Course Content: Mathematics 110A 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, optimization problems.

Textbook: James Stewart, *Single Variable Calculus, Early Transcendental Functions*, 7th Edition. Try to read the book before coming to class: believe me, this is a very useful habit.

Course Goals: Upon successful completion of Math 110A students 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 evaluate limits. 6. Be well-prepared for Math 111 and 119.

Classes: The student is responsible for what is covered in class. In addition to the regular class meetings, there will also be several tests scheduled on Tuesday or Thursday mornings. (See below).

Homework: There is a homework assignment for almost every day of class. These exercises usually will not be collected but are for the benefit of the student. Students may ask questions, and quizzes based on the homework may be given. The instructor may ask to see a student’s homework.

Quizzes: (100 points.) There will be 12 quizzes of which the highest 10 will be counted.

Gateway Exam: (50 points.) In order to pass this course the student must pass an examination in algebra, graphs and trigonometry.

See the calendar for the schedule. The student will be allowed three opportunities to pass it. Each test (of each kind) will be different but very similar to the original test.

8:00 a.m. Thursday, October 27

8:00 a.m. Thursday, November 3

8:00 a.m. Tuesday, November 22

Project: (50 points.) A group project will be assigned during the semester.

Tests: (500 points.) In general, calculators will not be allowed on tests. Five tests will be given on the following days:

8:00 a.m. Tuesday, September 13

8:00 a.m. Thursday, September 29

8:00 a.m. Thursday, October 20

8:00 a.m. Thursday, November 10

8:00 a.m. Thursday, December 1

Final Exam: (200 points.) A cumulative final exam will be given at the time scheduled by the Registrar.

Excuses: Excuses deemed legitimate by the instructor will be handled according to the individual circumstances and college policies.

The student is expected to take all tests and exams at the scheduled times. For legitimate excuses arrangements will be made to take a test prior to the testing time. There will be no make-up tests given after the testing time.

Written Style: Thoughts are expressed by sentences: just so in mathematics. Pay attention to your textbook: it is written in sentences. Your written work must be in complete sentences. Note “ $1+1 = 2$ ” is a complete sentence (it has a subject “ $1+1$ ”, verb “ $=$ ” and predicate “ 2 ”). Use mathematical symbols wherever appropriate. Your work also needs to be neat and orderly to be intelligible. See the “Calculus Style Guide” on Blackboard.

Evaluation: Grades will be based on the following written work:

Tests (5 @ 100 pts)	500 points**
Project	50 points
Gateway Exam	50 points
Quizzes (10 @ 10 pts)	100 points
Final Examination	200 points
Total	900 points

The plus/minus system will be used. A rough guide to grades:

A: ≥ 810 pts. B: 720–810 pts. C: 630–720 pts. D: 540–630 pts. F: < 540 pts.

**Students do not always anticipate the high demands of college. This sometimes results in underachievement initially. To encourage students to pull themselves together and raise their efforts, we will drop *one of the first two* test scores, if doing so would raise their average. This policy applies to the first two tests *only*. Students will be expected to have adjusted to the demands of college and be attaining their potential after that point.

Tips for Success: Calculus is hard, but it can be made easier by intelligent and efficient study habits. “The purpose of computing is insight, not numbers.” (R.W. Hamming) 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.

Although the homework exercises are not graded, it is important for the success of the student that they be completed as soon after covering the material as possible. Calculators may be used when appropriate, but the student should keep in mind that they are not permitted on the tests. While collaboration is encouraged, each student should be sure that he or she ultimately can solve problems unaided by notes, the textbook, a calculator, or other people. Practice good style on homework. A clean style helps to clean up messy thinking. In general the student will need to study at least six good hours per week exclusive of the time spent on case studies and review for tests.

Tests are performances, similar to those by athletes, musicians, and dancers. Prepare for them in similar ways. Begin practicing for them weeks in advance. The topics we will cover are very useful and fundamental in the sciences, business and engineering, among other fields, and I want you all to succeed. However, success in the course will require your diligence and hard work. Be sure to keep up with the assignments and to attend class. Talk to me as soon as you are having problems — don't wait until the week of a test. In addition to learning quantitative skills, it is important that you develop learning skills and study habits that will help you in calculus, in other courses, and in life beyond Oxford College.

Help Sessions/Tutoring: Help sessions will be scheduled when appropriate; attendance is optional. The schedule for tutoring in the Math Center will be announced when available.

Honor Code: The Honor Code of Oxford College applies to all work submitted for credit in this course. To receive credit for work submitted you must place your name on it. By placing your name on such work, you pledge that the work has been done in accordance with the given instructions and that you have witnessed no Honor Code violations in the conduct of the assignment.

You may always ask the instructor any question about an assignment. He will answer at his discretion.

Good luck and I hope this will be an enjoyable experience for all of you!

Proposed Calendar

Date	Topic	Section
Wed 24 Aug	Introduction: Optimization and calculus	Preview
Fri 26 Aug	Algebra Diagnostic Quiz	—
Mon 29 Aug	Introduction: Velocity and calculus	Preview, §2.1
Wed 31 Aug	Algebra Review	§1.1, “Handout A”
Fri 2 Sep	Quadratic, polynomial, and rational functions	§1.1, “Handout B”
	Quiz	
Mon 5 Sep	<i>Labor Day</i>	
Wed 7 Sep	Piecewise-defined functions	§1.1, “Handout B”
Fri 9 Sep	Combining functions; transformations of graphs	§1.3
	Quiz	
Mon 12 Sep	Review	
Tue 13 Sep	Test 1 at 8:00 a.m.	
Wed 14 Sep	Trigonometric functions: definitions and basic graphs	NTF A
Fri 16 Sep	Trigonometric functions: identities	NTF B
	Quiz	
Mon 19 Sep	Trigonometric functions: graphs	NTF C
Wed 21 Sep	Trigonometric functions: equations	NTF D
Fri 23 Sep	The Limit of a Function	§2.2
	Quiz	
Mon 26 Sep	Calculating Limits	§2.3
Wed 28 Sep	Review	
Thu 29 Sep	Test 2 at 8:00 a.m.	
Fri 30 Sep	Continuity	§2.5
Mon 3 Oct	Continuity	§2.5
Wed 5 Oct	Derivative	§2.7
Fri 7 Oct	Derivative as a function	§2.8
	Quiz	
Mon 10 Oct	<i>Fall Break</i>	
Wed 12 Oct	Exponential and logarithmic functions	NTF F
Fri 14 Oct	Exponential and logarithmic equations	NTF G
	Quiz	
Mon 17 Oct	Derivatives of Polynomials and Exponential Functions	§3.1
Wed 19 Oct	Review	
	Quiz	
Thu 20 Oct	Test 3 at 8:00 a.m.	

Fri 21 Oct	The Product and Quotient Rules	§3.2
Mon 24 Oct	Review of trigonometry	§3.3
Wed 26 Oct	Derivatives of trigonometric functions	§3.3
	Quiz	
Thu 27 Oct	Gateway Exam (First Opportunity) at 8:00 a.m.	
Fri 28 Oct	The Chain Rule	§3.4
Mon 31 Oct	Derivatives of logarithmic functions	§3.6
Wed 2 Nov	Working with Derivatives	
	Quiz	
Thu 3 Nov	Gateway Exam (Second Opportunity) at 8:00 a.m.	
Fri 4 Nov	Maximum and minimum values	§4.1
Mon 7 Nov	Inverse Trigonometric Functions	NTF E
Wed 9 Nov	Review	
	Quiz	
Thu 10 Nov	Test 4 at 8:00 a.m.	
Fri 11 Nov	Increasing/Decreasing Test	§4.3
Mon 14 Nov	Optimization problems	§4.7
Wed 16 Nov	Antiderivatives	§4.9
Fri 18 Nov	Antiderivatives	§5.5 (1st part)
	Quiz	
Mon 21 Nov	Antiderivatives	§5.5 (1st part)
Tue 22 Nov	Gateway Exam (Last Opportunity) at 8:00 a.m.	
Wed 23 Nov	<i>Thanksgiving</i>	
Fri 25 Nov	<i>Thanksgiving</i>	
Mon 28 Nov	Summation	Handout
Wed 30 Nov	Review	
	Quiz	
Thu 1 Dec	Test 5 at 8:00 a.m.	
Fri 2 Dec	Review	
Mon 5 Dec	Review	