

# 3450:221-007 Analytic Geometry-Calculus I

Dr. Laura Gross, Instructor  
Mr. Mitch Shipman, Learning Assistant  
Fall 2003

## COURSE OBJECTIVES

In this course you will calculate both rates of change and areas of irregular regions. You'll learn the relationship between the two activities.

You will also develop your problem-solving skills, from the point of view of analytical geometry, meaning both algebra and geometry working together.

You'll become more sophisticated at reading, analyzing, and writing technical material and reasoning *very* precisely.

Specific topics will include limits, continuity, derivatives, tangent lines, maxima and minima of functions, key calculus theorems, related rates, antiderivatives, definite integrals, areas, and volumes.

## COURSE MATERIALS

*Single Variable Calculus*, Stewart, 5th ed., 2003 (required)

*How to Ace Calculus: The Streetwise Guide*, Adams, Hass, and Thompson (recommended)

Graphing calculator (TI-85 or below allowed on most exams and quizzes)

## CONTACT INFORMATION

Laura's office: Arts and Sciences (CAS) 266  
Phone: (330) 972-6829  
E-mail: gross@math.uakron.edu  
FAX: (330) 374-8630  
Web: <http://www.math.uakron.edu/~gross><sup>1</sup>

Mitch's study table: Carroll Hall (CH) second floor  
E-mail: mas59@uakron.edu<sup>1</sup>

## OUTSIDE HELP

- Laura's **office hours for the first week of school** are Monday, August 25 from 5:15 to 6:45 p.m., Tuesday, August 26 from 4:15 to 5:45 p.m., Wednesday, August 27 from 5:15 to 6:45 p.m., and Friday, August 29 from 2:15 to 3:15 p.m. in CAS 266. To be extra safe, you might want to call before you come over, in case some unexpected meeting interferes with these hours in the first week of classes. Subsequent office hours will be announced in class and posted on Laura's web page.
- Mitch will host a **study session on Wednesday, August 27** from 7:00–8:00 p.m. in Olin 119A. Please try to attend to get insider tips on how to succeed in calculus, plus get help with critical precalculus review. Mitch will finalize this semester's study session time, plus two hours of **study table** (tutoring) times after getting student feedback.

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<sup>1</sup>Mitch will forward your e-mail to Laura if he has completed his maximum number of hours per week when he hears from you.

- **Bring your Zip Card to study sessions and study tables.** The Supplemental Instruction (Learning Assistant) program on campus requires us to keep student ID attendance records.
- In case you can't attend scheduled outside help, make an appointment, preferably at least one day in advance.
- If you wish, you may go to Carroll Hall, Room 215A, Monday through Friday and request additional free tutorial assistance. Call (330) 972-6552 for further information.

## PREREQUISITES

You are responsible for having completed Precalculus Mathematics 3450:149 or equivalent with a grade of C- or better or obtaining the appropriate grade on the placement exam. If you have not met the prerequisite, you might be administratively withdrawn from the course without refund.

## POLICIES

- ATTENDANCE
  - The course meets Mondays, Tuesdays, Wednesdays, and Fridays 1:10–2:00 in James A. Rhodes Auditorium (JAR), Room 45.
  - Attendance plays an important role in your grade: Good attendance helps you perform well in the course. People who attend infrequently almost always drop or fail the course. Also, your attendance record is one indicator to me of how much effort you are putting into learning. **In case of a borderline course grade, attendance and participation may influence the final outcome by up to 5%.**
- HOMEWORK
  1. Homework will be collected approximately every week.
  2. Please keep a copy of your homework, so that you can refer to your work when the grader has your original.
  3. **At the beginning of class, you may submit written questions about the current homework assignment or any recently-covered material.** Have your questions prepared before the beginning of class. Questions must be more specific than “How do you do number 6?” (Say what you tried.) If you put your name on your paper, you will receive a written answer to follow up on our discussion.
  4. *Please start writing on a new sheet of paper for each new section of problems you begin.*
  5. To receive full credit, homework must
    - be on clean 8 1/2 by 11 inch paper,
    - be stapled,
    - be neat and clear.
  6. When the grader looks at each of your homework problems, he or she should be able to understand what you are doing without looking at the book. To receive full credit, you need to (1) indicate what the question is, (2) show your work, and (3) use complete sentences whenever discussion is required.
  7. I encourage students to work together on homework. However, you must *write it up* by yourself.

8. You may submit late homework at your own risk. If the grader has already completed the grading when you submit it, you will receive a grade of zero. Homework submitted by e-mail *will not* be graded. Homework submitted by fax by the due date *will* be graded.
9. Each assignment will be graded out of 20 points. Four points will be based on the completeness of the assignment, and 16 points will be based on the careful grading of four problems chosen at random.
10. At the end of the semester, I will drop your three lowest homework grades.

- SUGGESTED PROBLEMS

Many of the homework, quiz, and exam problems will be drawn from the suggested problems handed out in class. I encourage you to work *all* of the suggested problems for practice.

- QUIZZES AND IN-CLASS ASSIGNMENTS

1. Quizzes and in-class assignments will be given approximately every week that there is no test. Quizzes will generally take place on Fridays. You will collaborate with other students on in-class assignments.
2. Each quiz or in-class worksheet will be graded out of 20 points.
3. At the end of the semester, I will drop your lowest three quiz/worksheet grades.
4. Quizzes/worksheets may be taken only in class on the designated day.

- EXAMS

- There will be four exams during the semester. Makeup exams are given at my discretion. Unless there is an emergency, you must contact me before the exam to be considered for a makeup.
- The comprehensive final exam will be **Monday, December 8, 7:30–9:55 a.m.** at a place to be announced. No make-up tests will be available.

- GRADES

- Course grades are determined by:
 

four exams	10% each
homework	20%
quizzes/in-class assignments	15%
comprehensive final exam	25%
- The tentative grade scale is A 90-100%, B 80-89%, C 70-79%, D 60-69%, F 0-59%. Cut-offs for plus/minus grades will be determined at the discretion of the instructor.
- If you are unable to complete the course due to circumstances beyond your control, see the instructor. You may be eligible for a grade of incomplete if your average on work completed is at least a C. Incompletes must be approved by the Dean's Office.
- You may contest any grade up until one week after the work was returned in class.
- When work is returned to you, save it. Also, keep a running log of your grades. If you have any questions about my records, you must be able to show the relevant work.

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- REGISTRATION AND WITHDRAWAL

1. You must register for the class during the first two weeks of school. To participate in the class, your name must appear on the university's official class list by Monday, September 8, 2003.
2. Withdrawal from the course is permitted at any time on or before Friday, October 17th with your advisor's signature. After that date, my signature is also required. After Friday, November 14th at 4:30, University policy prohibits withdrawal from any class. All withdrawals must be processed by the registrar by that date.

#### RESPONSIBILITIES

1. Adhere to academic honesty policies. (See handout.) They will be strongly enforced.
2. All pagers, cellular phones, etc. must be turned off during class time.
3. To remain in the class you must, of course, behave courteously and appropriately.

#### TIPS FOR SUCCESS

- Most successful calculus students rely on good study skills rather than in-born talent! In order to do well in this course, you must practice extensively— keep up with the homework, be patient, persevere, and ask questions.
- Aim for an A. Students who aim low usually fall short of their goals.
- Take an active approach to learning the material. Watching an instructor explain it is insufficient for learning. **A standard rule for college mathematics is to spend about two hours outside of class for each hour in class.**
- Read the sections at least briefly before lecture, so the lecture will be more understandable.
- Attend the lecture, and pay attention. Failure to attend class is a very common cause of low course grades.
- Read the sections in detail after lecture and go back over your notes.
- Do all of the assigned and suggested homework and more if you need to.
- Asking questions is one of the smartest things you can do! Coming to office hours, study sessions, and study tables for further discussion is also invaluable; I can't emphasize that enough. If you have a conflict, schedule an appointment for another time. One-on-one interactions with the professor and the learning assistant are very valuable learning tools for you (AND a good way for us to get to know you better AND important in getting your money's worth out of your education).
- Keep up to date. Come and see the professor or learning assistant right away if you have any difficulties or fall behind in the course.

I hope you find calculus— as I do— both interesting and useful!

### TENTATIVE SCHEDULE

Week	Date	Section	Title
1	25 Aug	2.1 2.2 2.3	The tangent and velocity problems The limit of a function Calculating limits using the limit laws
2	1 Sep	Labor Day 2.4	No class on Monday The precise definition of a limit
3	8 Sep	2.5 2.6 3.1	Continuity Tangents, velocities, and other rates of change Derivatives
4	15 Sep	3.2 EXAM 1	The derivative as a function Friday 19 Sep
5	22 Sep	3.3 3.4 3.5	Differentiation formulas Rates of change in the natural and social sciences Derivatives of trigonometric functions
6	29 Sep	3.5 3.6 3.7	Derivatives of trigonometric functions The chain rule Implicit differentiation
7	6 Oct	3.7 3.8 EXAM 2	Implicit differentiation Higher derivatives Friday 10 Oct
8	13 Oct	3.9 3.10 4.1	Related rates Linear approximations and differentials Maximum and minimum values
9	20 Oct	4.2 4.3 4.4	The mean value theorem How derivatives affect the shape of a graph Limits at infinity, horizontal asymptotes
10	27 Oct	4.5 4.7 EXAM 3	Summary of curve sketching Optimization problems Friday 31 Oct
11	3 Nov	4.9 4.10 5.1	Newton's method Antiderivatives Areas and distances
12	10 Nov	5.1 5.2 5.3	Areas and distances The definite integral The fundamental theorem of calculus
13	17 Nov	5.5 6.1	The substitution rule Areas between curves
14	24 Nov	6.2 EXAM 4 Thanksgiving	Volumes Wednesday Nov 26 No class Friday
15	1 Dec	6.3 6.4	Volumes by cylindrical shells Work
16	8 Dec	FINAL EXAM	7:30 – 9:50 a.m.

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## SUGGESTED PROBLEMS, Chapters 1 and 2

- Your Day 1 homework is to read “A Preview of Calculus,” PP. 3–9 in your textbook. Read also §2.1: “The tangent and velocity problems,” PP. 65–69. Both of these sections will help you complete today’s in-class exercise, due Friday, and help you benefit from and contribute to tomorrow’s class on §2.1.
- The in-class exercise also includes review questions. Skim through Chapter 1 if you need to brush up on some of those precalculus concepts involving functions and models.
- Please do a thorough precalculus review this week. Such review concepts will be explicitly tested on the first quiz. Start by doing all the Chapter 1 review problems on PP. 55–57.
- There is an algebra review on the CD that came with your book.
- For a general problem-solving review, read PP. 58–62 (skipping induction), and do Problems 1–12.
- Mitch’s study session on Wednesday this week provides a particularly good opportunity for you to ask questions on review material. Please try to attend, and bring your questions!
- Chapter 2 suggested problems follow:

Section	Suggested Problems
2.1	1, 3a (ii, iii, iv), 3b, 3c 5
2.2	1–4, 6, 8, 10, 12, 13, 17, 20, 23, 25, 28, 33
2.3	1, 2, 10, 11, 12, 18, 29, 36, 37, 41, 43, 47, 49, 53, 54, 58, 59
2.4	1a, 3, 4, 7, 16, 23, 28, 31, 37, 43
2.5	1, 3, 6, 8, 10, 11, 14, 19, 21, 22, 35, 39, 41, 43, 45, 49
2.6	1, 3, 8, 11, 15, 17