

MA 122 Calculus 1

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Office Hours: Monday 1-3, Thursday 4-5, Friday 1-2 (no appointment necessary). Feel free to make an appointment if you cannot come to my regular office hours.

Topics covered:

1. Limits, continuity
2. Infinite limits, limits at infinity, asymptotes
3. The derivative, rates of change
4. Finding and using derivative
5. Higher derivatives. Differentiability

(Exam 1)

6. Product, quotient and chain rules
7. Derivatives of exponential, logarithmic and trigonometric functions
8. Linear approximation
9. Implicit differentiation
10. Related rates

(Exam 2)

11. Increasing and decreasing functions
12. Second derivative and concavity
13. Relative extrema. First and second derivative tests
14. Graphical analysis
15. Absolute extrema and optimization

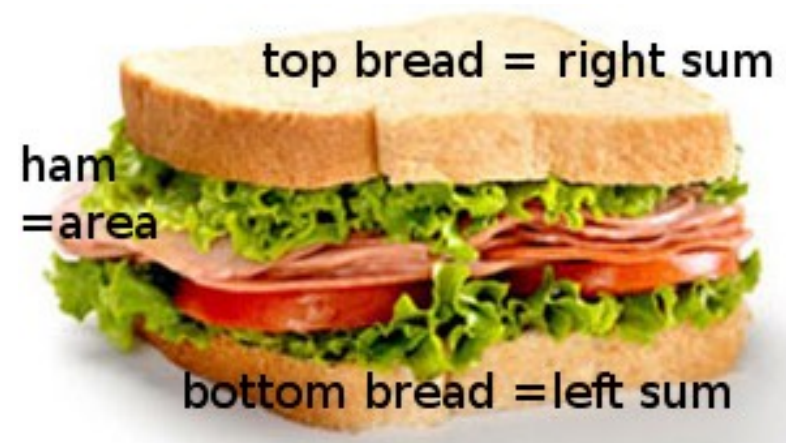
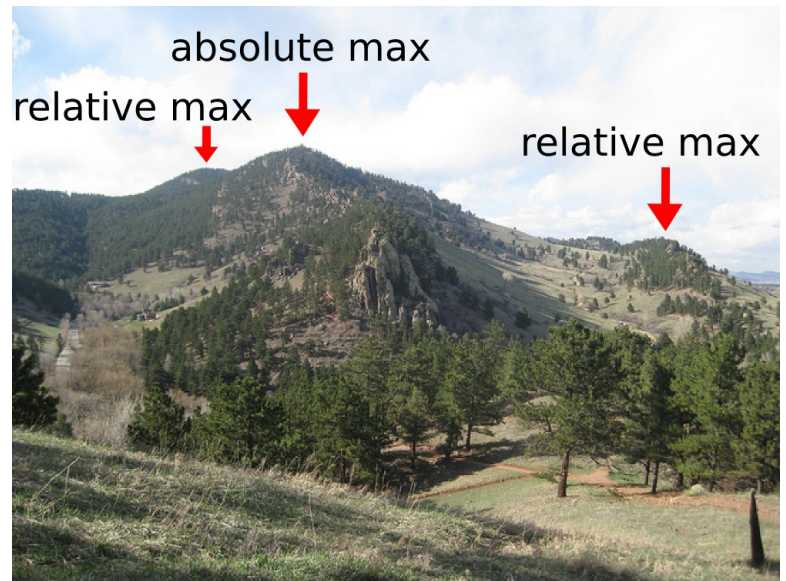
(Exam 3)

16. Indefinite integral. Substitution
17. Integrals of exponential and trigonometric functions. Integrals producing logarithms
18. Left and right sums. Definite integral
19. The Fundamental Theorem of Calculus
20. Areas between curves

(Final Exam)

Text: No textbook required.

Handouts with new material and practice problems will be distributed for each teaching unit. The course topics match chapters 2 to 5 (without 2.4, 4.8, and 4.9), and sections 6.1, and 7.1 to 7.4 of *Calculus* by James Stewart, published by Brooks/Cole. The same book covers topics of Calculus 2 and 3 courses.



Technology: All students are required to have a graphing calculator. Instructions will be given for TI83(+) or TI-84 calculators.

Tentative Exam Schedule:

Exam 1. During week 4 (9/15)
Exam 3. During week 11 (11/3)

Exam 2. During week 7 (10/10)
Final Exam: During the finals week

Grading:

Exams 1, 2 and 3	18% each
Final Exam	24%
Homework Assignments	11%
Projects	11%
TOTAL	100%

Grades are computed according to the following system:

letter grade	A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
number grade	97 to 100	93 to 96	90 to 92	87 to 89	83 to 86	80 to 82	77 to 79	73 to 76	70 to 72	67 to 69	63 to 66	60 to 62	0 to 59

Relevant Course Elements.

- Prerequisites:** MA101 or the permission of instructor.
- Attendance:** It is imperative that students attend all classes. Students are responsible for all material covered in class, even if attendance is not checked or assignments collected. This is a rigorous course. You should plan to spend a minimum of twice the number of class hours on reading, homework assignments, and practice problems. It is your responsibility to come to class prepared to ask questions on any covered concept.
- Course Objectives.** By passing all exams and projects with at least 60% accuracy, the student will be able to:
 - obtain a well rounded introduction to the area of limits, differentiation and basic integration techniques;
 - develop basic knowledge of calculus problem formulation, problem solving and modeling techniques required for successful application of mathematics;
 - competently use the appropriate technology to model data, implement mathematical algorithms and solve mathematical problems.
 - cultivate the analytical skills required for the efficient use and understanding of mathematics.
- Learning outcomes:** Students will
 - know the basic concepts of differential and integral calculus.
 - demonstrate the proficiency in differentiation and integration techniques.
 - be able to interpret and critique graphs using calculus techniques.
 - be able to understand and solve multidisciplinary application problems using calculus.
 - demonstrate a proficiency in using mathematical software.
 - know how to use appropriate technology to solve problems applying calculus techniques.
 - value the use of calculus and technology in problem solving.

5. Assessment

Exams

There will be **3 semester exams and a cumulative final exam**. No makeup exam will be given unless the excuse for missing the scheduled exam is acceptable to the instructor. Any makeup exam must be taken **before** the next regularly scheduled exam. **No exam grade will be dropped.**

Assignments and projects

There will be **4 assignments and 3 projects** during the semester. There will be **no makeup** assignments or projects. Assignments and projects turned in after their due date will receive an automatic reduction in grade. **No assignment or project grade will be dropped.**

6. General Education Skills and their Assessment

The course satisfies two General Education Skills: (1) Reasoning and Problem Solving, (2) Technology.

Reasoning and Problem Solving

Relevant Learning Outcomes. Students will demonstrate a logical approach to the solution of a problem. Specifically, (1) Students will be able to critically examine information; (2) Students will be able to understand and solve multidisciplinary calculus application problems; (3) Students will be able to demonstrate the use of calculus in problem solving.

Learning Activities. Problem solving in class. Includes (1) demonstration by instructor, practice by students, class discussion and developing problem solving skills, demonstration and practice in mathematical modeling; (2) Problem solving on assignments, projects, and exams. Emphasis on student learning. Students directly demonstrate acquired problem solving skills and success in applying problem solving in mathematics to problems in other disciplines.

Means of Assessment and Evaluation. Student's grade on three in-class exams and the comprehensive final exam will be used for assessment of the skill. The following grading scheme will be used.

Exceeded Expectations:	97% to 100%
Met Expectations:	73% to 96%
Approaching Expectations:	70% to 72%
Did Not Meet Expectations:	69% and below

Technology

Relevant Learning Outcomes. Students will demonstrate the ability to use advanced technology for professional activities. Specifically, (1) Students will know how to use appropriate technology to solve problems applying calculus techniques; (2) Students will demonstrate a proficiency in using mathematical software.

Learning Activities. Technology demonstration and practice. (1) General introduction to computer classroom, learning management system and specific computer technology. (2) Solving problems using mathematical software and graphing calculators.

Means of Assessment and Evaluation. Student's grade on three Matlab semester projects will be used for assessment of proficiency with mathematical software and the following scheme will be used. Selected problems on semester exams and/or the final exam will be used for assessment of proficiency using graphing calculator and the same scoring scheme will be used.

Exceeded Expectations:	97% to 100%
Met Expectations:	73% to 96%
Approaching Expectations:	70% to 72%
Did Not Meet Expectations:	69% and below

7. Academic integrity: Academic integrity is at the center of the educational experience at USciences. Students are therefore expected to uphold the highest standards of academic integrity and not engage in or tolerate academic dishonesty. Academic dishonesty includes, but is not limited to, fabrication, cheating or plagiarism. Any violation of academic integrity will be investigated and, where warranted, the student will receive appropriate sanctions through the University's Student Conduct Process. Please familiarize yourself with the current USciences Student Handbook. Adherence to the Student Conduct Policy and Academic Integrity Policy will help to ensure that your learning and living experiences are founded on integrity.

8. Americans with Disabilities Act (ADA) Compliance Statement: USciences supports the educational endeavors of all students, including students with disabilities. ADA defines a disability as a mental or physical impairment that substantially limits one or more major life activities. If you believe that you have a disability that may impact your ability to fulfill your course or degree requirements, and you would like more information on applying for an accommodation under ADA, please contact the Administrator of Student Accommodations at 215-596-8758.