

Welcome to MA 113 in Spring 2019

Calculus I at the University of Kentucky

Course Description

A course in one-variable calculus, including topics from analytic geometry. Derivatives and integrals of elementary functions (including the trigonometric functions) with applications. Lecture, three hours; recitation, two hours per week. Students may not receive credit for MA 113 and MA 137. Prereq: Math ACT of 27 or above, or math SAT of 620 or above, or MA 109 and MA 112, or MA 110, or consent of the department. Students who enroll in MA 113 based on their test scores should have completed a year of pre-calculus study in high school that includes the study of the trigonometric functions. Note: Math placement test recommended

MA 113 consists of lectures and recitations. Each large lecture is divided into multiple sections for recitations. When combined, this course website and the website for lecture section OXY comprises the syllabus for MA 113 OXY.

Learning Outcomes

Students will investigate the following "big questions" and their associated learning outcomes.

1. What are common functions used to model the change in one quantity or value when it is determined by another quantity or value? Students will be able to:
 - a. use common functions, such as polynomials and rational functions, trigonometric functions, exponential functions, root functions, and their inverses, to model real-world phenomena.
 - b. apply functional relationships such as composition, inversion, and arithmetical operations to solve problems.
 - c. use various representations of functions, such as symbolic expressions, graphs, and tables, to solve problems.
2. What functions can we use to model smoothly-changing motion? For an object in motion, how do we measure the change in position for that object at a given instant in time? Students will be able to:
 - a. solve problems involving average velocities.
 - b. use limits to solve problems involving instantaneous velocity.
 - c. learn the definition of continuous function, understand key properties of continuous functions such as the intermediate value theorem, and apply their knowledge to solve problems related to continuity.
3. What are the important mathematical properties of functions that model smoothly-changing motion? What mathematical techniques can we use to analyze those functions and develop models with them? Students will be able to:

- a. state the definition of the derivative and explain its relationship to computing instantaneous velocity.
 - b. use the derivatives of common functions to solve problems.
 - c. state properties of derivatives, such as the product and quotient rules and chain rule, and use these properties to solve problems.
 - d. use implicit differentiation and related techniques to solve optimization problems.
 - e. state and apply the mean value theorem.
 - f. state and apply L'Hopital's theorem.
4. What phenomena can we model using derivatives and elementary functions? Students will be able to:
- a. solve problems involving exponential growth and decay.
 - b. solve problems involving related rates.
 - c. solve optimization problems.
5. For an object that is continuously changing position, how do we determine the total change of position during a period of time? How do we compute the area of a two-dimensional figure with a curved boundary? Students will be able to:
- a. use Riemann sums to approximate net change and areas of curved figures.
 - b. find antiderivatives for elementary functions.
 - c. state the Fundamental Theorem of Calculus.
 - d. evaluate definite integrals using (i) limits of Riemann sums and (ii) the evaluation of antiderivatives.
 - e. Evaluate indefinite and definite integrals using substitution.
6. How can we use polynomials to approximate more complicated functions? Students will be able to:
- a. find the linear approximation to a function at a point and use it to solve real-world problems.
 - b. state the definition of the Taylor polynomial for a function.
 - c. use Taylor polynomials to approximate irrational numbers and approximate definite integrals.

Students will improve with regard to the following mathematical practices.

1. Students will make sense of problems and be persistent while solving them.
2. Students will engage in productive struggle with mathematics problems.

3. Students will productively collaborate with others.
4. Students will communicate through mathematical writing.

Course policy regarding supportive discourse. Students are not allowed to make negative comments about themselves or their mathematical ability, at any time, for any reason. Here are example statements that are banned, along with acceptable replacement phrases.

- I can't do this -> I am still learning how to do this
- That was stupid -> That was a productive mistake
- This is impossible -> There is something interesting and subtle in this problem
- I'm an idiot -> This is going to take careful thought
- I'll never understand this -> This might take me a long time and a lot of work to figure out
- This is terrible -> I think I've done something incorrectly, let me check it again

The banned phrases represent having a fixed view of your own intelligence, which does not reflect the reality that you are all capable of dynamic, continued learning. The suggested replacement phrases support and represent having a realistic perspective regarding your abilities and your capacity for improvement.

Course Calendar

The [course calendar is available as a pdf](#).

Instructors

Course meeting times and locations are available from myuk.uky.edu.

Instructor, Lecture Sections 001-004: [Dr. Benjamin Braun](#)

- Recitation Teaching Assistant, Section 001: Veronica Lawrence
- Recitation Teaching Assistant, Section 002: Camille Felton
- Recitation Teaching Assistant, Section 003: Chase Ashby
- Recitation Teaching Assistant, Section 004: Jeff Slye

Instructor, Lecture Sections 005-007: [Dr. Margaret Readdy](#)

- Recitation Teaching Assistant, Section 005: Landon Gauthier
- Recitation Teaching Assistant, Section 006: Travis Wheeler
- Recitation Teaching Assistant, Section 007: Travis Wheeler

Instructor, Lecture Sections 009-011: [Dr. Katherine Paullin](#)

- Recitation Teaching Assistant, Section 009: Daniel Plaugher

- Recitation Teaching Assistant, Section 010: Matias Von Bell
- Recitation Teaching Assistant, Section 011: Matias Von Bell

Textbook

Calculus: Early Transcendentals, 8th edition, by James Stewart, ISBN 9781337056403 (Chapters 1-11) or ISBN 9781337030595 (Chapters 1-16). For MA 113, you only need to obtain one of either the Chapter 1-11 text or the Chapter 1-16 text. The bookstore has custom paperback editions of the textbook for UK.

- If you plan on only taking Calculus I and II (MA 113-114), then you need chapters 1-11.
- If you plan on taking Calculus I, II, and III (MA 113-114-213), then you need chapters 1-16.

You **do not need to purchase** a separate WebAssign access code for this course. We will use the WebWork online homework system.

During the last two weeks of class, students will be using this [handout on higher-order approximation](#) to supplement the textbook reading.

You purchased access to the eBook when you purchased your textbook from the UK Bookstore. Instructions for accessing the eBook are available in the [Student Quick Start guide](#). If you are using an eBook, you will need our class access key: uky 6128 8408

WebAssign gives you free access to the eBook for two weeks after the start of class. To continue to use the eBook after that, you will need to enter the access code that came with the textbook you bought or purchase access online.

Recitations, Worksheets, & MA 193

All students enrolled in MA 113 are expected to attend recitations. In addition to the 4 hours of credit for MA 113, the department offers one additional hour of credit as MA 193 on a pass/fail basis. You will pass MA 193 if you satisfy the following two criteria:

- you have no more than 2 unexcused absences during MA 113 recitations
- you receive a grade of D or better in MA 113

If you receive a grade of E in MA 113, or if you have 3 or more unexcused absences in recitation, you will fail MA 193.

Your section number for MA 193 must be the same as your section number for MA 113. If you drop or change sections of MA 113, please make sure to also drop or change sections of MA 193. It is your responsibility to do this if you change sections. If you do not change the section of MA 193 you may receive a failing grade for MA 193 because you are not on the proper class roll.

In recitation, you will practice the material of the lectures using worksheets. Most of your recitation time will be spent working in groups. For the schedule of the worksheets see the [course calendar](#).

Recitation Worksheet Packet: The packet containing all recitation worksheets is [downloadable as a single pdf file](#).

Beginning with worksheet 2, you will be responsible for having the recitation worksheets with you for recitation classes. If you fail to do so, then it may be counted as an unexcused absence. You may print the worksheet and bring it to recitation class or your TA might provide other options.

Calculators

You may use calculators on the homework and exams. You may not use any machine (carbon-based life form or silicon-based) that has symbolic manipulation capabilities of any sort on any exam. This precludes the use of TI-89, TI-Nspire CAS, HP 48, TI 92, Voyage 200, Casio Classpad or laptop computer. Also, you may not use your mobile phone, iPhone or Blackberry on any exam even if you forget your regular calculator. If it runs Android, GEOS, iOS, Linux, MacOS, PalmOS, Ubuntu, Unix, Windows, or similar operating systems, you cannot use it on the exams. Answers that are simply the output of a calculator routine or a single numerical or symbolic expression that has no supporting work will receive little or no credit on exams and assignments.

Policies

Attendance. Attend lectures and recitations regularly. Be on time and remain until dismissed. Do not leave in the middle of class. Instructors have the right to take off attendance points for coming late or leaving early. If you cannot come to lecture or recitation and would like to request an excused absence, inform the instructor as early as possible and provide documentation.

Excused absences. Students need to notify the instructor of absences prior to class when possible. Senate Rules 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, (e) interviews for full-time job opportunities post-graduation and interviews for graduate or professional school, and (f) other circumstances found to fit “reasonable cause for nonattendance” by the professor. Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Two weeks prior to the absence is reasonable, but should not be given any later. Information regarding major religious holidays may be obtained through the [Ombud](#)(859-257-3737).

Per Senate Rule 5.2.4.2, students missing any graded work due to an excused absence are responsible: for informing the Instructor of Record about their excused absence within one week following the period of the excused absence (except where prior notification is required); and for making up the missed work. The professor must give the student an opportunity to make up the work and/or the exams missed due to an excused absence, and shall do so, if feasible, during the semester in which the absence occurred.

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request “appropriate verification” when students claim an excused absence because of illness, or death in the family. Appropriate notification of absences due to University-related trips is required prior to the absence when feasible and in no case more than one week after the absence.

Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused) per University policy.

Note that classes meet as indicated in the course calendar, including on the day following exams.

Use of electronic devices. Electronic devices such as mobile phones, laptops and tablets should be put away or used only as part of class activities during lectures and recitations at the direction of instructors. Instructors may prohibit their use during class. Students who are not participating in class may be marked absent. Mobile phones, laptops, and computers may not be used during exams.

Students with disabilities. If you have a documented disability that requires academic accommodations, please see your instructor as soon as possible. In order to receive accommodations in this course, you must provide your instructor with a Letter of Accommodation from [the Disability Resource Center](#). The Disability Resource Center coordinates campus disability services available to students with disabilities. It is located on the corner of Rose Street and Huguelet Drive in the Multidisciplinary Science Building, Suite 407. You can reach them via phone at (859) 257-2754 and via email at drc@uky.edu and at the [DRC website](#).

Assignment deadlines and alternate exam policy. In order to be fair to all students, dates for exams and homework assignments are as listed on the course calendar. Missed work and exams may be made up only due to illness with medical documentation or for other unusual (documented) circumstances. If you have a university excused absence or a university-scheduled class conflict with uniform examinations please contact your lecturer as soon as possible, *but at least two weeks before the exam*, so that an alternate exam can be arranged for you.

University Policy on Academic Integrity. Per University policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the University may be imposed. Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the [Ombud website](#). A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Senate Rules 6.3.1 (see [Senate Rules](#) for the current set of Senate Rules) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about a question of plagiarism involving their work, they are obliged to consult their instructors on the matter before submission. When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording, or content from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism.

Plagiarism includes reproducing someone else's work (including, but not limited to a published article, a book, a website, computer code, or a paper from a friend) without clear attribution. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work, which a student submits as his/her own, whoever that other person may be. Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources

or information, the student must carefully acknowledge exactly what, where and how he/she has employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content, and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas, which are so generally and freely circulated as to be a part of the public domain.

Non-Discrimination Statement and Title IX Information. The University of Kentucky faculty are committed to supporting students and upholding the University's non-discrimination policy. Discrimination is prohibited at UK. If you experience an incident of discrimination we encourage you to report it to Institutional Equity & Equal Opportunity (IEEO) Office, 13 Main Building, (859) 257-8927.

Acts of Sex- and Gender-Based Discrimination or Interpersonal Violence: If you experience an incident of sex- or gender-based discrimination or interpersonal violence, we encourage you to report it. While you may talk to a faculty member or TA/RA/GA, understand that as a "Responsible Employee" of the University these individuals MUST report any acts of violence (including verbal bullying and sexual harassment) to the University's Title IX Coordinator in the IEEO Office. If you would like to speak with someone who may be able to afford you confidentiality, the Violence Intervention and Prevention (VIP) program (Frazee Hall – Lower Level; <http://www.uky.edu/StudentAffairs/VIPCenter/>), the Counseling Center (106 Frazee Hall, <http://www.uky.edu/StudentAffairs/Counseling/>), and the University Health Services (<http://ukhealthcare.uky.edu/uhs/student-health/>) are confidential resources on campus.

MA 113 policy regarding collaboration. Mathematics is an inherently collaborative and social activity. Students are encouraged to work together to understand a problem and to develop a solution. However, the solution you submit for credit must be your own work. In particular, you should prepare your solutions to the written assignments independently and you should submit your answers for web homework independently. Copying on exams and usage of books, notes, or communication devices during examinations is not allowed. Cheating or plagiarism is a serious offense and will not be tolerated. Students are responsible for knowing the [University policy on academic dishonesty](#).

MA 113 mid-term grade policy. Mid-term grades will be posted in myUK by the deadline established in the [Academic Calendar](#). All requests for corrections to grading should be addressed to your instructor. Requests should be made shortly after you receive the paper back and must be made within one day of the paper being returned.

Recording in the Classroom. Video and audio recordings are not permitted during the class unless the student has received prior permission from the Professors. If permission is granted, recording of other students is prohibited. Any distribution of recordings is also prohibited. Students with specific recording accommodations approved by the Disability Resource Center should present their official documentation to the professor. All content for this course, including handouts, assignments, and powerpoint lectures are the intellectual property of the instructors and cannot be reproduced, sold, or used for any purpose other than educational work in this class without prior permission from the professor.

Expectations for Student Work

For any written solutions to problems in this course, students are expected to submit work that is clear, legible, and well-written. Students should show all their work in an organized manner, using complete sentences to explain their solutions and justify their computations. To illustrate our expectations for written work, we have included here three sample solutions to a problem: one of these is a correct solution that meets our expectations; one of these is a solution having the correct answer yet it is not sufficiently well-written to receive full credit; and one of these is a solution that is ungradable and will receive zero credit, even though it appears that the correct answer might have been found.

- [Example problem and homework template](#)
- [Correct solution receiving full credit](#)
- [Correct numerical answer, but solution is not well-written and thus receives only some limited credit](#)
- [Ungradable, even though a correct numerical answer is written on the page](#)

Study Advice and Getting Help

Mathematics is not a spectator sport. To understand what this means, consider how well you might learn to play football by merely watching Luka Modrić, or learn to sing by only listening to Aretha Franklin. Similarly, you will not learn the material in this course by only listening to the lectures and thinking to yourself - "Yes, I understand that". In order to learn, you must also actively read the textbook, work a large number of problems, talk to your classmates, and reflect on your work. The instructor's role is that of a coach or guide who will help you learn as much of the material as you desire. This being said, form good study skills from the start!

- Come to class and take notes during lecture.
- Read each section of the text prior to the lecture where it will be covered.
- As you read the text, have pencil and paper handy. Work through the computations. Find examples to illustrate the theorems and results in the text. If the text tells you that every differentiable function is continuous, think of examples of differentiable functions and check if they are continuous. Think of examples of functions that are not continuous and determine if they are differentiable. Can you think of an example of a function that is continuous but not differentiable?
- Begin the homework immediately after material is covered in class. Mathematics is cumulative. In order to benefit from Wednesday's lecture, you must understand the material covered on Monday.
- Find classmates and form a study group. Spend time discussing problems.
- Do not fall behind. It is very difficult to catch up in a math class after falling behind.
- Begin preparing for exams well in advance. Read the text again to review all of the material to be covered on the exam. Be sure you are familiar with the main results and theorems and how they are used in homework.

- Work additional problems to prepare for the exam. Use [old exams](#) from previous semesters of MA 113 to take a practice test. Treat it like a test. Compare your solutions with those provided by the answer key.
- If you are having trouble, then seek help immediately.

If you are having trouble with one or two homework problems, you can send an e-mail through the online homework system to your teaching assistant. Try to provide as much information as possible in your help request. Describe what you have attempted and give a guess as to what might be wrong.

If you are having trouble with multiple homework problems, instead of using the e-mail function in the online homework system you should take one or more of the following steps.

- Talk to your instructors before or after class or send them an email. Let them know what problems you are having, if any. They will be happy to help!
- Go to the office hours of your instructor and teaching assistant.
- You can also seek help in the [Mathskeller](#) that is located in room CB 063 in the basement of the classroom building. Many instructors and teaching assistants from the Department of Mathematics will hold office hours in the Mathskeller. In addition, limited drop-in tutoring is available. You can seek help from any of the instructors or teaching assistants --- not just your own. The Mathskeller is open from 9 am to 5 pm Monday through Friday (except academic holidays) during the semester.
- Furthermore, you can seek help in [The Study](#), which provides drop-in peer tutoring by undergraduate students who have successfully navigated the courses for which they tutor. A regular schedule of all tutoring is available on [The Study's web site](#)

Grading

You may access your course grades through the [Canvas](#) system, logging in with your linkblue ID and password. Your grade in the course will be determined as follows:

Activity	Number of points
3 Midterm Exams	300 points
Final Exam	100 points
Web Homework (WebWork)	100 points
Six Written Assignments	48 points (8 each)
Quizzes	30 points (3 each)

Lecture Attendance	22 points
Total	600 points

Your grade will be determined as follows.

Total Points	Final Grade
At least 540	A
At least 480	B
At least 420	C
At least 360	D
Less than 360	E

We may adjust (or curve) the grade lines down (but not up!). Decisions about changing the grade lines will be made by the faculty after considering the difficulty of the exams and the performance of students on the exams. Typical means for exams in previous years have been in the 70's. In computing these means, we do not include scores of students who score 30 or below.

Exams

There will be three uniform midterm exams and one final exam. Each midterm exam is 120 minutes (2 hours) and the final exam is 120 minutes (2 hours). You must bring your student identification card with you to the exams!

If you must miss an exam due to a conflict as defined in the University Senate Rules, you may request an alternate exam. You will need to submit your request to your lecture instructor at least two weeks in advance of the scheduled date of the exam using the [MA 113 Alternate Exam Request Form](#). Information regarding alternate exam times will be emailed directly to the students requesting an alternate exam.

Exam	Date	Time
I	Tuesday, February 5, 2019	5:00 - 7:00 pm
II	Tuesday, March 5, 2019	5:00 - 7:00 pm

III	Tuesday, April 9, 2019	5:00 - 7:00 pm
Final Exam	Wednesday, May 1, 2019	6:00 - 8:00 pm

Exams 1, 2, and 3 are scheduled in the following rooms.

Sections	Room	Building
001, 002, 003, 004, 005	CB 106	White Hall Classroom Building
006, 007, 009, 010, 011	CB 118	White Hall Classroom Building

Online Homework (Webwork)

Homework is completed using WeBWork, an open-source online homework system supported by the Mathematical Association of America (MAA). To access WeBWork go to the Modules tab in your [Canvas](#) page and select the link for WeBWork.

See the document titled [Introduction to WeBWork](#) for information about accessing your homework sets. The document [Entering Answers in WeBWork](#) gives more information about how to enter mathematics to answer questions in WeBWork. Please contact your lecturer or teaching assistant if you have difficulty logging in or need to change sections.

The due date for each of these homework assignments is given on the corresponding web page as well as in the [course calendar](#). Occasionally, we may delay homework due dates. The due date at the WeBWork server will be the most up-to-date information.

Late web homework will not be accepted. Shortly after the homework is due, solutions to many of the web homework problems will be made available through the WeBWork server. We cannot allow some students to continue working on the problems after the solutions are available or delay providing solutions to students who have completed the homework on time. If you have an unusual situation that prevents you from completing web homework, please contact your instructor. However, in general students will be expected to complete web homework even if they are traveling.

Suggestions for working web homework:

- Print out the web homework and write out complete solutions of problems before attempting to submit answers. These solutions will be helpful in studying for exams and to bring to discussions with others.
- Form a study group and meet regularly to discuss web homework and the material covered in lectures.
- Make sure you understand your solution to each homework problem. Discuss your approach with members of your study group, your instructor, or peer tutors at the Mathskeller or the Study.

- Do not guess. If you submit an answer and are marked wrong, look through your solution for computational and conceptual errors.
- Near the bottom of many pages at WeBWork, you will find a link to email your instructor. Please work to formulate clear questions in your email. We will work to answer emailed questions by the next work day. Instructors will not be able to answer questions sent the evening of a due date.

Written Assignments

Six written assignments are to be turned in during lecture; for the due dates see the [course calendar](#).

Assignment 1	WA1.pdf
Assignment 2	WA2.pdf
Assignment 3	WA3.pdf
Assignment 4	WA4.pdf
Assignment 5	WA5.pdf
Assignment 6	WA6.pdf

These assignments are intended to help you learn to communicate mathematics and to present clear, well-written solutions to problems. Your solutions will be graded by humans for mathematical correctness and for clarity of exposition. Students who wish to receive full credit should write in complete, grammatically correct sentences. You should give clear reasoning and present the steps of your solution in logical order. You will want to include figures and graphs as needed to explain your reasoning.

Assignments are due at the beginning of your lecture on the due date listed in the course calendar. Late assignments will be accepted, but may lose 20% credit for each day or part of a day that the assignment is late. Please speak with your lecturer if a serious illness or family emergency prevents you from completing an assignment. Students with scheduled absences (travel or authorized university excuse) may turn in the assignment early or have another student bring the assignment to class.

Quizzes

Quizzes will be given on the dates specified in the [course calendar](#). Calculators will *not* be allowed for quizzes. The quiz grades contribute to your overall course grade as described in the grading section of this website.

A [sample solution](#) is provided so you can see the level of detail that is expected on quizzes.