Lecture Sections 30 and 40

Professor: Christine Berkesch Zamaere
Email address: cberkesc@math.umn.edu
Office: Vincent Hall 250
Lecture time: Section 30 is MWF from 11:15 AM - 12:05 PM in Smith Hall 100
Section 40 is MWF from 01:25 PM - 02:15 PM in Fraser Hall 102

Course webpage: http://www.math.umn.edu/~cberkesc/1271.html

The course webpage will contain the latest announcements, including the list of homework problems and a schedule of topics in lecture. The course webpage will be updated periodically, so it would be worth your while to check it on a regular basis.

Teaching Assistants

<table>
<thead>
<tr>
<th>TA name</th>
<th>Discuss.</th>
<th>Office</th>
<th>Office hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunita Chepuri</td>
<td>31, 35</td>
<td>Vincent Hall 552</td>
<td>MW 2:30 - 3:45, R 3:30 - 5:00</td>
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<tr>
<td>*Katie Storey</td>
<td>32, 36</td>
<td>Vincent Hall 550</td>
<td>TR 9 - 11</td>
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<tr>
<td>Jeffrey Cruse</td>
<td>33, 34</td>
<td>Vincent Hall 504</td>
<td>MF 9 - 11</td>
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<tr>
<td>Adrienne Sands</td>
<td>41</td>
<td>Vincent Hall 556</td>
<td>W 12:15 - 1:15, R 2:30 - 3:30</td>
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<tr>
<td>Amber Yuan</td>
<td>42, 44</td>
<td>Vincent Hall 520</td>
<td>M 4 - 5:30, T 3:30 - 5, F 12:15 - 1:15</td>
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<tr>
<td>*Kimberly Logan</td>
<td>43, 45</td>
<td>Vincent Hall 503</td>
<td>T 11:10 - 1:10, W 9 - 10, R 11 - 12</td>
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All TA office hours listed above are available to every student in Lectures 30 and 40. (*Head TA)


Quick overview of Calculus I

There are two big ideas in calculus, both of which we will cover this semester: differentiation and integration (see items 2 and 8 below). These are fundamental concepts not only in mathematics but also for the development of modern science and technology. The content of the course has not changed much in the last 50 years, but the nature of its applications have changed dramatically because of the power of modern computers: mathematical modeling of natural phenomenon has become ubiquitous. For this, understanding the meanings of “derivative” and “integral” are essential. Here are the main topics we will cover this semester:

1. The definition of limit: what it means for a function to approach a given value. (Notice that the notion of limit is fundamental to both items 2 and 8.)
2. The derivative \( f'(a) \) at \( x = a \) as the limit of \( \frac{f(a+h)-f(a)}{h} \) as \( h \to 0, h \neq 0 \).
3. Interpretation of derivatives as slopes of tangent lines and instantaneous rates of change.
4. Rules for finding derivatives of more complicated functions from simpler ones:
   \[(f \pm g)' = f' \pm g', \quad (fg)' = f'g + fg', \quad (f/g)' = (gf' - fg')/g^2, \quad (f \circ g)'(x) = f'(g(x))g'(x).\]
5. Formulas for the derivatives of functions obtained by the operations
   \[f(x) \pm g(x), \quad f(x)g(x), \quad f(x)/g(x), \quad (f \circ g)(x) = f(g(x)), \quad f^{-1}(X),\]
   from common functions: constants, polynomials, trigonometric functions, and exponentials.
6. Derivatives by implicit differentiation of equations.
7. Using information about derivatives to solve maximization and minimization problems, and to qualitatively analyze graphs of functions.
8. The definition of integral as a limit of approximating sums.
9. Interpretation of integrals as areas, volumes of revolution, and average values.
10. Functions defined by integrals: how to compute their values and their derivatives.
11. The easy way to integrate those functions recognizable as derivatives of familiar functions.

In modern science, integrals appear all over the place; however, they can rarely be evaluated by hand. This is why we must learn to regard an integral as the limit of an approximation process, not just something given by a formula.
Prerequisites
Understanding of pre-calculus topics, such as trigonometry, algebra, analytic geometry, and functions. One can demonstrate this via (i) four years of high school mathematics, including trigonometry, (ii) a grade of C- or better in MATH 1151 or 1155 or their equivalent, or (iii) sufficient score on a placement exam. Rusty high school algebra skills are the single biggest contributor to lack of success in this course. If you are not sure whether your preparation is sufficient, please contact the professor about it as soon as possible.

The calculus student aiming for success:
- Goes to lecture; tries to understand the professor.
- Does the homework assignment the same day; makes a note of what is not understood.
- Gets uncertainties resolved the next day by TA and/or professor at office hours.
- Carefully reviews for exams: outlines material, works a variety of problems (without notes).

Please take seriously the cautionary message about keeping up with this course. Besides not being completely on top of high school math concepts, the most common cause for failing the course is not keeping up with the class (not keeping the homework up to date). Math is not a spectator sport, and unless you practice every day, the material can quickly accumulate and overwhelm you.

Your TA
Your TA is your most valuable resource. Keep in mind that he or she is a hardworking math grad student who is taking advanced courses and perhaps doing research for a Ph.D. thesis. Part of their training is to work with students to help them learn calculus. Help them to help you! Ask questions (in discussion as well as in lecture) when something in the course is giving you trouble. The job of the professor is to give the “big picture” and to work sample problems. The job of your TA is to go over the homework problems and to try to clear up difficulties and misunderstandings.

Calculators and other electronic devices
Only one-line scientific calculators are allowed on quizzes, exams, and the final exam. Such calculators are inexpensive, have one-line displays, and cannot display graphs of functions, perform symbolic manipulations, or store text in memory. Cellphones and internet-connected devices are not allowed on quizzes, midterm exams, and the final exam. A violation of this policy will result in a grade of zero on the relevant quiz or exam.

Homework
Homework problems for the previous Wednesday, Friday, and Monday lectures will be collected and graded for completion each Thursday. Late homework will not be accepted; to accommodate illness and other possible absences, your lowest homework score will be dropped.

Your homework is your opportunity to dig deeply into the course material, without the time pressure of a quiz or exam. When working on your homework, make it your goal to not simply “get the right answer” but understand how you got there. When you can go back through your homework and can identify and are comfortable with the key steps needed to solve each problem, then you are well on your way to studying for the upcoming quiz.

Quizzes
A 15-minute quiz based closely on the homework will be given on the Thursday of each week without a midterm. There will be no option to make up a quiz or take it early; to accommodate illness and other possible absences, your two lowest quiz scores will be dropped.

Exams
There will be three 50-minute midterm exams common to my lecture sections, as well as a 3-hour final common to all students taking Math 1271.

Missing an exam
Missing an exam is permitted only for the most compelling reasons. You should obtain my permission in advance to miss an exam; otherwise, you will be given a zero. If you are excused from taking an exam, you will be given an oral exam, or your other exam scores will be prorated. There will be no make-up midterms.
Grading
Final exam: 35%  Midterm I: 15%  Midterm II: 15%  Midterm III: 15%  Discussion: 20%
The “Discussion” portion of your grade will be assigned by your TA and will be computed using the scores from your homework, quizzes, and class participation.
The final grade distribution for each discussion section will be determined by its students’ performance on the common final exam. An individual student’s final grade within that distribution depends on all of the work of the course, including work graded by that discussion’s TA.
The final grade of “incomplete” will only be assigned when a student has satisfactorily (a C grade or better) completed all but a small portion of the work for the course, and has made prior arrangements to complete the work.

Tutoring
Aside from the professor’s and TAs’ office hours, you might take advantage of tutoring that is offered across campus. Free walk-in tutoring is available through the SMART Learning Commons Peer Learning Consultant (PLC) program; see http://smart.umn.edu. The Multicultural Center for Academic Excellence is another tutoring resource; see http://diversity.umn.edu/multicultural. The Undergraduate Office in the School of Mathematics maintains a list of private tutors.

Questions, comments, and concerns
We are always interested in hearing your feedback and addressing your questions, comments, and concerns. In case something arises, here is a summary of various people you can reach out to:
  ○ You should always start by discussing your concern in person or via email with your TA as they will be most knowledgeable about your specific situation.
  ○ Next, email the head TA for your lecture (30: Katie Storey, store050@umn.edu; 40: Kimberly Logan, kling202@umn.edu). These are highly experienced TAs who have close working relationships with the TAs and with the professor.
  ○ After that, you can email the professor, Christine Berkesch Zamaere (cberkesc@math.umn.edu).
  ○ Finally, if you still have concerns that you don’t feel have been adequately addressed, you can email with the School of Mathematics Director of Undergraduate Studies, Bryan Mosher (mosher@math.umn.edu).

Academic dishonesty
See the Student Conduct Code, a link to which is posted on the course website, for general information. Academic dishonesty, including use of an unapproved electronic device, will result in a report to the Office for Student Conduct and Academic Integrity, and penalties can include a grade of zero on the task in question and/or a failing grade in the course.

Other policies
A link to other general policy statements - including statements about equal opportunity, disability accommodations, and mental health resources - appears on the course website above. If you have a letter detailing accommodations, notify the professor and your TA as soon as possible.

Liberal Education
This course fulfills the Mathematical Thinking component of the Liberal Education requirements at the University of Minnesota. An important part of any liberal education is learning to use abstract thinking and symbolic language to solve practical problems. Calculus is one of the pillars of modern mathematical thought, and has diverse applications essential to our complex world. In this course, students will be exposed to theoretical concepts at the heart of calculus and to numerous examples of real-world applications.