MATH 1271: Lecture 020 & 060

Fall 2016

Lecturer: Yuqin Zhao
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Office: Vincent 261
Office Hours: M/F 12:00-1:40; W: 1:20-3:00; or by appointment.
Lectures: LEC 020, MWF 10:10-11:00, Anderson 310;
LEC 060, MWF 3:35-4:25, Rapson 43.

Teaching Assistants:

TA Name	DIS	Office	Office Hours
Carolynn Johnson	021 & 027	Vincent 552	M 3:00-4:00; T/Th 1:30-3:00
Maria Jesus Munoz	022 & 026	Vincent 505	T/Th 9:00-10:00, 12:20-1:00
Danielle Stanton	023 & 025	Vincent 19	T/Th 3:00-4:40
Tuan Pham	024	Vincent 504	T/Th 10:05-10:55
Shiqiang Xia	062 & 064	Vincent 456	T 12:00-1:40; Th 10:00-11:40

Website: https://ay16.moodle.umn.edu/my/(for syllabus, assignments and grades).

Textbook: Calculus (Early Transcendentals), by James Stewart, 8th Edition, Chapters 2-6.

Exams and Quizzes:

- There will be three 50 minute Midterm exams and a three hour Final.
- EVERY TUESDAY in your section, there will either be a short quiz similar to the hw problems the previous week, OR one of the three Midterm exams of 50 minutes. Your final grade will be 45% on the three Midterms, 45% on the Final Exam, and 10% on your best 8 quiz scores. No makeup of quizzes.
- **Calculator:** No calculators, computers, electronics of any kind will be permitted on the quizzes or exams.
- **Missing a Midterm:** There will be no make-up exams under normal circumstances. Under exceptional, documented circumstances certain arrangements can be made to compensate for the missed exams; in this case the student should notify and discuss this with the instructor.
- **Incompletes:** A final grade of incomplete is given only if you have successfully completed all but a small portion of the work of the course, and have a very compelling, well documented excuse from completing the course. We cannot give you an incomplete simply because you are behind in your work.

Gradelines: We do not have fixed gradelines for this class. **Heads-up!** In the past, often up to 25% of the class gets final grade of D or F.

How to Pass the Course:

- Come to every class and your TA section.
- Work out all the assignment homework problems.
- Ask questions: in class or in your TA section to clarify issues that concern you. Don't hesitate to come to office hours when you have questions.

Additional Information:

- *Prerequisites:* Passing the course requires a solid working knowledge of high school math, including algebra, trig, logs, some geometry of lines and conics. You will find it helpful to read the review of these topics in Chapter 1. A prior high school Calc course does not guarantee success; college problems tend to be harder and we pay more attention to understanding why techniques work. But if you were "good at math" in high school and you do the necessary hard work, then you should succeed in this course.

- *Your TA:* Your TA is your most valuable course resource. He or she is a hard working math grad student, who is taking advanced courses and perhaps doing research for a Ph.D. thesis. Part of the training is to work with students to help them learn calculus. Help them to help you! The job of the lecturer 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 clear up difficulties and misunderstandings.

  Your TA will grade the quizzes and with the other TAs will grade the Midterm exams. He or She will also assign your final grade in consultation with me.

- *The Lectures:* In the lectures examples will be discussed, techniques for solving problems presented and model problems worked out. Since we proceed fairly quickly through the book, you will be expected to read the textbook ahead and also be familiar with the lectures prior to the current one.

- *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.

- *Academic Dishonesty:* See the Student Conduct Code: http://oscai.umn.edu/, 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:* Other general policy statements - including statements about equal opportunity, disability accommodations, and mental health resources, can be found at the following website: http://policy.umn.edu/education/syllabusrequirements-appa. If you have a letter detailing accommodations, notify the lecturer and your TA as soon as possible.

- *Drop Deadlines:* The schedule for drop deadlines can be found at the following site: http://onestop.umn.edu/calendars/cancel_add_refund_deadlines/fall_2016.html.

Why Care about Calculus?

Calculus is essential for math as well as for subjects from business and econ to neuroscience and high energy physics. Moreover math modeling of physical phenomena is carried out everywhere! Thus success in Calculus opens doors in the U. to many other courses. In addition, Calc 1 also fulfills the "mathematical thinking" component of the liberal education requirements at UMN.

Brief Overview of Calculus I:

The two big ideas of calculus come this semester: *Differentiation* and *Integration*. The specific topics we will cover include the following:

(1) *The derivative* $f'(a)$ at $x = a$ *as limit of the difference ratio* $\frac{f(a+h)f(a)}{h}$ or $\frac{f(x)-f(a)}{x-a}$ as $h \to 0, h \neq 0$, or as $x \to a, x \neq a$.
(2) Interpretation of derivative as slope of tangent line and instantaneous rate of change.
(3) Rules for finding derivatives of more complicated functions once derivatives of simpler ones are known, namely
$(fg)' = f'g'$, $(fg)' = f'g + fg'$, $(f/g)' = (gf'fg')/g^2$, $(f \circ g)'(x) = f'(g(x))g'(x)$.
(4) Using these rules, and starting just with the constants, $f(x) = x$, trig functions, logs and exponentials, we will find formulas for the derivatives of all functions that can be built up from these simple ones by the operations:
$f(x)g(x)$, $f(x)g(x)$, $f(x)/g(x)$, $(f \circ g)(x) = f(g(x))$, $f^1(x)$.
(5) Finding derivatives by implicit differentiation of equations.
(6) How to use info about derivatives to solve max/min problems, and to qualitatively analyze graphs of functions with the help of lHospitals rule.
(7) Newton's method for finding roots of polynomials.
(8) *The integral as a summation process.*
(9) Interpretation of limits of approximating sums: areas, volumes of revolution, average values.
(10) Functions defined by integrals; how to compute the values of such functions; derivatives of such functions.
(11) The easy way to integrate those functions recognizable as derivatives of familiar functions.
(12) Manipulating an integral to change its appearance in hopes the integrand will then be recognizable as the derivative of a familiar function.

Lecture Schedule. (Tentative. Not everything in the listed sections will be covered.)

Sep 7 to 9: §2.1, 2.2, 2.3
Sep 12 to 16: §2.4, 2.5, 2.6, 2.7
Sep 19 to 23: §2.8, 3.1, 3.2
Sep 26 to 30: §3.3, 3.4
Oct 3 to 7: Review on Mon, §3.5, 3.6; MIDTERM I TUESDAY
Oct 10 to 14: §3.9, 3.10, 4.1
Oct 17 to 21: §4.2, 4.3, 4.4
Oct 24 to 28: §4.5, 4.7
Oct 31 to Nov 4: Review on Mon, §4.8; MIDTERM II TUESDAY
Nov 7 to 11: §4.9, 5.1, 5.2
Nov 14 to 18: §5.2, 5.3, 5.4
Nov 21 to 23: §5.5, Wed, THANKSGIVING
Nov 28 to Dec 2: Review Mon, §6.1, 6.2; MIDTERM III TUESDAY
Dec 5 to Dec 9: §6.3, 6.5, Review Fri.
Dec 12 to 14: Review Mon, Wed.

MIDTERM EXAM DAYS:

TUESDAY, Oct 4
TUESDAY, Nov 1
TUESDAY, Nov 29

FINAL EXAM: FRIDAY DEC 16, 1:30-4:30

Homework Problems: (Subject to changes.)

Homework problems will not be collected. You can find answers to odd problems in *Appendix I (page A65)* of your textbook. Your TA will go over many of them during discussion classes. Quiz problems and some exam problems will be similar to your homework problems.

Section	Page	Problems
2.2	92	5, 7, 9, 31, 33, 41, 43.
2.3	102	odd 11-31, 37, 41, 45.
2.4	113	1, 2, 3
2.5	124	3, 5, 7, 41, 45, 51, 52, 53, 73.
2.6	137	3, odd 15-31, 75a.
2.7	148	5, 7, 33, 39.
2.8	160	3, 15, 21, 23, 27, 49.
3.1	180	odd 3-27, 35, 55, 67.
3.2	188	odd 3-27, 33, 47, 51.
3.3	196	odd 1-23, odd 39-49.
3.4	204	odd 7-37, 51, 53, 59, 71.
3.5	215	odd 5-31, 35, 45, odd 49-53.
3.6	223	odd 3-25, odd 39-49, 52.
3.9	249	odd 1-7, 15, 18, 20, 22.
3.10	256	odd 23-31.
4.1	283	3, 5, odd 47-59.
4.2	291	odd 5-11, 17, 19, 21, 23a, 25, 35.
4.3	300	odd 9-21, 37, 41, 83.
4.4	311	odd 9-67, 83.
4.5	321	odd 1-17, 37, 51.
4.7	336	3, 7, 14, 23, 37, 41.
4.8	348	3, if you have a calculator: 7, 17.
4.9	355	odd 1-39, 55.
5.1	375	1, 3, 13, 17, 21, 25.
5.2	388	1(Riemann sum only), 11, 17, 19, 29, 35, 37, 39, 47, 49.
5.3	399	odd 7-41, 53, 55, 56, 59, 61, 69, 75.
5.4	408	odd 1-11, odd 21-39, 51.
5.5	418	odd 1-33, odd 53-73, 87.
6.1	434	odd 3-23.
6.2	446	odd 1-17, do not evaluate: 33a, 39, 50, 63.
6.3	453	odd 3-9, odd 15-19, 21a, 23a, 29, 31, 37.
6.5	463	odd 1-7, 13.

Review Problems for Final Exam: (Subject to changes.)

CH. 2	166	QUIZ: odd 1-13; EX: odd 1-13, odd 19-33.
CH. 3	266	QUIZ: odd 1-9; EX: odd 1-33.
CH. 4	358	QUIZ: odd 1-9; EX: odd 1-13, odd 19-29.
CH. 5	421	QUIZ: odd 1-9; EX: 2a, 3, 4, 8, odd 11-31, odd 45-49.
CH. 6	466	EX: 1, 3, 7, 8, 9, 13, 19, 21, 31.