MATH 126 SPRING 2013

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Office Hours: 2:10 – 3:15 MW and Th 1:15 – 3:00 (usually), and by appointment.

Class Meetings: 1:00 – 1:50 MWF in MPH 105 and at either 2, 3 or 4 PM TTh in GFS 112.

Text: *Essential Calculus* (second edition) by J. Stewart. We will cover parts of Chapters 5 – 9 (all of 8).

Grading: There will be homework assignments to be turned in for grading and these, together with quizzes in the discussion sections, and likely two computer assignments, will count for 10% of the course grade. Each of two midterms (on Fri. 2/22 and Wed. 4/10), and the final exam on ***Wednesday May 15 from 4:30-6:30 PM*** (room to be announced) will count for 30% of the course grade. The letter grade on the final exam may replace one-half the grade on one midterm, or the entire homework grade.

Late homework assignments will be accepted only with a good reason and my specific approval. Missed quizzes may *not* be made up.

Prerequisite: Math 125 is the prerequisite. You should review and be familiar with basic algebra, the notion, definition, and evaluation of limits, the definition and computation of derivatives—including *sin x*, *cos x*, *log x*, and e^x, the evaluation of the trigonometric functions, the idea of the definite integral using Riemann sums, the Fundamental Theorem of Calculus, and the integrals of *sin x*, *cos x*, and e^x.

Material of the Course and Other Goals

The course begins with the inverse trigonometric functions and indeterminate forms, then moves on to techniques and applications of integration. The important topic of infinite series is the content of Chapter 8, taking about five weeks, and we end with a couple of lectures on polar coordinates. Primary purposes of the course are to learn this material, to learn how to apply it correctly, to learn to think logically and precisely, and to learn the importance of hypotheses and justification of statements.

General Comments / Expectations

Exam problems will *not* simply be routine text problems but are intended to test your understanding of concepts and appropriate procedures for the problems presented. You may have to give reasons for your approaches and you may have to state definitions of important terms or state important results.

You are responsible for what is covered in class, which is the content of the course, so it is very important to attend class: I make up the exam problems *based on how I have covered the material*. By the "material" I mean *the concepts and their relations, the definitions and theorems, and the applications of all of these*. The text is a useful reference, should be read, and presents different examples from those in class. It is extremely rare for a student who does not attend class regularly to do well in the course.

To solve problems you may use Calculus materia*l only if* we have covered it in class.

Academic Integrity Statement

For graded homework assignments you may consult with me or the TA and you may consult with other students in the class about general approaches, but *your solutions must not be copied from, or communicated to, anyone else*, *nor obtained from other sources, e.g. the Math Center or on-line*, except as specifically allowed on the computer assignments. Work on exams is to be your work alone without help or consultation from anyone else or any other source, except for the proctor. Calculators, books, or notes may *not* be used during midterms, and probably not during the final exam. Violation of these rules is a *very* serious offense.

Advice

It is very important to keep up with the material; it is difficult to catch up in a math course when behind. If you have any difficulties with the course material, have any questions about course related matters, including homework assignments, or just want to chat, feel free to come to see me (I have cookies in my office!). I am available daily, and will try to accommodate your schedule. In addition, the Math Center in KAP 263 is another source of help for you with the course material and problems. It is staffed most of each weekday by graduate students and faculty. It is *not* acceptable to get homework solutions in the Math Center for those problems to be turned in for grading.

Probably the most important advice I can give you is to spend adequate time studying, *reviewing the lecture material* frequently, and *working, yourself,* on the exercises, especially the exercises not from the text: these give you a better idea of the kinds of problems I make up, and are an important aid in studying for the exams. Most people cannot learn mathematics simply by seeing it done but must work on it themselves. When working on problems, first study the material then ask yourself how the problems relate to the material and examples presented in class and in the text. It is important to remember that the solution of a problem is not as important as understanding what approach to take and why. That is, the reason for doing problems is to understand the material, not to "get an answer". Thus, looking up homework solutions on-line, or getting the solutions from elsewhere (e.g. the Math Center or others), will not properly prepare you for the exams; you *must work on the problems yourself* and get help if you need to. Doing well in the course requires more than memorization of, and experience with, standard procedures for solving certain kinds of problems. Therefore, you must also study the material presented in class so that you will be able to use it for solving problems. Spending appropriate time will in the end make the material more understandable, make the course more enjoyable, provide a better and long-term mastery of the material, and almost certainly lead to a higher course grade.

Finally, if you are familiar with some of the material in this course, it is best to approach the course as if you have not seen the material before. It is easy to believe that you know the material and need not spend much time on it. My experience is that this can lead to poor results. Different instructors approach the same material somewhat differently, have different expectations, and different styles in making up problems. It is to your advantage for success in the course to focus on the expectations and approaches presented here.

REVIEW PROBLEMS

The following problems are *not* to be handed in. They represent material and techniques that you should know and that will be important for Math 126. You should also review the material on trigonometry in Appendix A, as needed.

Find the limits, if any (explain, or show work!), as $x \to \infty$ of: a) $\cos x$, b) $(x^6 - x)^{1/2}/(2x^3 + 9x - 17)$, c) $(x^6 + 5x^3)^{1/2} - x^3$, d) $x\sin(1/x)$; as $x \to 0$ of e) $x\sin(1/x)$; and as $x \to 1$ of f) $(x^{1/51} - 1)/(x - 1)$. (Do *not* use L'Hôpital's Rule for any of these!)

p. 113 – 114 #36, 47, 56; as an expression involving n, find the n^{th} derivative of x^{100}, of $1/(1 + x)$, and of $\sin x$; for $g(x) = 1/(1 + x^2)$, show that $g^{[n]}(x) = p_n(x)/(1 + x^2)^{n+1}$ for $p_n(x)$ a polynomial of degree at most n.

p. 222 #16, 24a, 26; p. 231 #17, 22, 28, 31,46, 48; p. 240 #6, 10, 14;
p. 247 –248 #22, 27, 30; pp. 250 – 251 #18, 26, 43, 44; pp. 275 – 276 #63, 67, 77;
p. 282 – 283 #32, 43, 46.