MATH 126 FALL 2015

Professor C. Lanski; Office: KAP 266D; Tel: 740-2417; e-mail: clanski@usc.edu (when in my office)
Office Hours: 2:10 – 3:15 MW, Tu 1:15 – 3:30, and by appointment.

Class Meetings: 1:00 – 1:50 MWF in KAP 144 and either at 3 or 4 PM TTh in KAP 138.

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

Grading: There will be homework assignments, including computer assignments, to be turned in for grading and frequent quizzes in the discussions. These together will count for 10% of the course grade. Each of two midterms (on Wed. Sept. 30 and Fri. Nov. 6), and the (common) final exam on ***Wednesday December 9 from 2:00-4:00 PM*** (room to be announced) will count for 30% of the course grade. Half of the letter grade on the final exam may replace half of the letter grade on one midterm.

Late homework assignments will be accepted *only* with 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 evaluation of the trigonometric functions, the basic notion and definition of limit, the computation of derivatives—including $\sin x$, $\cos x$, $\log x$, and e^x, the idea of the integral, 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 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 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

You are responsible for what is covered in the lectures, which is the content of the course, so it is very important to attend class, especially since the exam problems are *based on how I cover the material*. By the "material" I mean *the concepts and their relations, the definitions and theorems, and the applications of all of these*. Exam problems will *not* simply be standard text problems but are intended to test your understanding of concepts and appropriate procedures for the problem presented: you may have to give reasons for your approaches, state definitions of important terms, state important results. 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 obtain credit for solutions you *must use only the techniques and results presented in class*; the point of the problems is to see if you understand the class material, not just get an answer.

The examples done in class are intended to illustrate the results in class, show how to approach certain problems, and what are correct procedures for solutions. Getting an answer to a problem is much less important than a correct approach and proper use of the appropriate results from class.

Academic Integrity Statement

For graded homework assignments you may get help and hints from me or the TA, and you may consult with other students about general approaches, but *your solutions must not be copied from, or dictated to, anyone else, nor obtained from other sources, e.g. the Math Center or on-line*, except as specifically allowed on some assignments. Work on exams is to be your work alone without help or consultation from anyone or any other source, except for the proctor. Calculators, books, or notes may

not be used during midterms or quizzes, 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 candy and 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 on* the exercises *yourself*, 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 learning the material and 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 answer to 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, will not properly prepare you for the exams. 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 correctly for solving problems. Spending appropriate time will make the material more understandable, make the course more enjoyable, provide a better and long-term mastery of the material, and lead to a higher course grade.

If this is your first math course at USC and you have had some of the material in this course previously, then treat the course as if you have not seen the material before. It is easy to think that you know the material and need not spend much time on it. My experience is that this often leads to poor results.

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.