

Math 3B, Midterm 2 Review

Spring 2007

The problems on the midterm will be similar to the ones from the homework assignments, quizzes and lectures. As usual, you will be required to show your work and fully justify your answers to receive full credit. The test will be based on sections 7.1-7.5 and 7.8 from Stewart (see the webpage for the specific pages from sections 7.2-7.4 that you should know), but will of course require that you also be familiar with the material from the beginning of the course (most importantly, the integration formulas and u -substitution). You are allowed to use one 3" x 5" note-card of formulas on the test. You may write on both sides, but it must be hand-written. Below is a summary of the topics and types of problems you should be able to do, along with lists of practice problems from the text.

1. Integration by Parts (7.1). Know when to use integration by parts, and how to choose u and dv . Be aware that some problems require two applications of integration by parts, or some combination of u -substitution and integration by parts. (**7.1** # 7, 23, 25, 29, 31, 35)
2. Trigonometric Integrals (7.2). Be able to integrate $\int \sin^m x \cos^n x dx$ and simple variations (like replacing the x 's with $(3x)$ or when $m = 3$ and $n = 1/2$.) (**7.2** # 1, 5, 9, 15)
3. Trigonometric Substitution (7.3). Know when to make the substitution $x = a \sin \theta$ to simplify an integral, and how to convert the antiderivative back into terms of x by drawing a right triangle. (**7.3** # 7, 11, 29 (do u -sub. first))
4. Integrating Rational Functions (7.4). Know how to use long division of polynomials and the method of partial fractions to algebraically simplify rational functions, so that they can be integrated easily. (**7.4** # 8, 10, 13, 47)
5. Integration Strategies (7.5). This section contains useful information about how to recognize which integration method to use. You should read it over. It also contains a table of integration formulas on p. 506. You need to know numbers 1-10, 11, and 13; while 12, 14, 17 and 18 are also useful.
6. Improper Integrals (7.8). Be able to recognize an improper integral. In particular, when you see any definite integral $\int_a^b f(x) dx$, you should check to see if $f(x)$ has a vertical asymptote between a and b . More importantly, you should be able to evaluate an improper integral USING LIMITS. (**7.8** # 9, 13, 15, 27, 33)
7. Determine whether an improper integral converges or diverges by using the Comparison Theorem (7.8). (**7.8** # 49, 51, 53)