Math 15, Exam 3, Nov 3, 2005

Instructions

Calculators may be used on this exam.
<u>However, you must show your work in order to receive credit.</u>

1. Be sure to print your name and your instructor's name in the space provided.
2. Work all problems. Show all work. Full credit will be given only if work is shown which fully justifies your answer.
3. There will be sufficient space under each problem in which to show your work.
4. Circle, box, or underline each final answer. *All final answers must be simplified!*
5. This exam has 4 sheets of paper (front and back). Do not remove the staple! There are 100 points. Each problem is 10 points.
6. Turn off your cell phone if you have one with you.

Get ready for the exam

1. Some formulas will be supplied (see below). You are asked to remember other formulas and techniques from Chapters 7, 8, 12 and Math 14.
2. Problems will be (directly or slightly modified) from homework problems assigned from Chapter 12.
3. You should be able to do all of the following:
   a. Know the differences between a sequence and a series.
   b. Be able to determine convergence or divergence of a series using the following: geometric series / p-series / (limit) comparison test / integral test / alternating series test / ratio test / root test / test for divergence.
   c. Find the sum of a convergent geometric series.
   d. Determine absolute convergence versus conditional convergence.
   e. Find a power series representation for a given function.
   f. Integrate and differentiate a power series.
   g. Find the Taylor and Maclaurin series for a given function.
   h. Use the alternating series estimation theorem, the remainder estimate for the integral test, and Taylor's inequality to estimate the sum of a series.

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!}, \quad \sin x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!}, \quad \cos x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!} \quad (\text{for all } x)$$

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n \quad (\text{for } |x| < 1)$$

$$|R_n(x)| \le \frac{M}{(n+1)!}|x-a|^{n+1} \text{ where } \left|f^{(n+1)}(x)\right| \le M \text{ for } |x-a| \le d$$