Math 15, Exam 3, Nov 4, 2004

Instructions

Calculators may be used on this exam.

However, if a problem does not say to use a calculator, then you must show your work in order to receive credit.

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.
5. This exam has 4 sheets of paper (front and back). There are 100 points. Refer to the table given on the front page of the exam for the exact point distribution.
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 the same as 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.

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

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

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