Math 230, BL1 - Test #2 - April 3, 2006

DO NOT OPEN EXAM UNTIL TOLD TO DO SO

Name:____

Signature:____

Circle your Recitation Section:

8:00 (BD1, Hailong Hu)

9:00 (BD2, Hailong Hu)

11:00 (BD3, Caleb Eckhardt)

12:00 (BD4, Caleb Eckhardt)

12:00 (BD7, Carolyn Wendler)

1:00 (BD5, Carolyn Wendler)

3:00 (BD6, Bin Wang)

Time: 55 minutes. You may not use any books or notes or calculator. There are 100 points possible. To get full credit, you must show your work. Partial credit will be based only on what is actually written on the paper. All intermediate steps should be correct as written.

problem number	1	2	3	4	5	6
possible points	15	30	12	15	13	15
score						

1. (a) (5 points) Give the definition of “absolutely convergent series.”

   (b) (5 points) Give an example of an absolutely convergent series. You do not need to prove that the series is absolutely convergent.

   (c) (5 points) Give an example of a conditionally convergenct series. You do not need to prove that the series is conditionally convergent.

2. (10 points each part) Determine whether each of the following series converges or diverges, showing your work. If you are using a test, say which test it is.

   (a)
$$\sum_{n=1}^{\infty} \frac{1}{3^n}$$

   (b)
$$\sum_{n=0}^{\infty} n$$

   (c)
$$\sum_{n=0}^{\infty} \frac{1}{n^2+1}$$

3. (12 points) Find the 2nd degree (that is, n=2) Taylor polynomial with remainder for $f(x) = x^{7/2}$, centered at $a = 1$. In the remainder, be sure to state what the restrictions are on z.

4. (15 points) Find the interval of convergence for the power series

$$\sum_{n=1}^{\infty} \frac{(x-2)^n}{n\,3^n}$$

5. (13 points) Find a power series representation of the function $f(x) = \ln(1 - x^2)$. (Hint: begin with the power series for $\frac{1}{1-x}$.)

6. (3 points each part) Answer true or false. There is no partial credit and you do not need to show your work or give an explanation.

(a) If $\sum_{n=0}^{\infty} a_n$ converges, then $\sum_{n=0}^{\infty} |a_n|$ must converge.

(b) Every Taylor series converges for all x.

(c) The *sequence* $\{a_n\}$ with $a_n = \frac{2n}{3n+1}$ converges.

(d) Suppose $f(x)$ is a function and $P_2(x)$ is its 2nd-degree Taylor polynomial, centered at a point a. Then $f'''(a) = P_2'''(a)$.

(e) Let S_n denote the nth partial sum of a series $\sum_{n=1}^{\infty} a_n$. If $\lim_{n\to\infty} S_n = 1$, then $\sum_{n=1}^{\infty} a_n$ converges.