Bender Math 21D First Midterm Feb. 3, 2000

- Please put your name, ID number, and section number (or time) on your blue book. **If you fail to do this, you will probably get your exam back late.**
- The first page of your blue book may contain notes. No other paper is allowed.
- **You must show your work to receive credit.**

1. (60 pts.) Determine if each of the following series is convergent or divergent.
You must give **correct** *reasons for your answers to receive credit.*

(a) $\displaystyle\sum_{n=2}^{\infty} \frac{1}{\sqrt{n+3}}$ (b) $\displaystyle\sum_{n=2}^{\infty} \frac{(-1)^n}{\sqrt{n+3}}$ (c) $\displaystyle\sum_{n=1}^{\infty} \frac{n+2^n}{n2^n}$

(d) $\displaystyle\sum_{n=0}^{\infty} \tan n$ (e) $\displaystyle\sum_{n=0}^{\infty} \frac{6^{2n-3}}{3^{3n+3}}$ (f) $\displaystyle\sum_{n=0}^{\infty} \frac{3^{3n+3}}{6^{2n-3}}$

2. (20 pts) Find the radius of convergence AND the interval of convergence of the power series $\displaystyle\sum_{n=0}^{\infty} \frac{n^2(x+3)^n}{2^n}$.

3. (20 pts.) Find the coefficients of x^{10} and x^{11} in the Taylor series for $(1+x)e^{-2x^2}$ at $a=0$. You may leave powers and factorials in your answer; for example, $8!/3^{11}$ is a perfectly good form for an answer—but it is *not* the answer.

Hint: If you know the Taylor series for e^x, you can do this problem without computing derivatives of $(1+x)e^{-2x^2}$.