Math 107, Ledder **EXAM 3: 3/26/03** **Name** _____

Each part of each question is worth 6 points. **TA** _____

For full credit, show your work and report exact simplified answers.

1. Compute each integral or show that it diverges:

   (a) $\displaystyle\int_0^\infty \frac{1}{1+x^2}\,dx$

   (b) $\displaystyle\int_3^\infty \frac{\ln x}{\sqrt{x}}\,dx$

2. Compute each integral or show that it diverges:

   (a) $\displaystyle\int_0^2 \frac{e^{-\sqrt{x}}}{\sqrt{x}}\,dx$

(b) $\displaystyle\int_0^1 \frac{x}{2x^2-1}\,dx$

3. Use the tables to compute the following integrals:

(a) $\displaystyle\int x\sqrt{4-x^4}\,dx$

(b) $\displaystyle\int \frac{\sqrt{1-x}}{x}\,dx$

4. Determine if each of the following series converge or diverge.

   (a) $\displaystyle\sum_{k=1}^{\infty} \frac{k^2}{2k^{3/2}+1}$

   (b) $\displaystyle\sum_{k=0}^{\infty} \frac{2}{\sqrt{k^2+4}}$

5. Compute $\displaystyle\sum_{k=1}^{\infty} \frac{4}{2^k}$ or show that the series diverges.

6. Use the first term in the series $\displaystyle\sum_{k=1}^{\infty} \frac{1}{k^2}$ and the integral-test remainder estimates to determine upper and lower bounds for the series sum.