Name _____ Class Time _____

MATH 104 - QUIZ # 3
Spring 2003
Due Friday, April 11 at 2PM
Covers Sections 8.8, 10.1-10.6 of the textbook
Time: 60 minutes

Please show all work. Books, notes, calculators, are not permitted on this quiz. As part of your obligations under the Honor Code, do not discuss this quiz with anyone until after the Friday 2PM deadline.

WRITE OUT AND SIGN THE PLEDGE:
I pledge my honor that I have not violated the Honor Code during this examination.

1. *(10 points)* Determine whether the following converge or diverge. If they converge, evaluate.

(a) $\displaystyle\sum_{n=1}^{\infty} \frac{3^n + 2^{n+1}}{5^n}$

(b) $\displaystyle\int_0^1 x^2 \ln x \, dx$

2. *(15 points)*   Determine whether the following improper integrals converge or diverge. Justify your answers.

(a) $\displaystyle\int_1^\infty \frac{\sqrt{x^7 + 100x}}{x^5}\, dx$

(b) $\displaystyle\int_0^\infty \frac{\sqrt[6]{x}}{\sqrt{x} + x^4}\, dx$

(c) $\displaystyle\int_1^\infty \frac{(\ln x)\sin^2 x}{x^3 + 2}\, dx$

3. *(25 points)*   For each of the series below determine whether it converges or diverges. Justify your answers.

(a) $\displaystyle\sum_{n=1}^{\infty} \frac{n^2 + 5n}{(n+1)(n+2)(n+3)}$

(b) $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n \ln n}$

(c) $\displaystyle\sum_{n=1}^{\infty} \frac{n^2}{3^n}$

(Problem 3 continued. Determine whether the series converges or diverges and justify your answers)

(d) $\displaystyle\sum_{n=1}^{\infty} \left(\frac{n+1}{3n+6}\right)^n$

(e) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{\sqrt{n^3+1}}$