

GEORGIA TECH

SCHOOL OF MATHEMATICS

MATH 1512

## HONOR CALCULUS II

## Quiz # 2

September 1st, 2004

First Name : -----

Last Name : -----

1. What is

$$\lim_{n \rightarrow \infty} \frac{2^{n^2}}{n!} =$$

2. Compute

$$\lim_{n \rightarrow \infty} \frac{1}{n^2 + 1} + \frac{2}{n^2 + 2^2} + \cdots + \frac{n}{n^2 + n^2} =$$

3. What is

$$\liminf_{n \rightarrow \infty} (-1)^n \left[ 1 + \frac{1}{n} \right] =$$

4. Show that (*Hint : use the fundamental theorem of Calculus*)

$$\frac{1}{n+1} < \ln(n+1) - \ln n < \frac{1}{n}$$

5. Is the following sequence convergent (*Hint : is it monotone ?*)

$$x_{n+1} = \sqrt{x_n} \qquad 0 < x_0 < 1$$