MATH 1220-90 Fall 2011
Third Midterm Exam

INSTRUCTOR: H.-PING HUANG

LAST NAME _____

FIRST NAME _____

ID NO. _____

INSTRUCTION: SHOW ALL OF YOUR WORK. MAKE SURE YOUR ANSWERS ARE CLEAR AND LEGIBLE. USE **SPECIFIED** METHOD TO SOLVE THE QUESTION. IT IS NOT NECESSARY TO SIMPLIFY YOUR FINAL ANSWERS.

PROBLEM 1   20   _____

PROBLEM 2   20   _____

PROBLEM 3   20   _____

PROBLEM 4   20   _____

PROBLEM 5   20   _____

TOTAL   100   _____

PROBLEM 1

(20 pt) Consider the sequence

$$a_n = \frac{\ln(1/n)}{\sqrt{2n}}.$$

What is $\lim_{n\to\infty} a_n$?

PROBLEM 2

(20 pt) Use the Integral Test to decide the convergence or divergence of the following series:

$$\sum_{n=1} \frac{n}{e^n}.$$

PROBLEM 3

(20 pt) Decide the convergence or divergence of the following series:

$$\sum_{n=1}^{\infty} \frac{2(6)^n}{9^{2n}}$$

If it is convergent, find its sum. If not, prove it.

PROBLEM 4

(20 pt) Find the power series representation for

$$f(x) = \frac{1}{(1+x)^2}$$

and specify the radius of convergence.

PROBLEM 5

(20 pt) Find the power series representation for $f(x) = xe^{x^2}$. What is the set of convergence?