MATHEMATICS 201
SUMMER SEMESTER, 2000-01
Midterm

Time: 60 Minutes.

Date: July 30, 2001.

Name:————————————-

ID Number:————————————

Instructor: Prof. A. Lyzzaik

GRADE:	
PART I.	/50
PART II.	/15
PART II.	/15
PART IV.	/20
Total:	/100

I. Investigate for convergence or divergence the following series:

(1) $\sum_{n=1}^{\infty} \left\{ \frac{1}{n(\ln n)^2} \right\}^n$. (10 points)

(2) $\sum_{n=1}^{\infty} \frac{n + \ln n}{n^{5/2} + n^{3/2} + 1}$. (10 points)

(3) $\sum_{n=2}^{\infty} n^2 \sin(1/n) \tan(1/n)$. (10 points)

(4) $\sum_{n=1}^{\infty} \frac{1.3.5. \cdots (2n-1)}{n!}$. (10 points)

(5) $\sum_{n=1}^{\infty} \frac{(\ln n)^n}{n}$. (10 points)

II. Find the interval of convergence of the following power series; decide where the series converges absolutely or conditionally:

$$\sum_{n=1}^{\infty} (-1)^n \frac{(x-3)^n}{n+1}.$$

(15 points)

III. Show that the following series converges; approximate the sum of the series to four decimal places:

$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{n+1}{5^n}.$$

(15 points)

IV. Circle the correct answer in the following multiple-choice questions:

(5 points each)

1. The sum of the series

$$\sum_{n=1}^{\infty} \left\{ \frac{1}{8^n} + \frac{1}{n(n+1)} \right\}$$

is

(a) 7/8.
(b) 8/7.
(c) 9/8.
(d) 9/7.
(e) None of the above.

2. The approximate value correct to three decimal places of the definite integral

$$\int_0^{0.5} e^{-x^3}$$

is

(a) 0.8728.
(b) 0.8718.
(c) 0.8818.
(d) 0.8828.
(e) None of the above.

3. The Maclaurin's series of the indefinite integral

$$f(x) = \int_0^x \frac{\ln(1-t)}{t}\, dt$$

is

(a) $\sum_1^\infty \frac{x^n}{n^2}$.
(b) $\sum_1^\infty (-1)^n \frac{x^n}{n^2}$.
(c) $\sum_1^\infty -\frac{x^n}{n^2}$.
(d) $\sum_1^\infty \frac{x^n}{n}$.
(e) None of the above.

4. Which of the following statements is **TRUE?:**

(a) If $\lim_{n\to\infty} a_n = 0$, then $\sum a_n$ converges.

(b) If $\sum a_n$ and $\sum b_n$ diverge, then $\sum(a_n + b_n)$ may converge or diverge.

(c) If $\sum a_n$ is convergent and $\sum b_n$ is divergent, then $\sum(a_n + b_n)$ may converge or diverge.

(d) If $\sum a_n$ and $\sum b_n$ are both convergent, then $\sum(a_n/b_n)$ is convergent.

(e) None of the above is TRUE.