MATHEMATICS 201
FIRST SEMESTER, 1997-98
QUIZ 1

Time: 55 MINUTES.

Date: November 20, 1997.

Name:————————————-

ID Number:—————————

Section:——————————-

Circle Instructor's Name: Prof. H. Abu-Khuzam, Prof. A. Lyzzaik

GRADE:

1.

2.

3.

4.

5.

Total: /50

1. Investigate for convergence or divergence the following series:

(a) $\sum_{n=1}^{\infty} (\frac{2n}{2n+1})^{2n}$. (4 points)

(b) $\sum_{n=1}^{\infty} \frac{1+\cos n}{n^{3/2}}$. (4 points)

(c) $\sum_{n=2}^{\infty} \tan(1/\ln n)$. (4 points)

(d) $\sum_{n=1}^{\infty} ne^{-n^2}$. (4 points)

(e) $\displaystyle\sum_{n=1}^{\infty} \frac{(\ln n)^n}{n^{n/2}}$. (4 points)

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

2. Estimate the error of the approximation $\cos x = 1 - x^2/2$ for all values x, $|x| < 0.1$. (4 points)

3. Given the series $\sum_{n=1}^{\infty}[\frac{2}{n(n+1)}+\frac{3}{2^n}]$.

(a) Prove that the series converges. (4 points)

(b) Find the sum of the series. (4 points)

4. Given the power series $\sum_{n=2}^{\infty}(-1)^n \frac{x^n}{n\sqrt{\ln n}}$.

(a) Find the series radius and interval of convergence. (4 points)

(b) For what values of x the series (i) converges conditionally and (ii) absolutely. (3 points)

5. (a) Find the Maclaurin series of $\tan^{-1} x$. (4 points)

(b) Use (a) to find the sum $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n(\sqrt{3}/3)^{2n+1}}{(2n+1)}$. (3 points)