

MATHEMATICS 201
FIRST SEMESTER, 1999-2000
QUIZ 1

Time: 55 Minutes.

Date: November 13, 1999.

Name: _____

ID Number: _____

Section: _____

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

GRADE:

PART 1. /64

PART 2. /36

Total: /100

PART 1: Investigate for convergence or divergence the following series:

(1) $\sum_{n=1}^{\infty} \left(\frac{3n}{3n+1} \right)^n$. (9 points)

(2) $\sum_{n=1}^{\infty} \frac{(\ln n)^2}{n^{3/2}}$. (9 points)

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

(9 points)

(4) $\sum_{n=1}^{\infty} \frac{(n+2)!}{3^n (n!)^2}.$

(9 points)

(5) $\sum_{n=1}^{\infty} \frac{1}{[\ln^2(1/n)]^n}.$

(9 points)

6. Given the power series $\sum_{n=2}^{\infty} \frac{(-1)^n n!}{1.4.7. \cdots (3n-2)} x^n$.

(a) Find the series radius and interval of convergence. (15 points)

(b) For what values of x the series (i) converges conditionally and (ii) absolutely. (4 points)

PART 2: Circle the correct answer in the following multiple-choice questions: (9 points for each question)

7. The sum of the series

$$\sum_{n=2}^{\infty} \left[\frac{1}{n-1} - \frac{1}{n+1} \right]$$

is

- (a) $5/4$.
- (b) $3/2$.
- (c) 1 .
- (d) $7/4$.
- (e) None of the above.

8. The series whose n th term is $\frac{\cos n\pi}{n^{0.01}}$

- (a) converges absolutely.
- (b) converges conditionally.
- (c) the series is not alternating.
- (d) diverges.
- (e) None of the above.

9. The best magnitude of the error involved in using the sum of the first four terms to approximate the sum of the entire series

$$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{n^2}$$

is less than

- (a) 0.04.
- (b) 0.03.
- (c) 0.02.
- (d) 0.01.
- (e) None of the above.

10. Which of the following statements is **FALSE?**:

- (a) If $\sum a_n$ and $\sum b_n$ are both convergent, then $\sum(a_n + b_n)$ is convergent.
- (b) If $\sum a_n$ is convergent and $\sum b_n$ is divergent, then $\sum(a_n + b_n)$ is divergent.
- (c) If $\sum a_n$ converges, then $\lim_{n \rightarrow \infty} a_n = 0$.
- (d) If $\sum a_n$ and $\sum b_n$ are both divergent, then $\sum(a_n + b_n)$ is divergent.
- (e) None of the above.