

**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

**STUDENTS  
AT WORK**

...Together At Work

GRADE:

**PART 1.** /64

**PART 2.** /36

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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  $\sum_{n=2}^{\infty} \frac{(-1)^n n!}{1 \cdot 4 \cdot 7 \cdots (3n-2)} x^n$ .

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

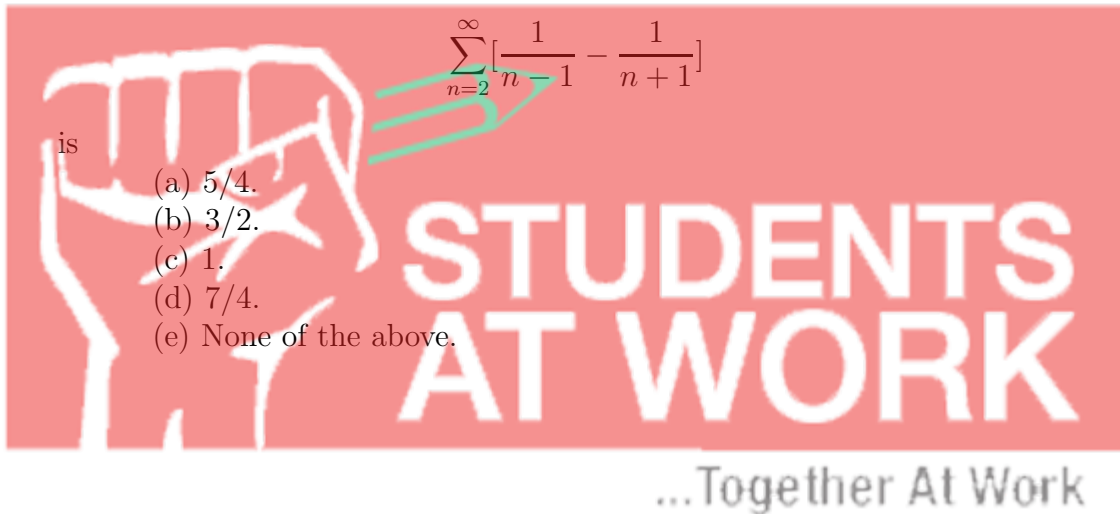


(b) For what values of  $x$  the series (i) converges conditionally and (ii) absolutely. (4 points)



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

7. The sum of the series



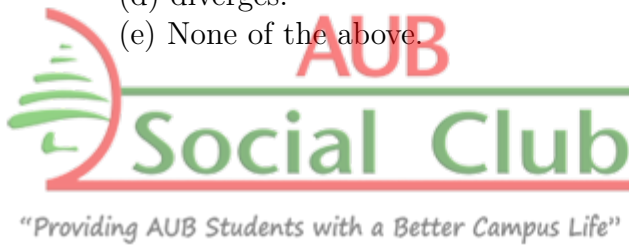
is

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

- (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.

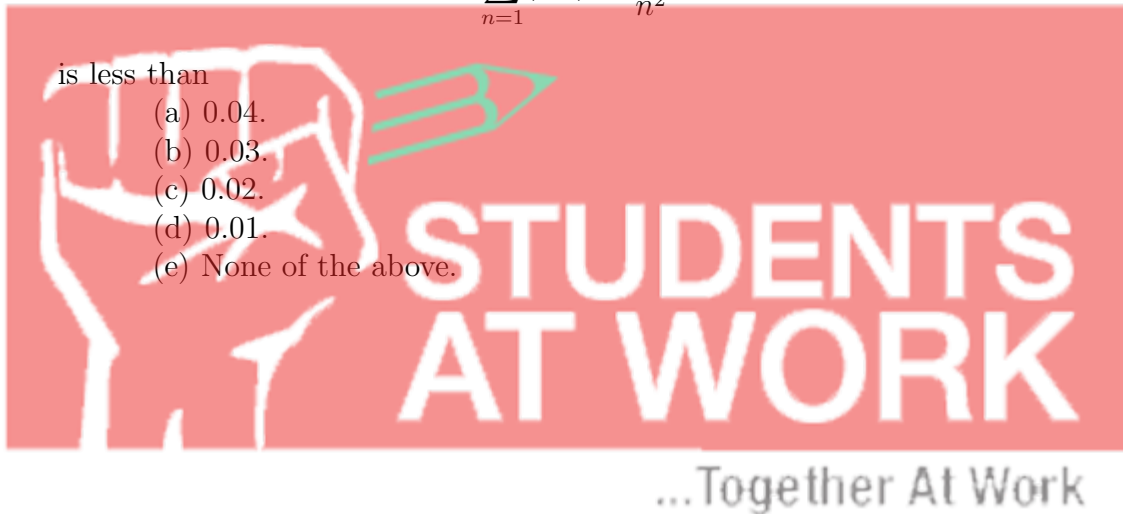


9. The best magnitude of the error involved in using the sum of the first four terms to approximate the sum of the entire series

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

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.

