

Math 21C

Test 1

Printed Name _____

(FIRST)

(LAST)

Signature _____

Please Show All Your Work, and Mark Your Answers Clearly.

No Calculators -- No Scratch Paper -- No Cell Phones

There are **4 pages** of problems. (The last problem is for extra credit.)

You are expected to do your own work, and to adhere to the UCD Code of Academic Conduct.

Be sure to use the limit symbol and summation sign where needed.

Please indicate clearly if you continue work on the back of a page.

If you finish the test during the last 10 minutes, please remain seated until the test papers have been collected from your row.

Be sure to stop working **immediately** when time is called; you are subject to a deduction from your test score if you do not.

① Show whether each of the following series converges or diverges.
(Justify your answers completely.)

a) $\sum_{n=1}^{\infty} \left(\frac{1}{4n} - \frac{9}{5^n} \right)$

8
PTS

b) $\sum_{n=1}^{\infty} \frac{n^2 + 8}{n^4 + 2n^3}$

8
PTS

c) $\sum_{n=1}^{\infty} \frac{(n+5)^9}{2^n}$

8
PTS

$$\textcircled{1} \text{ a) } \sum_{n=1}^{\infty} \frac{\sqrt{n} + 2}{n + 5\sqrt{n}}$$

17.2

9
PTS

$$\text{E) } \sum_{n=1}^{\infty} \left(\frac{2n+1}{2n+5} \right)^n$$

9
PTS

$$\text{F) } \sum_{n=1}^{\infty} \left(\frac{3n+8}{4n-3} \right)^n$$

9
PTS

2) FIND $\lim_{n \rightarrow \infty} \frac{(\ln n)^2}{n^3}$.

P.3

1
PTS

3) FIND THE SUM OF THE CONVERGENT SERIES $\sum_{n=1}^{\infty} \left(\frac{9}{2^n} + (-1)^{n+1} \frac{20}{3^{n-1}} \right)$.

9
PTS

4) DETERMINE IF EACH OF THE FOLLOWING SERIES CONVERGES ABSOLUTELY, CONVERGES CONDITIONALLY, OR DIVERGES. (JUSTIFY YOUR ANSWERS COMPLETELY.)

a) $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{n+1}{(n+6)^2}$

13
PTS

$$\textcircled{4} \text{ B) } \sum_{n=0}^{\infty} (-1)^n \frac{4^n n^8}{5^n - 3^n}$$

2.4

10
PTS

$$\text{C) } \sum_{n=1}^{\infty} (-1)^n \frac{n^n}{2^n (n+4)!}$$

12
PTS

$$\textcircled{5} \text{ FOR THE SERIES } \sum_{n=1}^{\infty} \frac{2n^2 + 4n + 1}{n^2 (n+1)^2},$$

FIND AND SIMPLIFY A FORMULA FOR S_n , AND THEN USE THIS TO FIND THE SUM OF THE SERIES (IF IT CONVERGES) OR TO SHOW THAT IT DIVERGES

13
PTS

(CATAA
(AC017))