

Math 126
Fall 1997
Test 3
Dec. 2, 1997

- This test runs for one hour.
- All work is to be your own.
- Calculators are not to be used.

Name: _____
Professor: Wong

Lab. Section # _____

Grading on this examination.
READ CAREFULLY BEFORE BEGINNING.

The two multiple choice questions are either correct or wrong. Please write the letter of the correct answer in the box provided. The remaining questions will require you to demonstrate knowledge of a correct procedure for arriving at the answer. Please circle the answer you want us to consider. The correct answer is not enough for full credit, you must indicate how you arrived at it; in particular, please specify which convergence tests you use. Please mark out any work on a problem that you do not want us to consider.

Score:

Please write your name and your Lab. section # at the top of this sheet. Write your name at the top of each subsequent sheet. If the name of your Professor is not the name at the top of this page, raise your hand.

Your Section # choices are:

#	Room	Time	Instructor	
01	184	Nieuwland	11:00 - 11:50	Jager
02	129	DeBartolo	12:55 - 1:45	Jager
03	184	Nieuwland	3:55 - 4:45	Vassiliev
04	140	DeBartolo	2:00 - 2:50	Jager
05	205	Cushing	2:00 - 2:50	Vassiliev
06	318	DeBartolo	9:30 - 10:20	Vassiliev

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

Total: _____

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1. (5pt) The Maclaurin series for $\sin(2x^2)$ starts off as:

(a) $2x^2 - \frac{4x^6}{3} + \frac{4x^{10}}{15} - \dots$

(b) $1 - \frac{2x^4}{2!} + \frac{2x^8}{4!} - \dots$

(c) $2x^2 - \frac{2x^6}{3!} + \frac{2x^{10}}{5!} - \dots$

(d) $1 - 2x^4 + \frac{2x^8}{3} - \dots$

(e) none of the above

2. (5pt) $\sum_{n=0}^{\infty} \frac{3}{(n+2)(n+3)} = ?$

(a) 0

(b) $\frac{1}{2}$

(c) 1

(d) $\frac{3}{2}$

(e) diverges

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3. (10pt) For each of the following series, does it converge or diverge? If it converges, identify the sum. Give reasons for your answers.

(a)
$$\sum_{n=0}^{\infty} (-1)^{n+1} \pi^{-n}.$$

(b)
$$\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}.$$

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4. (20pt) Determine whether each of the following series converges absolutely, converges conditionally, or diverges. Give reasons for your answers.

(a)
$$\sum_{n=0}^{\infty} \frac{(-1)^n}{3n-2}$$

(b)
$$\sum_{n=0}^{\infty} \frac{(-1)^n n}{3n^3-2}$$

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$$(c) \sum_{n=1}^{\infty} \left(\frac{3}{n}\right)^n$$

$$(d) \sum_{n=0}^{\infty} \frac{(-1)^n n^2}{\sqrt{n!}}$$

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5. (15pt) What is the interval of convergence of $\sum_{n=1}^{\infty} \frac{(2x)^n}{n^2}$?

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6. (15pt) Find the Taylor series for $f(x) = x^2 + e^x$ about $x = 1$.

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7. (15pt) Express $\int_0^1 e^{-x^2} dx$ as an infinite series. How accurate an estimate do you get from the first four terms of this series? (You may express your answer as a decimal or a fraction.)

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8. (15pt) Use the binomial theorem to evaluate

$$\lim_{x \rightarrow 0} \frac{(1 + x^2)^{3/4} - (1 + \frac{3}{4}x^2)}{x^4}.$$