MATH 1242 – CALCULUS II

Fall 2019

COMMON FINAL EXAMINATION

UNC CHARLOTTE
Department of Mathematics and Statistics

Last Name: _____ First Name: _____
(Please PRINT) (Please PRINT)

Student ID #: _____ Instructor: _____ Section: _____

PART II

- Part II consists of 12 multiple choice problems. After you have handed in part I and your exam proctor announces that calculator may be used, you may use your calculator on this part of the exam. (Texas Instruments 83 or 84 or equivalent models of other brands are allowed. TI Inspire, TI 89 or equivalent calculators are NOT allowed on this exam.)
- You must use a pencil with soft black lead (#2 or HB) to indicate your answers on the Opscan sheet.
- For each question, choose the response which best fits the question.
- If you wish to change an answer, make sure that you completely erase your old answer and any extraneous marks.
- There is no penalty for guessing.
- If you mark more than one answer to a question, that question will be marked as incorrect.
- You may perform your calculations on the test itself or on scratch paper, but do not make any stray marks on the Opscan sheet.
- Make sure that your name appears on the Opscan sheet and that you fill in the circles corresponding to your name in the format Last, First.
- At the end of the exam you must hand in all test material including the test booklets, Opscan sheet and scratch paper.

Part II (MULTIPLE CHOICE, CALCULATORS ALLOWED).

1. Which of the following best approximates the length of the curve $y = e^{2x}$ on the interval $[0, 1]$? (Use your calculator to evaluate the integral involved.)

(a) 6.49

(b) 14.40

(c) 2.00

(d) 3.39

(e) 3.19

2. Which of the following series converges conditionally but not absolutely?

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

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

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

(d) $\sum_{n=0}^{\infty}(-1)^n \ln(n+1)$

(e) $\sum_{n=0}^{\infty}(-1)^n$

3. Let $f(x) = x^4$. What is the average value of f on $[-2, 2]$?

(a) 8.0

(b) 51.2

(c) 0

(d) 3.2

(e) 12.8

4. The geometric series $3 - \frac{6}{5} + \frac{12}{25} - \frac{24}{125} + \cdots$

(a) converges to $\frac{3}{5}$.

(b) converges to $\frac{15}{7}$.

(c) converges to $\frac{2}{5}$.

(d) converges to 6.

(e) diverges.

5. Which of the following tests successfully determines whether the series $\sum_{n=1}^{\infty} \frac{n^2}{2n^2+5}$ converges or diverges?

(a) the test for divergence

(b) the ratio test

(c) the comparison test with the series $\sum_{n=1}^{\infty} \frac{1}{n^3}$

(d) the comparison test with the series $\sum_{n=1}^{\infty} \frac{1}{n^2}$

(e) the comparison test with the series $\sum_{n=1}^{\infty} n$

6. Find C in the partial fractions decomposition $\frac{8x+1}{x(x+1)^2} = \frac{A}{x} + \frac{B}{x+1} + \frac{C}{(x+1)^2}$.

(a) 0

(b) 2

(c) 7

(d) 3

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

7. In the Taylor expansion of $f(x) = x^8 - 100x^2 + 5$ about $a = -1$, what is the coefficient of $(x+1)^3$?

(a) $\frac{1}{6}$

(b) -56

(c) 75

(d) 100

(e) -50

8. Let $a_n = \dfrac{e^n}{n^2}$. Which of the following is true about the sequence $\{a_n\}$?

(a) The sequence converges to 0.

(b) The sequence converges to 1.

(c) The sequence converges to 2.

(d) The sequence diverges to infinity.

(e) The sequence diverges, but not to infinity.

9. A 50 pound cable (with uniformly distributed weight) is 50 feet long and hangs from the top of a tall building. How much work is done is pulling the cable to the top of the building?

(a) 100 ft-lbs.

(b) 50 ft-lbs.

(c) 1250 ft-lbs.

(d) 75 ft-lbs.

(e) 62,500 ft-lbs.

10. Consider the following table of values for the function f:

x	0	0.5	1.0	1.5	2.0
$f(x)$	2	3	-1	3	6

Use Simpson's rule with 4 subintervals of equal width to approximate $\int_0^2 f(x)\,dx$.

(a) 30

(b) 15

(c) 10

(d) 8

(e) 5

11. Find the area of the region in the first quadrant completely enclosed by the curves $y = x^3$ and $y = 4x$.

(a) 10

(b) 8

(c) 6

(d) 4

(e) 2

12. Of these series: (1) $\sum_{n=1}^{\infty} \frac{\sin^2(n)}{n^{3/2}}$, (2) $\sum_{n=1}^{\infty} \frac{\ln(n)}{n}$, (3) $\sum_{n=1}^{\infty} \frac{n}{n^2+100}$, and (4) $\sum_{n=1}^{\infty} \frac{n+100}{n^3+1}$, how many converge?

(a) none of them

(b) exactly one of them

(c) exactly two of them

(d) exactly three of them

(e) all four of them