MATH 1242 – CALCULUS II   FALL 2018

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. Find the interval of convergence for the power series $\displaystyle\sum_{n=1}^{\infty} \frac{(x-1)^n}{n^2}$.

(a) $(-1, 1)$

(b) $(-1, 1]$

(c) $[-1, 1]$

(d) $[0, 2]$

(e) $(0, 2]$.

2. A particle moves along the x-axis so that its velocity at time t is $\cos(t)$ cm/s. Which of the following is the best approximation of the average velocity of the particle during the time period $0 \le t \le \pi/2$?

(a) 0 cm/s

(b) 1 cm/s

(c) 0.64 cm/s

(d) -1 cm/s

(e) -0.64 cm/s

3. If $\dfrac{x+3}{x^2-1} = \dfrac{A}{x-1} + \dfrac{B}{x+1}$, then $B =$

(a) 1

(b) -1

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

(d) 0

(e) $-\frac{1}{2}$

4. Which of the statements below is true for the series $\sum_{n=0}^{\infty} \frac{(-2)^n}{3^{n+1}}$?

(a) The series diverges to ∞.

(b) The series diverges, but not to ∞.

(c) The series converges to $\frac{3}{5}$.

(d) The series converges to 3.

(e) The series converges to $\frac{1}{5}$.

5. Which of the following best approximates the length of the curve $y = \ln(x)$ on the interval $[1, 2]$? (Use your calculator to evaluate the integral involved.)

(a) 1.09

(b) 1.17

(c) 3.41

(d) 1.22

(e) 1.30

6. If a force of 10 N is required to hold a spring that has been stretched from its a natural length of 10 cm to a length of 15 cm, how much work is done in stretching the spring from its natural length to 20 cm?

(a) 1 J

(b) 2 J

(c) 3 J

(d) 4 J

(e) 5 J

7. Which of the following is the Maclaurin expansion of e^{x^2}?

(a) $1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \cdots$

(b) $1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \cdots$

(c) $1 + x^2 + \frac{x^4}{2!} + \frac{x^6}{3!} + \cdots$

(d) $1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots$

(e) $1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + \cdots$

8. Let $a_n = \frac{n^3+1}{2n^2+1}$. 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 converges to $\frac{1}{2}$.

(e) The sequence diverges.

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

(a) 0

(b) 10

(c) 20

(d) 40

(e) 60

10. The series $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n}{n^2+1} = 1 - \frac{1}{2} + \frac{1}{5} - \frac{1}{10} + \cdots$

(a) diverges.

(b) converges to a number less than 0.5.

(c) converges to a number greater than 0.5 and less that 0.6.

(d) converges to a number greater than 0.6 and less that 0.7.

(e) converges to a number greater than 0.7.

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

(a) 2

(b) 4

(c) 6

(d) 8

(e) 10

12. Only one of the following series converges. Which one?

(a) $\displaystyle\sum_{n=0}^{\infty} \sin(n)$

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

(c) $\displaystyle\sum_{n=0}^{\infty} (-1)^n \sqrt{n}$

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

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