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: _____

This exam is divided into three parts. **NO calculators may be used on part I or during the first hour of the exam.** You may start working on parts II and III of the exam within the first hour, but you cannot use your calculator during this time. You may use your calculator ONLY after your exam proctor has announced that calculators are allowed on Parts II and III. (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.)

PART I

- Part I consists of 15 multiple choice problems. These problems must be answered without the use of a calculator.
- 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 sheets.
- 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 I (MULTIPLE CHOICE, NO CALCULATORS).

1. $\int_0^2 x^3\,dx =$

(a) 16

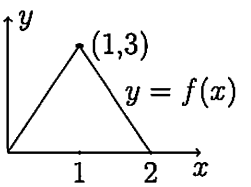
(b) 8

(c) 4

(d) 2

(e) 0

2. Consider the graph of the function f on $[0,2]$:



$\int_0^2 f(x)\,dx =$

(a) 0

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

(c) 3

(d) 4

(e) 6

3. $\int \sin^2(x)\cos(x)\,dx =$

(a) $\frac{1}{3}\sin^3(x) + C$

(b) $\sin(x) + C$

(c) $\sin^2(x) + C$

(d) $\frac{1}{2}\sin^2(x) + C$

(e) $\sin(x)\cos(x) + C$

4. $\int_0^1 e^{-x}\,dx =$

(a) a divergent improper integral

(b) $1 - e^{-1}$

(c) $e^{-1} - 1$

(d) e^{-1}

(e) $-e^{-1}$

5. $\int \sin(4x)\,dx =$

(a) $\sin(4x) + C$

(b) $-\cos(4x) + C$

(c) $\frac{1}{4}\sin(4x) + C$

(d) $-\frac{1}{4}\cos(4x) + C$

(e) $-4\cos(4x) + C$

6. $\displaystyle\int_1^\infty \frac{dx}{x^3} =$

(a) a divergent improper integral

(b) 4

(c) 2

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

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

7. 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	0	6

Use a left Riemann sum with 4 subintervals of equal width to approximate $\int_0^2 f(x)\,dx$.

(a) $\frac{5}{2}$

(b) 5

(c) 2

(d) 4

(e) 9

8. $\int_0^2 te^t\,dt =$

(a) $2e^2 - 2$

(b) $-2e^2$

(c) $2e^2$

(d) $2e^2 + 2$

(e) $e^2 + 1$

9. Let $f(u) = \int_1^u \sqrt{x^3+2}\,dx$. Then $f'(2) =$

(a) $3\sqrt{2}$

(b) $3\sqrt{2} - \sqrt{3}$

(c) $\frac{6}{\sqrt{10}}$

(d) $\sqrt{10}$

(e) $\sqrt{10} - \sqrt{2}$

10. The region in the first quadrant bounded by the curves $y = x^2$, $x = 1$, and $y = 0$ is rotated about the x-axis. What is the volume of the resulting solid?

(a) $\frac{1}{5}$

(b) $\frac{\pi}{5}$

(c) $\frac{1}{3}$

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

(e) 1

11. $\int_0^1 x(x^2+1)^3\,dx =$

(a) 0

(b) 1

(c) $\frac{15}{8}$

(d) 2

(e) $\frac{15}{4}$

12. $\displaystyle\int_a^b \frac{2\ln(x)}{x}\,dx =$

(a) $\frac{1}{2}(\ln^2(b) - \ln^2(a))$

(b) $\ln^2(b) - \ln^2(a)$

(c) $2(\ln^2(b) - \ln^2(a))$

(d) $\frac{1}{3}(\ln^3(b) - \ln^3(a))$

(e) $\frac{2}{3}(\ln^3(b) - \ln^3(a))$

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

(a) the divergence test

(b) comparison with the terms of the series $\sum_{n=1}^{\infty} \frac{1}{n}$

(c) comparison with the terms of the series $\sum_{n=1}^{\infty} \frac{1}{n^2}$

(d) the ratio test

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

14. $\int \frac{ds}{s^2+4s+5} =$

(a) $\ln(s-1) + \ln(s+5) + C$

(b) $\ln(s+1) - \ln(s+5) + C$

(c) $\ln(s+1) - \ln(s-5) + C$

(d) $\ln(s+1) + \ln(s-5) + C$

(e) $\tan^{-1}(s+2) + C$

15. Which of the following statements is correct?

(a) $\int \ln^5(x)\,dx = \frac{1}{6}\ln^6(x) + C$

(b) $\int \ln^5(x)\,dx = \frac{1}{6}x\ln^6(x) + C$

(c) $\int \ln^5(x)\,dx = \frac{5\ln^4(x)}{x} + C$

(d) $\int \ln^5(x)\,dx = x\ln^5(x) - \int 5\ln^4(x)\,dx$

(e) $\int \ln^5(x)\,dx = \ln^6(x) + C$