# MATH 1241 – CALCULUS I          FALL 2018

## COMMON FINAL EXAMINATION

◆

**UNC CHARLOTTE**
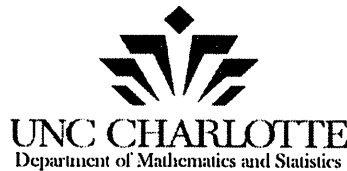Department of Mathematics and Statistics

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. Use of cell phones/smart phones is prohibited at all times.** 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 13 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.

1. Let $f(x) = 3x^2 - 2x + 1$. Evaluate $f'(1)$.
(a) 3
(b) 4
(c) 5
(d) 6
(e) 7

2. Let $F(x) = \frac{16}{x^2}$. Find $F'(2)$.

(a) 0

(b) $-2$

(c) $-4$

(d) 2

(e) 4

3. Let $h(x) = \sqrt{5x^2 - 1}$. Find $h'(1)$.
(a) $\frac{1}{4}$
(b) $\frac{1}{5}$
(c) $\sqrt{10}$
(d) $\frac{5}{2}$
(e) 5

4. Let $g(x) = tan(3x)$. Find $g'(x)$.
(a) $sec(3x)tan(3x)$
(b) $3sec(3x)tan(3x)$
(c) $sec^2(3x)$
(d) $3\,sec^2(3x)$
(e) $sec^2(3)$

5. Let $G(x) = (e^{2x} + 4x)^3$. Find $G'(x)$.
(a) $3(e^{2x} + 4x)^2(e^{2x} + 4)$
(b) $3(e^{2x} + 4x)^2(e^{2x} + 4)2$
(c) $3(e^{2x} + 4x)^2(2e^{2x} + 4)$
(d) $3(2e^{2x} + 4)^2$
(e) None of the above

6. Find an equation of the line tangent to the graph of $f(x) = 4x^2 + 2x - 3$ at the point where $x = 1$.
(a) $y = 10x - 7$
(b) $y = 8x - 5$
(c) $y = 5x + 3$
(d) $y = 8x + 2$
(e) $y = 10x - 10$

7. On which interval below is the graph of $g(x) = x^2 e^{-2x}$ increasing? (Choose the largest interval possible.)
(a) $(0, 1)$
(b) $(0, 2)$
(c) $(1, \infty)$
(d) $(-\infty, 0)$
(e) $(-\infty, 2)$

8. The graph of $f(x) = x^3 + kx^2 + 4x - 5$ has an inflection point at $x = -1$. What is the value of the number $k$?
(a) 1
(b) 2
(c) 3
(d) 4
(e) 5

9. Let $f(x) = ln(\frac{4x^2-3}{2x-1})$. Evaluate $f'(1)$
(a) 0
(b) 2
(c) 4
(d) 6
(e) 8

10. Evaluae $\lim\limits_{x \to 3} \frac{x^2+2x-15}{x-3}$
(a) The limit does not exist.
(b) 2
(c) 4
(d) 6
(e) 8

11. Evaluate $\lim\limits_{x \to \infty} \frac{9-3x}{x^2+9x+3}$ .

(a) The limit does not exist

(b) 0

(c) 9

(d) $-3$

(e) $-\infty$

12. Let $y = \frac{x}{2x-1}$. Evaluate the differential $dy$ when $x = 1$ and $dx = 0.2$.

(a) $dy = -0.4$

(b) $dy = -0.2$

(c) $dy = 0$

(d) $dy = 0.1$

(e) $dy = 0.5$

13. Find the general antiderivative of $g(x) = \frac{4}{x^2} + 3sin(x)$

(a) $4\,ln|x^2| + 3cos(x) + C$

(b) $4\,ln|x^2| - 3cos(x) + C$

(c) $\frac{4x}{(x^3/3)} + 3\,cos(x) + C$

(d) $\frac{4x}{(x^3/3)} - 3\,cos(x) + C$

(e) $-\frac{4}{x} - 3cos(x) + C$