

MA 161
EXAM 2 GREEN
October 20, 2016

NAME _____ YOUR TA'S NAME _____

STUDENT ID # _____ RECITATION TIME _____

1. You must use a #2 pencil on the scantron sheet (answer sheet).
2. Be sure the paper you are looking at right now is GREEN!
3. Write the following in the TEST/QUIZ NUMBER boxes (and blacken in the appropriate spaces below the boxes):

01
4. On the scantron sheet, fill in your TA's name and the course number.
5. Fill in your NAME and 10-digit STUDENT IDENTIFICATION NUMBER and blacken in the appropriate spaces. Note that your PUID MUST start with TWO zeroes to be registered properly here.
6. Fill in your four-digit SECTION NUMBER. If you do not know your section number, please ask your TA.
7. Sign the scantron sheet.
8. Fill in your name, etc. on this paper (above).
9. There are 12 questions, each worth 8 points (you will automatically earn 4 points for taking the exam). Blacken in your choice of the correct answer in the spaces provided for questions 1–12. Do all your work on the question sheets.
10. Turn in both the scantron sheets and the question sheets when you are finished.
11. If you finish the exam before 8:50, you may leave the room after turning in the scantron sheet and the exam booklet. You may not leave the room before 8:20.
If you don't finish before 8:50, you MUST REMAIN SEATED until your TA comes and collects your scantron sheet and your exam booklet.
12. NO CALCULATORS, PHONES, BOOKS, OR PAPERS ARE ALLOWED. Use the back of the test pages for scrap paper.

Exam Rules

1. Students may not open the exam until instructed to do so.
2. Students must obey the orders and requests by all proctors, TAs, and lecturers.
3. No student may leave in the first 20 min or in the last 10 min of the exam.
4. Books, notes, calculators, or any electronic devices are not allowed on the exam, and they should not even be in sight in the exam room. Students may not look at anybody else's test, and may not communicate with anybody else except, if they have a question, with their TA or lecturer.
5. After time is called, the students have to put down all writing instruments and remain in their seats, while the TAs will collect the scantrons and the exams.
6. Any violation of these rules and any act of academic dishonesty may result in severe penalties. Additionally, all violators will be reported to the Office of the Dean of Students.

I have read and understand the exam rules stated above:

STUDENT NAME: _____

STUDENT SIGNATURE: _____

1. If $y = (x^2 - 1)(2x + 1)^2$, then $\frac{dy}{dx} =$

A. $2(2x + 1)(3x^2 + x - 1)$

B. $8x(2x + 1)$

C. $2(2x + 1)(x + 2)$

D. $2(2x + 1)(4x^2 + x - 2)$

E. $(2x + 1)(10x^2 - 4)$

2. If $y = \sqrt{\sin 3x}$, then $y' =$

A. $\frac{1}{2\sqrt{\sin 3x}}$

B. $3\sqrt{\cos 3x}$

C. $\frac{3 \cos 3x}{2\sqrt{\sin 3x}}$

D. $\frac{3}{2}\sqrt{\sin 3x \cos 3x}$

E. $\frac{3}{2\sqrt{\cos 3x}}$

3. Find the slope of the tangent line to the curve

$$\sin(x + y) = xy$$

at the point $(0, 0)$.

- A. 0
- B. 1
- C. -1
- D. $\frac{1}{2}$
- E. It does not exist.

4. Suppose $g(e) = 4$ and $g'(e) = 2$. If $y = x^{g(x)}$, then what is y' at $x = e$?

- A. $\frac{4}{e} + 2e^4$
- B. $4e^3$
- C. $8e^3$
- D. $2e^4 + 4e^3$
- E. $\frac{4}{e}$

5. A certain bacteria culture grows at a rate proportional to its size and has a doubling time of two hours. How long does it take for the population to triple (i.e. grow to three times its initial size)?

A. 3 hours

B. $2 \ln \left(\frac{3}{2} \right)$ hours

C. $\frac{3 \ln 2}{\ln 3}$ hours

D. $\frac{3}{2} \ln 2$ hours

E. $\frac{2 \ln 3}{\ln 2}$ hours

6. If $f(x) = \frac{x}{x+1}$, then $f''(1) =$

A. 0

B. 1

C. -1

D. $\frac{1}{4}$

E. $-\frac{1}{4}$

7. If $f(x) = x^2 e^{2x} \ln x$, then $f'(1) =$

- A. e^2
- B. $2e^2$
- C. $4e^2$
- D. $2 + 2e^2$
- E. $2 + 2e^2 + e$

8. If $0 < x < \frac{1}{2}$, then $\sec(\sin^{-1} 2x) =$

- A. $\frac{1}{\sqrt{1-4x^2}}$
- B. $\frac{1}{\sqrt{1+4x^2}}$
- C. $\sqrt{1+4x^2}$
- D. $\frac{2x}{\sqrt{1-4x^2}}$
- E. $\frac{\sqrt{1-4x^2}}{2x}$

9. Evaluate $\lim_{x \rightarrow 0} \frac{\sin 2x}{x(2 + \sin x)^4}$.

A. $\frac{1}{16}$

B. $\frac{1}{8}$

C. $\frac{1}{2}$

D. 2

E. ∞

10. If $y = (\cos x)^4$, what is $\frac{dy}{dx}$ when $x = \frac{4\pi}{3}$?

A. $\frac{-3\sqrt{3}}{4}$

B. $\frac{-\sqrt{3}}{4}$

C. $\frac{1}{4}$

D. $\frac{\sqrt{3}}{4}$

E. $\frac{3\sqrt{3}}{4}$

11. A ball is thrown vertically upward at a velocity of 10 ft/sec from a point 5 ft above the surface of an alien planet. Its height (in feet) after t seconds is

$$s(t) = 5 + 10t - 40t^2.$$

Which of the following statements are true?

- I. The ball is slowing down when $0 < t < 1/2$.
 - II. The ball returns to the surface with a speed of 30 ft/sec.
 - III. The acceleration is a constant -80 ft/sec².
- A. Only one of the statements is true.
 - B. I and II
 - C. I and III
 - D. II and III
 - E. All three statements are true.

12. The line tangent to the curve $y = \frac{1}{x^2}$ at $(1, 1)$ crosses the x -axis at $x =$

- A. $\frac{1}{2}$
- B. $\frac{3}{2}$
- C. 2
- D. $\frac{5}{2}$
- E. 4