

MA 161
EXAM 1 GREEN
September 22, 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 $f(x) = e^{3+\sqrt{x}}$, then $f^{-1}(x) =$

A. $(\ln x)^2 - 3$

B. $\frac{1}{2} \ln x - 3$

C. x^2/e^3

D. $\frac{1}{2} \ln x + 3$

E. $(-3 + \ln x)^2$

2. The domain of the function $f(x) = \ln(2 - \sqrt{x})$ is

A. $[0, \infty)$

B. $[4, \infty)$

C. $[0, \sqrt{2})$

D. $[0, 4)$

E. $(-\infty, 4]$

3. Let $f(x) = x^2 - x$. Find the difference quotient $\frac{f(2+h) - f(2)}{h}$.

- A. $h + 1$
- B. $2h - 1$
- C. $h + 3$
- D. $h^2 - h - 2$
- E. $h^2 + 1$

4. Find a value for the constant c that makes $f(x)$ continuous for all values of x .

$$f(x) = \begin{cases} 6 & \text{if } x = 9 \\ \frac{x+c}{\sqrt{x}-3} & \text{if } x \neq 9 \end{cases}$$

- A. $c = 3$
- B. $c = -9$
- C. $c = 6$
- D. $c = -3$
- E. No value of c will make the function f continuous everywhere.

5. Suppose $f(x) = \frac{x^3 + 1}{x^2 + x}$. Then

- A. $\lim_{x \rightarrow 0^-} f(x) = -\infty$ and $\lim_{x \rightarrow -\infty} f(x) = -\infty$.
- B. $\lim_{x \rightarrow 0^-} f(x) = \infty$ and $\lim_{x \rightarrow -\infty} f(x) = \infty$.
- C. $\lim_{x \rightarrow 0^-} f(x) = \infty$ and $\lim_{x \rightarrow -\infty} f(x) = -\infty$.
- D. $\lim_{x \rightarrow 0^-} f(x) = -\infty$ and $\lim_{x \rightarrow -\infty} f(x) = \infty$.
- E. None of the above.

6. The limit

$$\lim_{h \rightarrow 0} \frac{\cos(h^2) - 1}{h}$$

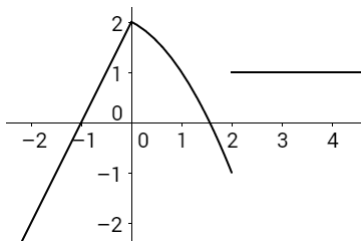
represents $f'(a)$, the derivative of some function f at some number a . Find such an f and a .

- A. $f(x) = \cos(x^2)$, $a = 1$
- B. $f(x) = \cos x$, $a = 0$
- C. $f(x) = \cos x$, $a = 1$
- D. $f(x) = \cos(x^2)$, $a = 0$
- E. None of the above.

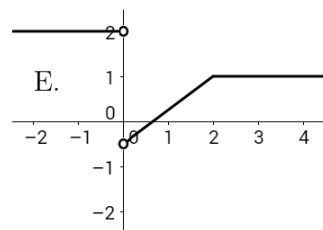
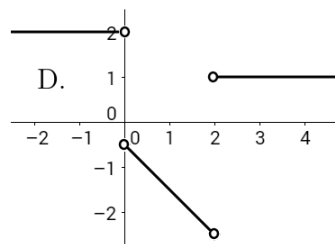
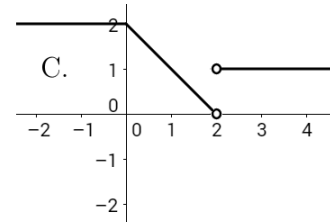
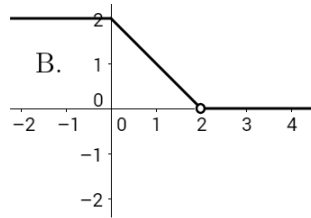
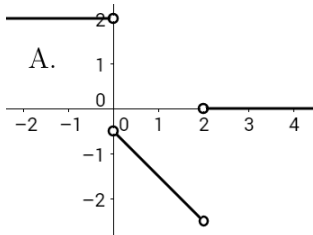
7. Solve $\ln(x+1) - \ln x = 1$ for x . $x =$

- A. $\frac{e}{e-1}$
- B. $\frac{1}{e-1}$
- C. $\frac{e-1}{e}$
- D. $\frac{1-e}{e}$
- E. $\frac{1}{1-e}$

8. Here is the graph of f :



Find the graph of f' , its derivative.



9. Compute the limit: $\lim_{x \rightarrow -1^+} \frac{x - 4}{x^2(x + 1)}$.

- A. 0
- B. -1
- C. 1
- D. ∞
- E. $-\infty$

10. Compute the limit: $\lim_{x \rightarrow 3} \frac{x - 3}{x^2 - x - 6}$. Which interval is the answer in?

- A. $(-3, -2)$
- B. $(-2, -1)$
- C. $(-1, 0)$
- D. $(0, 1)$
- E. The limit does not exist.

11. The graph of $y = 2^x$ is moved horizontally 3 units to the right and then reflected across the x axis. What function has this as its graph?

- A. $y = 2^{x-3}$
- B. $y = 2^{-x+3}$
- C. $y = -2^{x-3}$
- D. $y = 2^{-x-3}$
- E. $y = -2^{x+3}$

12. If $f(x)$ satisfies the inequality $x+1 \leq f(x) \leq e^x$ for all x , which of the following statements must be true?

- 1. $f(x)$ is continuous at $x = 0$.
- 2. $\lim_{x \rightarrow \infty} f(x) = \infty$.
- 3. $\lim_{x \rightarrow -\infty} f(x) = -\infty$.
- 4. $\lim_{x \rightarrow -\infty} f(x) = 0$.

- A. 1 and 2
- B. 2 and 3
- C. 2 and 4
- D. 1 and 3
- E. 1 and 4