MA 16100
EXAM 1 (Version 1 - Green)
(September 23, 2021)

NAME _____ YOUR TA's NAME _____

PUID # _____ RECITATION TIME _____

Write the following in the TEST/QUIZ NUMBER boxes: **11** (and blacken the appropriate digits below the boxes). You must use a #2 pencil on the mark-sense sheet (answer sheet). On the mark-sense sheet, fill in your TA's NAME and the COURSE number. Fill in YOUR NAME and PUID NUMBER and blacken the appropriate spaces. Fill in your four-digit SECTION NUMBER. If you do not know your section number, ask your TA. Sign the mark-sense sheet.

There are **12** questions, each worth 8 points. You automatically earn 4 points for taking the exam, for a total of 100 points. Blacken in your choice of the correct answer in the spaces provided for questions 1-12. Do all your work in the exam booklet. Use the back of the test pages for scrap paper. Turn in both the mark-sense sheet and the exam booklet when you are finished.

If you finish the exam before 8:50pm you may leave the room after turning in the mark-sense sheet and exam booklet. You may not leave the room before 8:20pm. If you don't finish before 8:50pm you MUST REMAIN SEATED until your TA comes and collects your mark-sense sheet and your exam booklet.

EXAM POLICIES

1. Students may not open the exam until instructed to do so
2. Students must obey the orders and requests by all proctors, TA, 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 mark-sense sheets and 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. Find the domain of $f(x) = \dfrac{\sqrt{1-\ln(x)}}{1-x^2}$

   A. $(0,1) \cup (1,e]$
   B. $(0,e]$
   C. $(-1,1)$
   D. $(1,e]$
   E. $(-1,e]$

2. Consider the functions $f(x) = x^2 + 3$, $g(x) = \dfrac{1}{7x-1}$, and $h(x) = \ln x$.
   Find the function $y(x) = g \circ f \circ h$

   A. $y(x) = \dfrac{1}{(7\ln x - 1)^2} + 3$

   B. $y(x) = [\ln(7x-1)]^2 + 3$

   C. $y(x) = \dfrac{1}{7[\ln x]^2 + 20}$

   D. $y(x) = \dfrac{1}{7\ln(x^2+3) - 1}$

   E. $y(x) = -\ln(7x^2 + 20)$

3. If $\log_b x = 4$ and $\log_b y = 9$, evaluate $\log_b \left(\dfrac{x^2 y^{1/3}}{\sqrt{x}} \right)$

A. 11
B. 6
C. 12
D. 9
E. 10

4. If $f(x) = \dfrac{5}{e^x + 1}$, find $f^{-1}(2)$.

A. $\ln(1.3)$
B. $\ln(1.4)$
C. $\ln(1.2)$
D. $\ln(1.1)$
E. $\ln(1.5)$

5. How many values of θ in the interval $[0, 2\pi]$ satisfy the following equation?

$$12\cos^2\theta - 3 = 0$$

A. 2

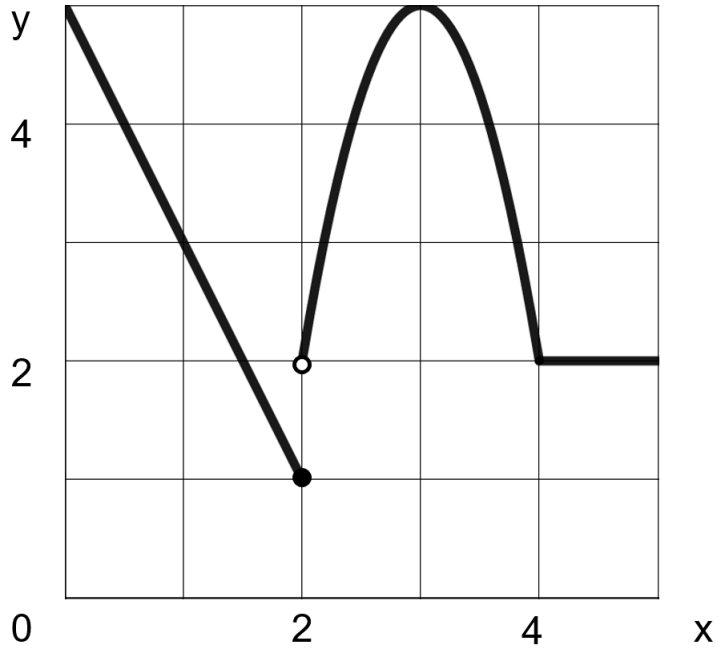
B. 0

C. 1

D. 4

E. 3

6. For the function $f(x)$ graphed below, which of the following statements are true?



I. $f(2)$ is defined

II. $\lim_{x\to 2} f(x) = 1$

III. $\lim_{x\to 2^-} f(x) = 1$

IV. $\lim_{x\to 2} f(x)$ exists

A. I, II, and IV only

B. I and III only

C. All of them

D. I and IV only

E. I, III, and IV only

7. Find the limit:

$$\lim_{x\to 2} \frac{x-2}{\sqrt{3x+10}-4}$$

A. 8

B. The limit does not exist

C. $\frac{8}{3}$

D. $\frac{20}{3}$

E. 0

8. Find the limit:

$$\lim_{x\to 4} \frac{-(x+1)^2+25}{x-4}$$

A. -10

B. 2

C. The limit does not exist

D. -5

E. 10

9. Find the limit:

$$\lim_{h\to 0} \frac{\frac{1}{8+h} - \frac{1}{8}}{h}$$

A. $-\dfrac{1}{16}$

B. $-\dfrac{1}{32}$

C. $-\dfrac{1}{128}$

D. $-\dfrac{1}{8}$

E. $-\dfrac{1}{64}$

10. Find the limit:

$$\lim_{x\to 4^+} \frac{x^2 - 7x + 10}{x - 4}$$

A. $-\infty$

B. 2

C. 0

D. ∞

E. 5

11. Find the value of c such that f is continuous at $x = 3$:

$$f(x) = \begin{cases} \dfrac{x^2 - c}{x - 3}, & \text{if } x \neq 3 \\ \\ 6, & \text{if } x = 3 \end{cases}$$

A. $c = 12$

B. $c = 6$

C. Such a c does not exist

D. $c = 9$

E. $c = 3$

12. Let $f(x) = 3x^2 + 2x + 5$. Use the definition of the derivative to find $f'(1)$. When you simplify the terms inside the limit, you get:

A. $f'(1) = \lim_{h \to 0} (8 + h)$

B. $f'(1) = \lim_{h \to 0} (8 + 3h)$

C. $f'(1) = \lim_{h \to 0} (8 + 5h)$

D. $f'(1) = \lim_{h \to 0} (8 + 2h)$

E. $f'(1) = \lim_{h \to 0} (8 + 4h)$